Perspectives in Public Health

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EDITORIAL

The editor is not the author: artificial intelligence and public health publishing

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Like me, you may have been imagining the potential impact that artificial intelligence (AI) might have on public health in the future. Rather than writing about my speculations, I thought it best to ask ChatGPT about the risks and the benefits of AI in public health. I was given some interesting advice.

First, the benefits (in 250 words):

Artificial Intelligence (AI) has the potential to revolutionize public health in several ways. Here are some of the benefits of AI in public health:

> *Disease Detection and Diagnosis: AI can analyze vast amounts of data from medical records, images, and lab reports to detect patterns and identify potential diseases at an early stage. This can help healthcare providers make more accurate diagnoses and improve treatment outcomes.*
> *Personalized Medicine: AI can use patient-specific data to create personalized treatment plans that are tailored to the individual's unique needs. This can lead to better health outcomes and reduced healthcare costs.*
> *Predictive Analytics: AI can analyze large datasets to identify patterns and predict disease outbreaks or other health-related events. This can help public health officials take proactive measures to prevent the spread of diseases and protect the population.*
> *Drug Discovery: AI can help accelerate the drug discovery process by analyzing vast amounts of data and identifying potential drug candidates. This can reduce the time and cost of developing new drugs and improve the overall success rate of drug development.*
> *Remote Patient Monitoring: AI can monitor patient data remotely and alert healthcare providers to potential issues before they become more serious. This can improve patient outcomes and reduce hospital readmissions.*

Overall, AI has the potential to transform public health by improving disease detection and diagnosis, creating personalized treatment plans, predicting disease outbreaks, accelerating drug discovery, and enabling remote patient monitoring. As AI technology continues to advance, its potential impact on public health will only continue to grow.

I then asked of the potential dangers of AI to public health (in 250 words) and here is the result:

> *In order to mitigate the dangers of AI in public health, several steps can be taken. First and foremost, it is crucial to ensure that AI algorithms are developed and trained on diverse and representative datasets. This will help to reduce the risk of algorithmic bias and ensure that AI systems are accurate and effective for all patients, regardless of their race, gender, or other factors.*
>
> *Secondly, it is essential to implement strong privacy protections for patient data. This can include measures such as data encryption, access controls, and auditing to ensure that patient data is kept secure and only accessed by authorized personnel. Additionally, patients should have the right to control their own data and to decide who has access to it.*
>
> *Thirdly, it is important to establish clear ethical guidelines for the development and use of AI in healthcare. This can include guidelines around transparency, fairness, and accountability, as well as guidelines for the use of AI in areas such as diagnosis, treatment, and research.*
>
> *Fourthly, healthcare providers should be trained to understand the limitations and potential biases of AI systems. This will help to ensure that they use AI tools appropriately and do not rely too heavily on AI for critical decisions.*

> *Finally, policymakers and healthcare leaders should work together to address the potential economic impacts of AI on healthcare jobs. This could involve investing in retraining programs for healthcare workers or developing new job opportunities in areas such as AI development and implementation.*
>
> *Overall, while there are dangers associated with the use of AI in public health, these risks can be mitigated through careful planning, ethical guidelines, and strong privacy protections. By using AI responsibly and in conjunction with other interventions, we can harness the power of AI to improve healthcare outcomes for all patients.*

I will leave you to evaluate the merit of these results created by a very well-informed robot. I imagine the answers will become more sophisticated as the technology develops. So, what have I learnt from the process of using ChatGPT?

- It has become apparent that answers are given in (irritating) short paragraphs and bullet points (I hope you have spotted the irony here).
- The text has a polemic tone.
- It lacks style, synthesis, or appraisal.
- It ‘feels’ artificial as you read it (but this may be because I was expecting that).
- Using the Chat, however, is a convenient way of identifying issues.

So, what are the implications for academic publishing? Having taught in Higher Education for 20 years, I have seen the positive and negative effects of the Internet on student learning and the rise of plagiarism. Within time, advanced software became widely available to spot plagiarism within academic submissions both in educational institutions and in publishing. I suspect AI software developed to spot AI-generated articles already exists. There are further implications that may completely transform academic publishing such as AI replacing the peer-review process. Thinking about it, AI may replace the need for academics at all other than operating the computer to generate the processes.

Whatever the future holds, do keep your (original and human-authored) submissions coming in for either our practice or research sections if AI hasn’t destroyed humanity in the meantime.

In this issue of *Perspectives in Public Health*, we have several papers reflecting on the COVID-19 pandemic from a variety of angles (refugees, young people, etc.), and other topics include friendship and mental health, qualitative design, co-creation, and the inequalities around food security.

Finally, if you are keen to peer-review research articles for us, do email to the editorial office at: publications@rsph.org.uk.

CONFLICT OF INTEREST

The author declared the following potential conflicts of interest with respect to the research, authorship, and/or publication of this article: 60% of this editorial was written by a robot.

In Practice

Enhancing the training of community engagement officers to address vaccine hesitancy: a university and local authority collaboration

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INTRODUCTION

Vaccine hesitancy/scepticism remains an issue, and ongoing actions to promote vaccination are needed. reword: While no single intervention strategy addresses all instances of vaccine hesitancy, effective methods have been identified. For example, recommendations from a healthcare professional and dialogue-based, directly targeted approaches with personalised and tailored communications for different audiences, including from a trusted community member.[1–6]

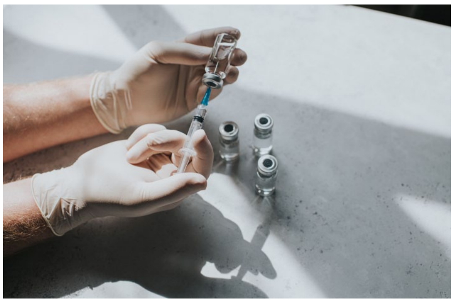
UNIVERSITY AND LOCAL GOVERNMENT JOINING FORCES TO INCREASE THEIR IMPACT

In mid-2020, the UCL School of Pharmacy started training Pharmacy undergraduate students to become Vaccination Champions and promote vaccination in their multitude of identities, that is, not only as a healthcare students but also as a family and community member, neighbour, friend, etc.[7] We have also provided resources for Pharmacy professionals.[8]

In response to COVID-19, the Bedford Borough, Central Bedfordshire and Milton Keynes Council's shared Public Health Service employed place-based teams of four COVID-19 and Health Inequality Community Engagement Officers. As part of their role within the wider Health Protection and Disadvantaged Groups team, the Community Engagement Officers visit and engage with places of worship, key businesses and community groups to develop relationships with local residents. By building relationships with religious and community leaders, trusted individuals and Local Councillors, the teams are able to determine barriers to the uptake of COVID-19 vaccines. They can also answer questions and provide information and solutions, such as dispelling myths and misinformation or arranging taxis to vaccination centres.

By building relationships with religious and community leaders, trusted individuals and Local Councillors, the teams are able to determine barriers to the uptake of COVID-19 vaccines

In this article, we describe how the University and the local government teams worked together to maximise the impact of the Community Engagement Officers, in line with fulfilling Universities' Third Mission,[9,10] with the priority herein being the transfer of academic knowledge to help resolve a societal challenge.



HOW IT STARTED

The academic team approached Bedford Borough Council to offer support with addressing vaccine hesitancy, given their experience of training Pharmacy students to become Vaccination Champions. Following consultation with Public Health's Health Protection and Disadvantaged Groups team, it was agreed that the academic partners would deliver, at no cost, a 2 h live online workshop to the Community Engagement Officers (adapting the resources previously used with students), conduct pre and post workshop surveys, hold a follow-up session and publish a report about the joint activity. The Public Health team suggested topics and questions relevant to their residents and strategic direction for which they required more information.

The aim of the joint activity was to increase Community Engagement Officers' knowledge about COVID-19 vaccines and vaccination, and their confidence when engaging with vaccine-hesitant individuals.

DELIVERING THE WORKSHOP

The workshop surveys of participants indicated a greater proportion of female participants, a range of ages (20–59 years), ethnicities (Black or Black British – African, Caribbean, White British, White Irish, White any other background, Asian or Asian British (Indian/any other Asian background) and Mixed) and backgrounds in Science/Health (from none to a Master's degree in a health-related subject and experience in vaccine community engagement). Answers about vaccination showed some gaps in knowledge, while one participant asked for more information about dealing with anti-vaxxers and the best way to engage with young people. The 2 h online live workshop was delivered to 13 Community Engagement Officers, and four members of the wider Health Protection and Disadvantaged Groups team. The workshop was conducted using Microsoft (MS) Teams and consisted of presentations, breakout rooms and a question-and-answer session. Presentations covered frequently encountered topics, including vaccine efficacy and effectiveness, the waning of effectiveness and the need for booster doses, adverse effects, vaccination in pregnancy and herd immunity. They also looked at the vaccine development process and factors which sped up the development of COVID-19 vaccines, hesitancy and barriers to vaccine uptake, COVID-19 vaccine misconceptions and 'Dos and Don'ts' when addressing vaccine hesitancy.

The first breakout room slot took place prior to the related presentation and engaged participants in a discussion on the common misconceptions, concerns and barriers to vaccination they had encountered. Breakout room rapporteurs reported collective encounters of concerns about infertility, needle phobias, denial, a belief in their immune system looking after them, getting COVID-19 with the booster dose, adverse effects and the impact on work, blood clots, taking the vaccine while pregnant, and concerns about access and peer/family pressure.

A second breakout room slot, which took place towards the end of the workshop, resulted in Community Engagement Officers reporting a sense of being more 'clued-up'. In particular, that they now had more facts and scientific knowledge to 'back up' their conversations, and that the training had increased confidence in their answers, and a commitment to listen more to people to understand 'where they are coming from'.

POST WORKSHOP FEEDBACK AND CASE STUDY

The post workshop survey showed very positive feedback about the workshop overall. Participants found the session stimulating, interesting and relevant to their role; the session was paced well and the duration was appropriate, and participants complimented the speakers' audibility and explanation, and adequacy and preparedness of slides. An example of a comment:

> *The workshop was really engaging, the slides were visual and relevant, explaining complex scientific data and knowledge clearly. The breakout session worked really well and I think the group discussions (although maybe some were reluctant to contribute) were very effective and support knowledge sharing and learning through experiences. My only point of change would be to allow for a bit more time, so maybe the session should be 3 hours with two set–breaks (cover that in the intro – so layout the timing of the whole workshop).*

Within a few weeks of the workshop, participants submitted a case study of an interaction during their work, where they had used the training. Several participants had used the diagrams provided in the slides to communicate more effectively, for example, to explain the speed of the COVID-19 vaccine development and the potential for COVID-19 infection post vaccination as the vaccine only reaches full efficacy after 2–3 weeks. Other participants reported providing information about and supporting the use of the free taxi service to vaccination centres and about dealing with needle phobia. One participant explained how useful the provided information would have been during their own family's experience of COVID-19, while another used their knowledge to convert technical documents on the effectiveness of vaccination against long COVID-19 into digestible information for the public. Several participants reported conversations with individuals who were totally against vaccination, resulting in an inability to promote vaccination.

Several participants had used the diagrams provided in the slides to communicate more effectively, for example, to explain the speed of the COVID-19 vaccine development and the potential for COVID-19 infection post vaccination as the vaccine only reaches full efficacy after 2–3 weeks

POST WORKSHOP FOLLOW-UP SESSION

Ten weeks after the online workshop, Community Engagement Officers attended an online follow-up session to share their experiences. During the session, they reported that during their interactions, they could explain things more clearly, for example, the speed of COVID-19 vaccine development, using the relevant workshop slides and felt

> *more secure in what I was saying and more confident in the knowledge that I'd been given*,
>
> *had the statistics to back it up*,
>
> *more strongly and passionate about what I was doing*,

and that their interlocutors *understood it* and *accepted it a lot better* and went away with information leaflets: *It is like we can win them*

Community Engagement Officers still encountered vaccine scepticism and public mistrust in the government from some. It is noteworthy that race and religion were frequently mentioned in vaccine conversations. It is therefore essential for anyone promoting vaccination to have a working knowledge of different faith and ethnic groups, in addition to a scientific understanding of vaccines and vaccination.

Participants who completed the whole course were awarded a Vaccination Champion Certificate by the Local Authority (template in Supplementary Info).

THE SEQUEL

The impact and importance of Community Engagement Officers as a permanent fixture within local authority Public Health has again been demonstrated to funders, and the teams involved in this collaborative training project will continue in their roles until the end of March 2023. As they move forward, ‘Living with COVID’, ‘Making Every Contact Count’, and the wider Health Protection remit including screening and immunisation programmes impacted by COVID are on the agenda.

CONCLUSION

We hope that by reporting this collaboration, we inspire others to engage in similar activities, as these can have large impacts at fairly low costs to all partners. By adapting teaching and learning resources that had previously been used with undergraduates, academic cost was lowered, making the collaboration more feasible. The academic team has a greater understanding of the reality on the ground, and both parties have gained new perspectives of community engagement.

ACKNOWLEDGEMENTS

The authors thank Vicky Head, Director of Public Health for Bedford Borough, Central Bedfordshire and Milton Keynes Councils, Celia Shohet, Dr Ian Brown and Dr Oliver Mytton, Assistant Directors for reviewing and supporting the initiative; Omolara Ajibola and Victoria Bola-Okerinde, Health Protection Team for supporting smooth facilitation of different aspects of the training and post-training evaluations and entire Health Protection Team for their commitment to completing the different phases of the training.

CONFLICT OF INTEREST

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

FUNDING

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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Has interest in smoking cessation declined during the COVID-19 pandemic?

This article focuses on the impact of the COVID-19 pandemic on smoking behaviours and builds upon work published in 2020 which used Google Trends data to investigate if interest in smoking cessation increased during the beginning of the pandemic.

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At the end of 2020, we began recruiting for a study which examined the effect of mailing a five week supply of nicotine patches free-of-charge to adult smokers in rural communities across Canada, in order to promote smoking cessation.[1] Based on previous recruitment efforts, we expected to recruit 1252 participants in eight months. Although we recruited the desired sample, it took nearly twice as long as expected. While there are likely a number of contributing factors, we were particularly interested in understanding the impact the COVID-19 pandemic may have had on the motivation to quit smoking and if it has contributed to a decreased interest in smoking cessation.

On 11 March 2020, the World Health Organization (WHO) declared a global pandemic caused by the spread of the severe acute respiratory syndrome coronavirus 2 (SARS CoV-2) and the resultant coronavirus disease 2019 (COVID-19).[2,3] Health professionals and experts were quick to express concerns related to the risk the respiratory virus posed to people who smoke. Past research involving other respiratory infections (e.g. influenza, MERSCoV) has demonstrated that smokers are more vulnerable to infectious disease[4,5] and subsequent research specifically addressing the effects of COVID-19 have largely supported this. People who smoke appear to be at greater risk of infection from COVID-19 and if infected are at greater risk of experiencing severe complications including hospitalisation, needing mechanical ventilation, intensive care, and/or having the infection result in death.[5–9]

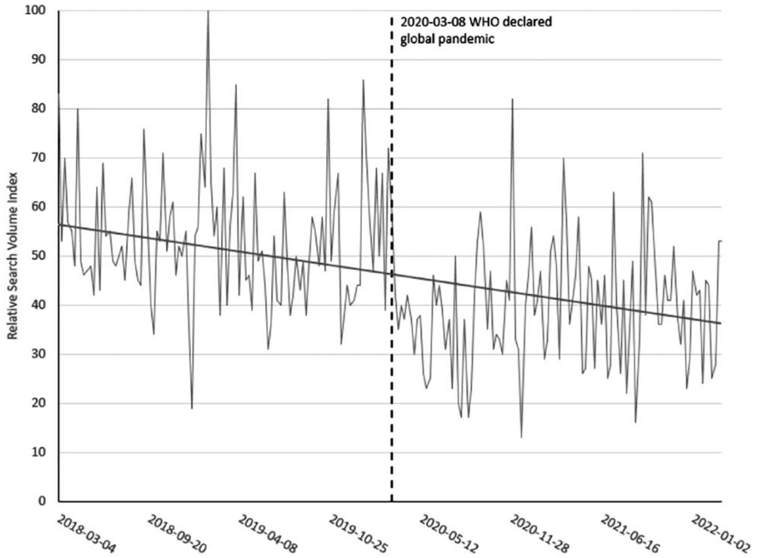
People who smoke appear to be at greater risk of infection from COVID-19 and if infected are at greater risk of experiencing severe complications including hospitalisation, needing mechanical ventilation, intensive care, and/or having the infection result in death

This greater risk has led many smokers to express renewed interest in smoking cessation[8] and a number of health agencies and experts have recommended using the pandemic as an impetus to encourage smokers to make attempts to quit,[8,10] as it is an established theory of behaviour change that an increased perceived risk can increase an individual's motivation to change a behaviour.[8,11] During the pandemic, there have been targeted education campaigns; however, the actual effectiveness of the messaging remains unclear. One study found that a combined message that explained the role of smoking in increasing COVID-19 severity was most effective at increasing intentions to quit in the next month and in reducing smoking in the next six months, compared to those where the message only focused on the risks associated with COVID-19 exposure.[8] Conversely, another study found that messages explaining the harms of smoking with and without COVID-19 risks were

SAGE Publications
ISSN 1757-9139 DOI: 10.1177/17579139221136720

Figure 1

Google Trends relative search volume index for smoking cessation in Canada before and during the COVID-19 pandemic.



equally more effective than a control message. These authors note that a single message is unlikely to change an intention or behaviour. Furthermore, they speculate about the role of an individuals' fatigue in hearing smoking and COVID-19 messaging on their intention to make a quit attempt.[10]

While the effectiveness of COVID-19 messaging may be unclear, an intention to quit smoking is an important step in changing smoking behaviour. Independent of message effectiveness, several studies have reported increased intentions among people who smoke. An MTurk survey of people who use both tobacco cigarettes and e-cigarettes found more than a third of participants reported greater motivation to quit smoking.[12] Likewise, a representative survey of US adults found 26% of tobacco cigarette and 41% or e-cigarette smokers reported trying to quit.[11] However, there is also some evidence that smoking has increased, or at least stayed the same among smokers. The same survey of US adults also found 33% of tobacco cigarette and 23% of e-cigarettes users reported increasing their use[11] and this finding was echoed in the MTurk study where nearly half of respondents reported no change in their use, 15% reported less motivation to quit and 30% increased their use.[12] Substance use and smoking are well-documented coping mechanisms in response to negative affect,[12] stressful life events,[11] and large-scale hardship.[9] Increased stress related to disruptions caused by the pandemic[7] and COVID-19-related anxiety[9] may help explain why some smokers have increased or maintained their smoking behaviour.

Substance use and smoking are well-documented coping mechanisms in response to negative affect, stressful life events, and large-scale hardship

It is unclear from these self-reported surveys if smoking cessation is increasing, decreasing, or remaining the same among smokers in light of the COVID-19 pandemic. Google Trends data overcome some of the limitations of self-reports and have been used to estimate interest in smoking cessation during the pandemic. Google Trends allows public access to aggregated data from the Google search engine. The site produces a search volume index graph for each search term and represents interest over time relative to the highest point on the chart (i.e. 100 = peak popularity, 50 = half as popular, 0 = insufficient data).[13] Google Trends data have been useful in research. For example, researchers used changes in the popularity of search terms related to flu symptoms to identify outbreaks 7–10 days before traditional Centers for Disease Control Surveillance programmes.[14]

Using Google Trends for near real-time monitoring of healthcare seeking behaviour in research is in its early stages and there are some limitations; however, Heerfordt and Heerfordt[4] used Google Trends to investigate if interest in smoking cessation increased during the beginning of the pandemic (16 January–13 April 2020). While there were reports of more smokers indicating intentions to quit smoking, Google searches for 'smoking cessation', 'quit smoking', and 'help quitting' appeared unchanged during this time.[4] We extended this analysis and used Google Trends data to compare the relative search index during the two years of the pandemic (March 2020 to March 2022) with the preceding two years (March 2018 to March 2020). We found a significant decrease in the relative search volume index during the pandemic among searches for 'smoking cessation' in Canada (mean prepandemic = 52.5, SD = 13.2; mean during pandemic = 38.8, SD = 12.1; $t(208) = 7.8$, $p < .001$; Figure 1).

The approximation methods used by Google Trends to generate the relative search volume index ensure anonymity and user privacy, but is also a limitation as the method has not been clearly shared by the company and may contain inaccuracies or data sampling issues.[3] Furthermore, search terms are not standardised, and while Google is the most visited website on the Internet,[15] it is not the only way smokers seek help to quit smoking (e.g. doctors, public health offices, telephone help lines). With these limitations in mind, Google Trends, combined with self-reported survey data reporting increased tobacco use, and our challenges recruiting for a smoking cessation study are concerning. Overall, the impact of COVID-19 and the resulting disruptions caused by the pandemic appear to have had a mixed effect on smoking behaviour. However, if the decrease in searches actually correlates with decreased attempts to quit smoking, clinicians, public health agencies, and researchers will need to monitor this trend and the motivation to quit among smokers in order to ensure that declines in smoking cessation do not become part of our 'new normal'.

ACKNOWLEDGEMENTS

John Cunningham is currently supported by the Nat & Loretta Rothschild Chair in Addictions Treatment & Recovery Studies. Support to CAMH for salary and infrastructure has been provided by the Ministry of Health and Long-Term Care.

CONFLICT OF INTEREST

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Making co-creation a trustworthy methodology for closing the implementation gap between knowledge and action in health promotion: the Health CASCADE project.

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published in Volume 143, Issue 4 of *Perspectives in Public Health*

https://doi.org/10.1177/17579139221136718

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The promotion of a healthy lifestyle and the creation of supportive environments are necessary to decrease the burden of disease on society. Therefore, we need interventions that work and are efficient, sustainable, inclusive and equitable (Shelton 2014; Hallal et al., 2012). However, existing public health interventions generally have small effects and only a few are implemented on a large scale. Moreover, those that are widely implemented, tend to fail to replicate in the real world effects that were found under more controlled conditions. This is also known as the implementation gap (Green, 2006; McKay et al., 2019). One of the reasons for the implementation gap might be an overreliance on Mode 1 research (Gibbons, 2000). Mode 1 research has the aim to produce universal knowledge and is characterized by theory building and testing. It is predominantly driven by the autonomy of researchers and their host institutions (Gibbons, 1994). Our scientific practices purposely control conditions and this might result in knowledge that is too disconnected from the complexity of the real world to design effective and sustainable interventions. Thus frameworks or protocols have been developed to take into account complex influences and interrelations of real-world factors on public health problems during the development, implementation and evaluation of interventions (Moullin et al., 2020; Skivington et al., 2021). Furthermore, more emphasis is now placed on implementation science to identify barriers and facilitators when implementing interventions (Nilsen, 2015). However, the focus is still predominantly on “translating” knowledge to the real world, instead of producing it in the real world (Greenhalgh, 2016).

An alternative is therefore to rely more strongly on Mode 2 research which has the aim to produce knowledge in the context of application (Gibbons, 1994; Gibbons, 2000). Community-Based Participatory Research and Participatory Action Research, for example, can be situated within Mode 2 (Greenhalgh et al., 2016). These approaches focus on developing relevant solutions for a local problem in a specific context, generating collaborative knowledge and establishing an equitable partnership with stakeholders in the real world. Both share the core principles of participation, dialogue, and empowerment of the populations at interest (Baum et al., 2006; ICHPR, 2013; Israel et al., 2010; Macauly, 2016). There is already a long tradition of participatory research (Macauly, 2016), but it is only recently that there has been an increasing global interest in using a participatory approach in public health (Leask et al., 2019). In the public health domain, the population at interest and other relevant stakeholders are generally only partly involved during the research process, and predominantly through consulting or informing. To date, very few projects have considered them as co-decision makers throughout the entire research process (Macauly, 2016). Therefore, we advocate for a “collaborative public health intervention development, implementation and evaluation by academics working alongside other stakeholders”, which has been described as co-creation by Leask and colleagues (2019). However, using co-creation in public health brings challenges. Because co-creation leads to locally relevant evidence, it lacks the universality and reproducibility of evidence provided by Mode 1 research approaches (Shelton, 2014; Higgings and Green, 2008). In addition, its flexible and adaptive nature is challenging in terms of rigor and transparency of the research (Goodyear-Smith et al., 2015). Currently, there is no extensive framework or protocol for co-creation in the development, implementation and evaluation of interventions in public health, although this is of major importance to guide researchers and stakeholders throughout the whole co-creation process (Jackson and Greenhalgh, 2015; Leask et al., 2019; Greenhalgh et al., 2016; Macauly, 2016).

Thus there is a clear need to combine real-world co-creation with rigorous research into evidence-based co-creation, i.e., a methodology grounded in evidence, based on both scientific precepts and the principles of a participatory approach. One example is the preliminary work of Leask and colleagues in which some principles and recommendations for co-creation in public health have been laid out and in which the PRODUCES framework has been introduced as a way of planning the co-creation of a public health intervention (Leask et al., 2019). Another example is the establishment of the International Collaboration for Participatory Health Research (ICPHR), an international scientific network collaboration open to stakeholders with the aim to strengthen the role of participatory research in interventions and decision-making on health problems and to improve its quality, credibility and impact on policy and practice (ICHPR, 2013).

To go beyond the state of the art and to deliver an innovative and comprehensive research programme on co-creation methodology, we have set up the Health CASCADE project, a European-funded H2020 Marie Sklodowska-Curie Innovative Training Network (ITN) project that started in January 2021 (https://healthcascade.eu). More specifically, Health CASCADE aims to develop the methodological foundation of evidence-based co-creation with a focus on both science and praxis: theory (ontology and epistemology), ethics, methods and evaluation (scaling up and impact evaluation) and the creation of innovative digital technologies to support co-creation processes. Indeed, co-creation can be enhanced in conjunction with the affordances of novel evidence-based information technologies (Manzoni et al., 2021) and Health CASCADE will therefore investigate whether Artificial Intelligence can be a tool within the co-creation process to help with transcending human limits, synthesizing knowledge, and keeping the co-creation process democratic and free of bias. The co-creation methodology, supported by Artificial Intelligence, will be tested in four settings: schools, workplaces, health care and the community. Based on the scientific work of Health CASCADE, the final aim is to develop a training programme for researchers on how to conduct evidence-based co-creation for public health. In conclusion, with this project we promote the conduct of co-creation as a transparent, trustworthy and evidence-based methodology to improve public health interventions, while training a new generation of researchers who will in turn “cascade” this knowledge to other researchers and stakeholders within public health.

Funding

The author(s) disclosed receipt of the following financial support for the research,authorship and/or publication of this article: Health CASCADE is a Marie Skłodowska-Curie Innovative Training Network funded by the European Union’s Horizon 2020 research and innovation programme under Marie Skłodowska-Curie grant agreement n° 956501.

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Corporate social and community-oriented support by UK food retailers: a documentary review and typology of actions towards community wellbeing

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Keywords

public health policy; community engagement; community wellbeing; social responsibility; food retail; inequalities

Abstract

Aim: This article provides a comprehensive exploration of the varied Corporate Social Responsibility (CSR) actions in relation to supporting communities reported by the UK's leading food retailers. Findings are discussed against a backdrop of enduring inequalities, exacerbated by the on-going global Coronavirus pandemic, with actions considered for their potential contribution to community-based approaches to addressing local wellbeing and inequalities.

Method: This article presents the structure and key characteristics of community-oriented CSR in food retailing in the UK. A thematic analysis of comprehensive documentary evidence from the 11 principle UK food retailers was conducted, drawing on asset-based frameworks of community-centred actions towards wellbeing.

Findings: The findings suggest an increasing acknowledgement in food retail that local community is of key importance. Initiatives were categorised according to a typology, comprising national partnerships, local store-based funding and support actions, targeted programmes on healthy lifestyles or employability, and changes to store operations, in the favour of priority groups, prompted by the pandemic.

Conclusion: The article combines an up to date overview of community-focused CSR agendas and support by food retailers at a time of significant economic and social challenge for the UK. It highlights the potential of the sector to contribute more strategically to reducing inequalities and supporting community wellbeing, alongside statutory and voluntary sector partners.

INTRODUCTION

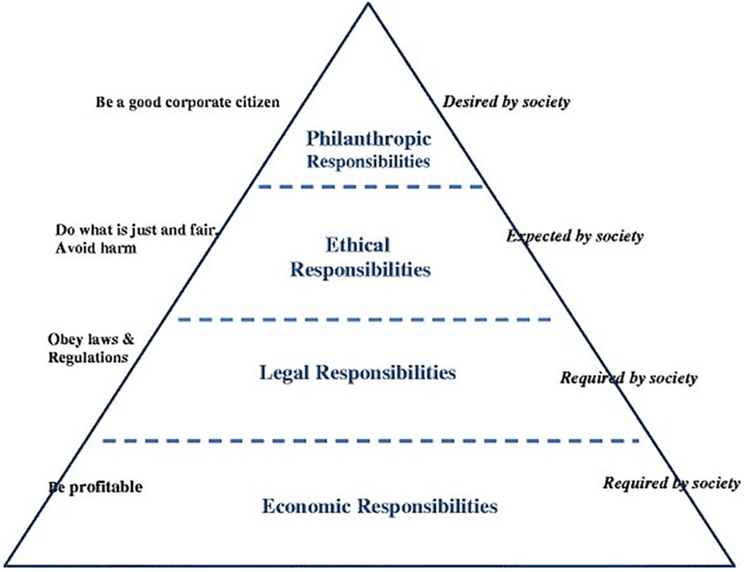
Grocery retailing is a central part of the UK's economy accounting for ~44p in every pound spent in 2021.[1] The four biggest retailers in the UK are all supermarkets, with the sector employing nearly 1 million people[2] who, since the COVID-19 pandemic 'lockdown', are now widely considered 'key workers', vital to the nation's daily life and wellbeing. As one of the few places to remain open, and with other food outlets closed and upward pressure on food prices,[3] supermarkets saw growth in sales both in-store and on-line.[4]

Many business operations have the potential to affect wellbeing, not only as providers of employment, education and training but also as indirect influences on community connections, physical and mental health and health behaviours. Yet, the 'commercial determinants of health' can also be negative. Indeed, there is strong critique both of: unhealthy commodity industries (UCIs) (such as alcohol, fast food and gambling) and the role of 'obesogenic environments' (e.g. fast food, cheap alcohol, lack of green space and health-promoting environments) in exacerbating health inequalities; and of public–private partnerships as

SAGE Publications
ISSN 1757-9139 DOI: 10.1177/17579139221095326

Figure 1.

Carroll's CSR pyramid[10]



a cynical manipulation of corporate social responsibility (CSR) to limit the reputational damage associated with harmful products.[5,6] Retail and food retailers are therefore rightly scrutinised and challenged over business and CSR practices.

CSR crystallised as a field of enquiry post-1950.[7,8] One of the longest established explanatory models and formative on business operations, is that of Carroll's 'pyramid (Figure 1).[9]

The base of the pyramid represents the company's economic responsibility to be financially sustainable, followed by statutory and legally required activity, ethical behaviour responding to societal expectations and discretionary actions (originally described as philanthropic responsibilities) at the top of the pyramid.[10] Supermarkets' community engagement and support is traditionally situated within the 'ethical' and 'discretionary' tiers. However, stakeholder pressure (investors, peers and communities) and consciousness of reputational risk may be driving a shift from largely philanthropic donations to integrating social responsibility into core business functions with increasing attention being paid to companies [whose actions] 'add value to the communities within which they operate' (p. 134).[11]

'Uniquely' positioned?

Located in the communities from which they draw both consumers and employees, supermarket retailers have many opportunities daily to interact face-to-face with the public. CSR is considered to be context-specific,[12] and the proximity of supermarkets to their customers, and related vulnerability to public opinion, means they are more likely to focus on charitable giving and education efforts than other less public-facing industries.[13,14] As far back as 2012, the BIS retail strategy pointed out that retail, 'underpins local economies and plays a vital role in delivering public policy (and providing social value) in areas such as public health, employment and skills, environmental sustainability and community cohesion' (p. 3).[15]

Alongside the challenge of responding to high levels of competition and changes to production and distribution, food retailers also need to consolidate economic and social value for customers and their communities. Supermarkets 'anchor positioning' in thousands of localities, integral to the communities in which they operate, creates pressure to generate 'shared value' by aligning the concerns of local stakeholders (including community members) with corporate goals and competencies.[11,16] This lynchpin status has been highlighted over the past year in the emergency response to the Coronavirus pandemic such as rapid mobilisation of support, including deliveries for those shielding and dedicated shopping times for NHS workers.

Inequalities and the role of community assets

The devastation of the pandemic served to highlight as well as exacerbate some of the inequalities in UK society, where clear discrepancies in experience and impact reflected the distribution of income, wealth and health, and associations with ethnicity, gender and geography.[17] Investment in understanding factors driving inequality and effective approaches to closing the gap between rich and poor and improving individual and community health and wellbeing often highlight the importance of 'wider determinants', including structural drivers such as education and employment.[18] Furthermore, there is greater recognition of the influence of *community conditions* on determining outcomes for wellbeing and resilience, and on place-based strategies as the most appropriate response,[19,20]

Public health practice is increasingly interested in the potential of community-centred approaches in addressing health inequalities.[21,22] This has led to an emphasis on identifying and understanding local resources, or 'assets', in terms of what exists, where gaps are, and what can be mobilised in favour of improving outcomes for the population. Assets can be categorised according to: formal services (such as provided by statutory or voluntary sectors), the presence or absence of organisational infrastructure (e.g. voluntary and community sector organisations, businesses, support groups, social networks), the built environment (buildings and community spaces), and human resources (community members, volunteers).[19] The impact of these aspects on wellbeing (and indeed resilience during the COVID-19 pandemic) has become a focus both of study and of theory development.[23–25]

AIM AND METHODS

Despite this increasingly acknowledged importance of community assets in supporting community wellbeing, related research and evaluation has nevertheless almost entirely focused on the statutory, voluntary and community sectors. Yet, there is a rationale for looking at food retailers as potentially more strategic contributors to the wellbeing of their catchment communities. As such, the aim of this review is to undertake a thematic documentary analysis of the approach and actions undertaken by UK supermarkets under the auspices of CSR, and to consider intended direct and indirect impacts on community wellbeing.[26–28] Eleven supermarkets, accounting for 96% of the grocery market share in the UK were included. Independent retailers, including franchise convenience shops were excluded for pragmatic reasons, as were companies offering delivery only.[i] Community-oriented initiatives were identified by examining the most recent information available on public-facing websites. Sources included: supermarket websites (including corporate sites); sustainability and CSR web pages (and separate websites where signposted); press releases; and on-line reports, including those on CSR, annual accounts and topic-specific documents. The information gathered relates to the last reporting period (most often 2019–2020), while the website and media information was that available on-line at any period between October 2020 to January 2021. Any on-site health-related services, such as in-store pharmacies, opticians or other clinics, have been excluded from the analysis as these are deemed to be business decisions made independently of the CSR strategy.

Details of any action or initiative described separately by the supermarket as a strand or sub-strand of their 'community strategy' were extracted to a Microsoft Excel spreadsheet template based on one adapted from the TiDier Checklist including: activity/initiative, locus of action, inputs and partnerships and any record of impact.[29] In addition to the pre-pandemic community-oriented CSR initiatives, we also extracted data on the supermarkets' response to COVID-19. In neither case was any distinction made regarding the size or the resourcing of the activity. If separately reported, actions were recorded as a stand-alone initiative. Two researchers extracted and coded data, with a minimum of 20% double extraction and subject to cross-comparison, with any disparities or disagreement resolved by discussion.

Thematic analysis was carried out to identify similarities and differences in the detailed inputs, approach, means of organisation and locus of action described. Finally, a typology of the broad approaches and range of resources associated with the community actions was produced.

FINDINGS

CSR activity appears to be well embedded in all supermarket operations, described variously as 'sustainability' (five supermarkets), 'corporate responsibility' (three), 'operating responsibly' (one) and 'ethics' (one). Irrespective of differences in terminology, the range of activities reported were broadly similar, focusing on: the **environment** – including suppliers and supply chain relationships, own brand product formulation, waste reduction (packaging) and energy reduction/zero carbon; **people** – including promoting an inclusive and diverse workforce; and local **community** (the focus of this research).

A total of 172 individual 'initiatives' related to local community were recorded, with roughly a 50–50 split between pre-pandemic operations and response to the COVID-19 pandemic (see Table 1 for an example of data extraction).

Eight main types of community action were identified, grouped in three overarching fields which relate to where and how community engagement is organised (Tables 2 and 3).

In the pre-pandemic context, the themes and fields are linked and activities grouped according to whether the action is indirect, through partnerships, or direct, with decision making primarily at local store or head office level (Figure 2). National partnerships (food redistribution, national fundraising) were the field where the greatest numbers of retailers take action, followed by local store-based activity (local funding, local support) thematic programmes (employment, lifestyle) and finally, of operational change prompted by the pandemic.

NATIONAL PARTNERSHIP INITIATIVES

National engagement via partnerships is split into two charitable endeavours, both key to the retailers' CSR reporting.

Food donation

All supermarkets aim to assist communities with food insecurity/poverty and reduce food waste through redistribution schemes. Sources of donations include: food which is unsold, generally direct from each store (back of store donation); food sourced from distribution centres and supplier surplus items; and items directly donated by customers, facilitated by the supermarket (front of store donation). The majority of this activity is in partnership with voluntary sector organisations who distribute food to community groups and charities in need.

Six retailers partner with Fareshare, a charity distributing surplus food to a network of 10,962 community-based organisations, and three works with 'Neighbourly', which helps businesses donate surplus products to local good causes. Four have arrangements with The Trussell Trust, a charity which supports the UK's largest network of food banks. In addition, two supermarkets work through 'The Company Shop', who buy surplus stock and sell at heavy discount to restricted membership, including NHS workers and people in receipt of means-tested benefits. Individual stores also make local arrangements with food banks and other charities, though this is less common, and one retailer has developed an on-line portal to facilitate direct assistance to local groups.

Other efforts towards mediating food poverty include donating fridges and freezers to community groups and charities; improvements to charity partners' infrastructure, such as warehouses, delivery vehicles, passing

Table 1

Extraction table example.

Retailer	Strategy	Aim/target population	Intervention	Inputs (e.g. ££)	Partnerships	Outcomes/impact
A	CSR (Community)	Food redistribution	Redistribution agreement to community enterprises with other social, educational goals.	Surplus food and goods	Surplus food donated to Neighbourly and Fareshare charities (connecting with local communities in the UK) and His Church, an organisation supplying food, clothes and supplies to vulnerable people around the world. Surplus stock redistributed to Company Shop (social supermarkets and 'hub' for members to seek welfare advice, mentoring and support services, in deprived areas).	Donated 1689 tonnes of food to charities in 2019, the equivalent of over four million meals (based on an average meal size of 420 g)
B	CSR (Community)	National fundraising	Long-term partnerships to raise funds with charities.	Staff time, space in store	Comic Relief (supported for 20 years), The Royal British Legion (supported for 25 years). On-going commitment to increase the scale and innovation of support for national charity partners.	£3.4 m to Royal British Legion 2019/20 with est. £40 m over length of partnership. Since 1999 £130 m raised for comic Relief Combined: 2017/18 £9 m, 2018/19 £14.8 m, 2019/20 £7.2 m
C	CSR (Community)	Local funding	Direct donations of goods and administration of Company's Charitable Foundation grants.	Community Champions (22 h pw in larger stores). Donations from central budget. Charitable foundation funded by business (% of profit).	Monthly community budget for product donations to local groups and charities. Green Token Scheme – quarterly customer vote – worth 1x £500, 2x £200. £1.4 m distributed to over 4000 good causes annually. Grants (in conjunction with Charitable Foundation) include: Transforming lives grants for: seasonal celebrations/festivals + active lives grants encouraging physical activity; Transforming communities' grants for: facilities and equipment; Emergency grants for local disasters. Match funding for employees fundraising	1 m beneficiaries of community contributions (donations of goods/space/time and Foundation grants). Green tokens – more than £1.4 m to over 4000 good causes annually. £4.5 m grants committed by Charitable Foundation in 2020.
D	CSR (Community)	Local support	Member Pioneers (4 h weekly to support local communities). Supported by 0.5 Full Time Equivalent (FTE) Member Pioneer (MP) Coordinators. Dedicated community website.	Staff time. £2 m invested in 2019 to scale-up member pioneers from a base of 300 to goal of 1500 communities by end 2021.	Member Pioneers bring together retailer members, colleagues and local causes. Activities include: action planning; running a local community forum; building networks and developing skills-share programmes; supporting community events; Supporting applications to and distributing Charitable Foundation grants. Also operate a community group directory and volunteering on-line platform.	Target member pioneer across 1500 communities, supported by 100 co-ordinators. In 2019, 150 staff donated 1046 h to their communities through the skills sharing initiatives.

(Continued)

Table 1

Extraction table example.

Retailer	Strategy	Aim/target population	Intervention	Inputs (e.g. ££)	Partnerships	Outcomes/impact
E	CSR (Community)	Employment support	Insight into working in retail and work placements.		2–4 week placement programme with coaching, providing insight into working in retail for single parents, people with disabilities or health conditions, people who are homeless or at risk of homelessness, and disadvantaged young people. The retailer works in partnership with Business in the Community, Remploy and The Prince's Trust. Youth unemployment programme provides tailored support packages for unemployed 16–24 year olds.	Placement programme offered to 20,000 people since 2004. Thousand eight hundred and sixty-three placements offered 2019/2020 (2554 2018/19). More than 90,000 vocational training and work experience opportunities for young people - 60%+ found work.
E	CSR (Community)	Healthy lifestyles	Supporting customers and colleagues to live healthy lives and make healthier food choices		Thousand community cooks trained through partnership with FareShare Community Food Connection scheme. Five-year partnership with Cancer Research UK, British Heart Foundation and Diabetes UK to: raise awareness of risk factors for conditions; inspire colleagues and customers to make lasting healthy shopping and lifestyle choices; fundraise to support the work.	57% of customers agree Store E 'helps me lead a healthier lifestyle' 2019/20 (55%:2018/19)
F	CSR (Community)	Operational (Actions in response to COVID-19 pandemic)	A range of initiatives to alleviate the impact of COVID-19 on specific groups		Support for elderly/ vulnerable/ shielding/ National Health Service (NHS) Staff: assistance with shopping (with Marie Curie and CLIC Sargent charity); dedicated gift card website (facilitating volunteer shopping); call centre for ordering 'essential items' delivered next day by Community Champion; specialist status for NHS workers (with dedicated shopping hours, food boxes to pick up in hospital car parks, 10% discount club). Vaccination programme support: car parks offered for vaccine drives.	Not yet reported

CSR: corporate social responsibility.

Table 2

Themes and fields of supermarket community actions.

Type of initiative	Initiative: field	
Food redistribution	Partnership (indirect)	National initiatives where the retailers engage the community via a partner organisation.
National fundraising		
Local funding	Store (direct)	Local initiatives where the local store engages with the local community.
Local support		
Support for employment	Programme (direct)	National initiatives where the retailers have developed programmes to engage more broadly with communities to improve wellbeing.
Promoting healthy lifestyles		
Operational		

Table 3

Summary of supermarket community actions.

Type of initiative	Indirect action – partnership		Direct action – store led		Direct action – programmes	
	Food redistribution	National fundraising	Local funding	Local support	Thematic	Operational
Examples of actions	• Back of store donation of unsold food • Food sourced from distribution centres/ suppliers • Front of store donations from customers • Partner support e.g. equipment donation/ grants/ publicising volunteering opportunities	• Direct financial contributes to chosen national charities • Staff fundraising and awareness raising for specific charities • Collecting customer contributions including amounts raised from store card purchases	• Token schemes (support for local charity/ groups) • Charitable foundation grant giving to local projects • Donations of goods to local groups • Local emergency support	• Dedicated staff developing networks of community groups/ publicising events/ volunteering • All staff volunteering on specific projects for a few hours a year • Provision of dedicated community space in store/ encouraging café use	Workforce support – promoting existing staff wellbeing • Insight to working for a retailer (work placements and apprenticeships) • Encouraging healthy eating including advisors/ own brand reformulation • Physical and mental health initiatives	Emergency food supply • Deliveries for vulnerable groups • Priority access for National Health Service (NHS) and 'Key Workers' • Swifter response in grant making • Supporting schools with laptops • Supporting vaccine rollout

on bulk-buyer advantages (e.g. lower cost equipment); commissioned research into drivers of food bank demand; charity staff training; grants to individual food banks; and in-store volunteer recruitment drives.

Charity fundraising

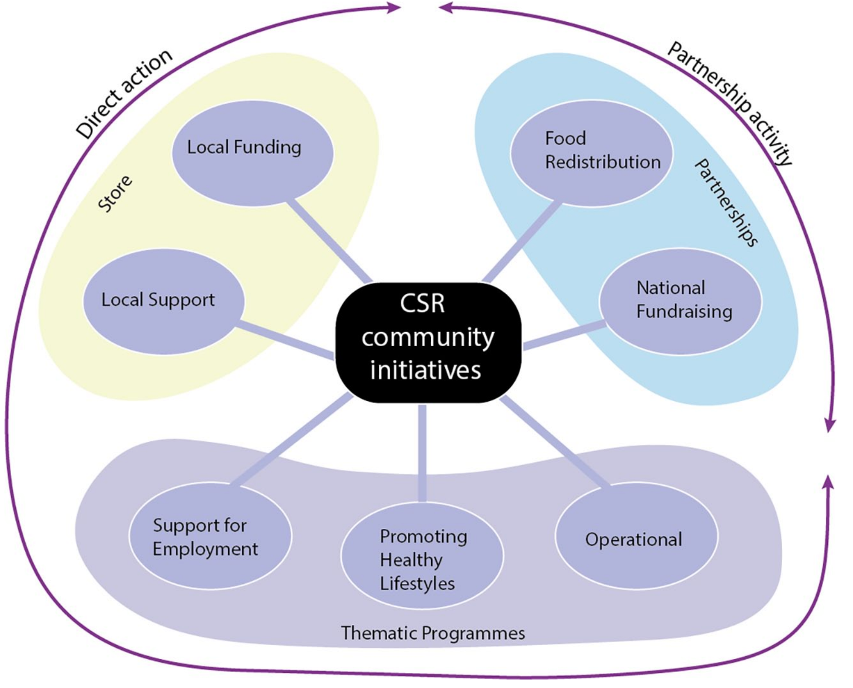
A central pillar in the majority of retailers' community CSR is fundraising for charitable causes. Money is raised for national charities through direct financial donations by the supermarkets, customer contributions through percentage value of store card purchases, store events and fundraising activities. The list of the charitable organisations supported is extensive, although health-related issues and children's causes feature widely. Some supermarkets have developed long-term partnerships, while others choose a new cause to support every year.

DIRECT ACTIONS

Direct actions cover both store-based activities and the wider thematic programmes run by supermarkets. Local initiatives where the store engages directly with the local community include

Figure 2.

Typology of supermarkets' CSR community-oriented actions



the provision of funding and other support for local organisations.

Local funding

This type of community engagement was the most frequently reported type of activity (21 across eight retailers). Money or goods are distributed by supermarkets in similar ways: four retailers run a 'token' scheme where communities nominate and vote for local causes in store–votes determining the size of donation received. Usually several groups are supported over the course of a year, although customers of one food retailer vote to support a single organisation annually. Funding for these schemes generally comes from the retailer's profits or from the carrier bag levy, although one retailer also donates a small percentage of spend on own-branded products to local causes. The retailers own charitable foundations offer grants, and five retailers run specific programmes via their charities for a wide range of potential projects, such as grants for community celebrations, support for sport and facilities and equipment to improve community facilities. Finally, donations of goods, rather than money, at the request of community groups or local schools for projects is also a common type of action. The retailers' dedicated 'Community Champions' (or equivalent, see below) are key in distributing funds and goods, including taking an active role in distributing aid and practical support during local emergencies.

Local support initiatives

These can be broadly divided into activities supported by staff time (both through dedicated community roles and staff volunteering their time), and those where the store's physical assets (e.g. community rooms, cafes, shop floor) are made available to the community. First, in terms of activities supported by staff resources, a role commonly described as 'Community Champion' by three retailers and 'Member Pioneer' by another is key. These could be employees splitting their time between community engagement and another role in store, though increasingly are dedicated part-time or full-time roles. The 'Champions' act as conduits between the store, the local community and community groups, supporting them and developing networks through publicity and events, while also facilitating access to stores' charitable foundation grant funding. The role often includes: volunteering in and making links between community groups; delivering educational/ information sessions on healthy eating; and can extend to organising campaigns to support and develop local spaces. Some are charged with developing action plans focused on health and wellbeing, and one supermarket's staff curate an on-line directory highlighting local needs and resources. Community champions also tend to coordinate donations of 'space' to community groups, for example, dedicated rooms or store cafés, frequently without charge.

In addition to the Champion role, staff volunteering in the community appears to be encouraged. Community projects receive a few hours a year of staff time across a wide range of activities including supporting older adults or people with disabilities, undertaking environmental improvements or revamping community spaces. There are also examples of longer-term commitments, such as senior management secondments to Business in the Community, for example.

'Thematic' programmes

Initiatives driven through head office activity were aligned to three main themes: employability; mental health/ wellbeing and healthy lifestyles. Six of the retailers documented specific workforce-related actions for both current and potential future employees. Two retailers recorded activities to promote existing staff wellbeing, with five promoting schemes to gain insight into working in a retail environment, through short- or longer-term work placements, or full-time apprenticeships. One retailer provides wider support for young people, including wellbeing support for pupils at the key point of school transition. These activities are run in conjunction with organisations dedicated to skills and employability as well charity partners dedicated to mental health and wellbeing.

A number of programmes focus on promoting healthy lifestyles, with six supermarkets active in this area. A particular goal is encouraging healthy eating through supporting people to make healthy choices by offering specialist in-store advisers, promoting healthier products and developing healthier versions of own-brand products. Initiatives focusing on promoting physical and mental wellbeing were also recorded.

Responses to the COVID-19 pandemic

Eighty-seven community-based initiatives were identified as responses to the COVID-19 pandemic (March 2020 and January 2021). Actions were predominantly focused on new or enhanced vulnerabilities in communities. National funding continued with new partners such as the National Emergencies Trust or those supporting frail older adults. New actions were launched on loneliness, such as befriending programmes for 'shielding' older adults, and some funded laptops for disadvantaged children at local schools. Others simplified the distribution of small local grants, with swifter decision making, responding to increased existing demand, and demand for new or adapted services resulting from the pandemic. Four supermarkets have supported the vaccine roll-out by offering facilities (e.g. car parks) for vaccinations, and some increased in-store pharmacy support to those shielding.

New initiatives consistent with 'operational change' also emerged to ease the impact of 'lockdown' restrictions on local people, employees and, in some cases, small businesses. Common actions included: extending opening hours and priority access (on-line and in-store) for groups such as NHS employees and people shielding; employing additional staff to meet new security and delivery demands; improved flexibility and terms for suppliers; rent adjustments for tenants (within-store shops); and bonuses for staff to compensate for increased demand and personal risk of being on the 'front-line' during the pandemic. Some launched limited next day and emergency package delivery services.

As well as honouring free school meal vouchers to children in low income families while schools were closed, three supermarkets offered small top-up sums to eligible families to spend on fruit and vegetables. Several also offered Volunteer Shopping Cards, providing a secure way for community volunteers to shop for vulnerable customers, and the community website mentioned above began to put volunteers in touch with customers who needed groceries.

OUTCOMES AND IMPACT

Several CSR reports included statements to the effect that their engagement goal was to make a positive difference to communities and the people that live there, and a few retailers identified Key Performance Indicators. However, the reports and other communications mainly focused on listing activity rather than impact, with indicators generally tracking outputs rather than outcomes, for example, the amount donated to national charities, number of 'meals' donated through food redistribution channels, number of small community grants distributed. Five mentioned the UN Sustainable Development Goals and selected examples where activities related to the goals, and all provided case studies which brought to life the activities that they were undertaking. While no real evaluation of impact on wellbeing was found at this time in the documentary review, there were two examples of investment in research partnerships which have a bearing on assessment of impact and outcomes. One was the creation of a Community Wellbeing Index to underpin understanding of factors influencing wellbeing in communities and enable local groups to better effect change;[30] and the other an effort to identify social and economic value derived from local community initiatives.[31]

DISCUSSION AND CONCLUSION

This documentary review has presented the broad approaches and resources associated with the community actions of UK food retailers. The typology illustrates a range of community actions by food retailers which align to a degree both with certain public health goals and with asset-based approaches to supporting community wellbeing. Actions can be seen to support community groups and 'priority' subgroups through transfer of financial assets or goods, which in turn enable direct support to vulnerable populations. Hence, supermarkets play a role in building civic capacity[32] both through partnerships, and via their organisational assets providing spaces and human resource to raise funds. The support provided by those in 'Community Champion' roles is of particular interest (as it is for similarly titled individuals working in the voluntary and statutory sector), and merits greater attention regarding both current and potential contribution. As well as brokering access to organisational assets (funding, goods, spaces), these staff members represent a community resource (and asset), whose role is potentially to grow social infrastructure for wellbeing – through networking, enabling and facilitating links between community partners and influencing social capital and community capacity.

Reflecting on Caroll's pyramid of CSR actions, it does seem that actions are still strongly aligned to the ethical/ philanthropic domain, now reinforced by elements that signal movement towards social sustainability and added value, (e.g. supporting community and voluntary sector infrastructure), direct support to public health, for example, support to mass vaccination and enhanced pharmacy. Some 'shared value' actions are also apparent, for example, training and apprenticeships targeting disadvantaged young people, and flexibility to suppliers and local small businesses offered during the pandemic.

Tensions no doubt exist between the aspirations and reality of what CSR delivers for communities, but (as in other sectors) the impact of an emergency situation such as the pandemic, appears to facilitate a more agile response to local need in food retailer CSR actions and their charitable foundation priorities. A focus on 'vulnerable' groups is apparent, perhaps revealing heightened awareness of local inequalities. The 'pandemic response' may well continue to influence transitional and perhaps longer-term community strategies as focus turns to ‘building back’.

These findings indicate a potential for supermarkets to contribute more strategically to supporting communities alongside other stakeholders in local systems. We believe it would be a missed opportunity not to consider how to integrate these actions into mobilising, growing and transforming community assets alongside other stakeholders, such as local government and Integrated Care Systems, particularly in places with weaker social infrastructure on which to build more resilient communities.

LIMITATIONS

This documentary review was reliant on the accessibility and transparency of information provided in publicly available information. The typology produced reflects the researchers’ prior reading and interests and interpretations of what should be included. Any potential bias or subjectivity was minimised through the application of dual coding, and third-party mediation of conflicting opinions.

ACKNOWLEDGEMENTS

The authors thank Ellen Bassam for her administrative support in preparation of this manuscript.

CONFLICT OF INTEREST

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

ETHICS

The research is conducted under strict standards of governance of research conducted at the University of Cambridge and the wider study has received ethical approval from the Cambridge School of Technology Research Ethics Committee.

FUNDING

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: The research, of which this documentary review is a part, is carried out under the Prince of Wales Global Sustainability Fellowship programme and is supported by a philanthropic donation by ASDA. The authors do not work, consult for, or own shares in any company or organisation that would benefit from this article, and disclose no relevant affiliations beyond their academic appointment.

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NOTES

i. At the time of writing one of these had just opened its first physical store in London, UK.

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The changing vaccine landscape: rates of COVID-19 vaccine acceptance and hesitancy in young adults during vaccine rollout

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Keywords

COVID-19; vaccine hesitancy; public health

Abstract

Aims: Development and rollout of vaccines offers the best opportunity for population protection against the SARS-CoV-2 (COVID-19) virus. However, hesitancy towards the vaccines might impede successful uptake in the United Kingdom, particularly in young adults who demonstrate the highest rates of hesitancy. This prospective study explored COVID-19 vaccine hesitancy in young adults and whether the reasons behind these attitudes changed during the initial stages of the United Kingdom's vaccine rollout.

Method: Data on vaccination intention were collected from a British university student cohort at three time points: October 2020, February 2021, and March 2021. This online survey included items on intention to receive a vaccine and a free-text response for the reasons behind this intention. Cochran's Q tests examined changes in rates of hesitancy and acceptance over time and free-text responses were analysed thematically.

Results: At baseline, 893 students provided data, with 476 participants completing all three time points. Hesitancy declined over time, with 29.4% of participants expressing hesitancy at baseline, reducing to 9.1% at wave 2 and 5.9% at wave 3. The most commonly endorsed themes for those willing to accept a vaccine were self-protection against COVID-19 and pro-social reasons, including protecting the population or unspecific others, and ending the pandemic/returning to normal life. The most commonly endorsed hesitancy themes related to 'confidence' in the vaccines and potential personal risk, including insufficient testing/scientific evidence, concern about side effects, and long-term effects. These reasons remained the most commonly endorsed at both waves 2 and 3.

Conclusions: While a decline in hesitancy was observed over time, the key reasons behind both vaccine acceptance and hesitancy remained consistent. Reasons behind hesitancy aligned with those of the general public, providing support for the use of generalist interventions. Pro-social reasons frequently underpinned vaccine acceptance, so cohort-specific interventions targeting those factors may be of benefit.

INTRODUCTION

The ongoing COVID-19 pandemic has resulted in the deaths of over six million people thus far (Coronavirus Worldometer) and substantial social restrictions worldwide. Development of COVID-19 vaccines rapidly became the focus of global research, offering an important mechanism for controlling transmission. In December 2020, the UK

SAGE Publications
ISSN 1757-9139 DOI: 10.1177/17579139221094750

initiated a rapid COVID-19 vaccine programme, resulting in the vaccination of almost 50 million adults to date (3 May 2022[1]). Although uptake of the vaccines in prioritised populations has been relatively high, general mistrust of the vaccines and concerns about potential side effects may impede the UK's ability to achieve population immunity through vaccination.

Hesitancy towards receiving a COVID-19 vaccine has declined during the UK's vaccine rollout.[2] However, data continue to highlight a discrepancy between older and younger adults. As of April 2022, rates of complete (two dose) vaccine uptake in young adults ranged from 64.6% (ages 25–under 30) to 64.1% (ages 18–under 20),[3] despite the vaccine being readily available to these age groups and the introduction of vaccination requirements for some social events and travel. In contrast, over 90% of adults aged 60+ have already received a COVID-19 vaccine.[3] Young adults play an integral role in population immunity,[4] and rates remain significantly lower than that of middle-aged and older adults. Attitudes towards vaccine safety, their importance and their effectiveness are consistently associated with vaccine uptake.[5] Tracking changes in attitudes towards the COVID-19 vaccines is important to ensure public health interventions continue to target key concerns. However, research has predominantly focused on the general population, rather than the concerns unique to young adults. We report here a prospective study exploring COVID-19 vaccine hesitancy and acceptance in young adults, and whether the reasons behind these attitudes changed during the initial stages of the UK's vaccine rollout (Feb-March 2021).

METHOD

As part of a longitudinal university student cohort study, data on COVID-19 vaccination intention were collected at three time points: 5 October 2020 to 1 November 2020 (before vaccination rollout; baseline), 1 February 2021 to 26 February 2021 (during rollout; wave 2), 10 March 2021 to 26 March 2021 (during rollout; wave 3). This included vaccination intention ('If you were offered a COVID-19 vaccine, would you take it?'; response options: Yes/No/Unsure) and a free-text response to elaborate on the reasons behind this intention. We defined vaccine hesitancy as participants providing 'No' or 'Unsure' responses. An option 'I have already had a COVID-19 vaccine' was added at wave 3. Ethical approval was received from the University of Nottingham Faculty of Health Sciences Research Ethics Committee.

STATISTICAL AND CONTENT ANALYSIS

Independent *t*-test and chi-square tests compared differences in demographics and vaccine attitudes at baseline between completers and non-completers (did not complete all three surveys). Cochran's Q tests examined changes in rates of hesitancy and acceptance over time. Free-text responses were analysed using inductive content analysis; responses were coded into themes and the frequency of common themes was subsequently quantified. If free-text responses contained multiple themes, each theme was coded separately. Follow-up with non-completers was not conducted.

RESULTS

Cohort characteristics

Participant characteristics are summarised in Table 1. In total, 893 participants (mean age = 21 years) provided baseline data (October 2020). The cohort was predominantly undergraduate ($n=789$, 88%), 63% female ($n=556$), and 66% white British ($n=589$), aligning with gender and ethnicity characteristics of undergraduates in British higher education (57% female, 74% White; 2019–2020). 540 students completed the wave 2 survey (February 2021), with 476 providing data at all time points. Students who discontinued the study were more likely to be male ($\chi^2=28.7$, $p<.001$) and from an ethnic minority background ($\chi^2=7.6$, $p=.006$). No difference in baseline vaccine hesitancy was found between completers and non-completers ($p=.70$; see Supplemental Table 1).

Vaccine hesitancy and acceptance

At baseline, 29.4% of participants ($n=262$) were hesitant about receiving a vaccine, reducing to 9.1% ($n=49$) at wave 2 and 5.9% (n=28) at wave 3, with $n=114$ (24%) participants having already received a vaccine (Supplemental Figure 1). This declining pattern of hesitancy was also observed in participants completing all three surveys ($n=476$), (baseline to wave 2: Cochran's Q=78.7, $p<.001$; waves 2 to 3: Cochran's Q=4.17, $p=.041$; baseline to wave 3: Cochran's Q=96.59, $p<.001$.

Reasons for hesitancy and acceptance

At baseline, 699 participants (78.3%) provided free-text responses ($n=205$ for hesitancy, $n=494$ for acceptance) allowing coding of 935 unique responses; 316 responses related to hesitancy themes and 619 related to acceptance (see Table 1). The most commonly endorsed themes for those willing to accept a vaccine were 'self-protection against COVID-19' (40% of responses), to 'protect the population or unspecific others, and control the virus' (35%), to 'end the pandemic and return to normal life' (12%), and 'protect specific others' (6%). The most commonly endorsed hesitancy themes related to 'confidence' in the vaccines and potential personal risk, including insufficient testing/scientific evidence (20%), concern about side effects (18%), long-term effects (13%), speed of the vaccines' development (10%), general safety issues (9%), and general effectiveness (9%). Other infrequent responses related to lack of knowledge, a belief in existing protection or being at low risk of contracting COVID-19.

At wave 2, 73% ($n=393$) of the sample provided free-text responses ($n=32$ for hesitancy, $n=361$ for acceptance). At wave 3, 55% ($n=260$) provided free-text responses ($n=17$ for hesitancy, $n=243$ for acceptance). The primary themes identified at baseline remained the most commonly endorsed across waves 2 and 3 for both hesitancy and acceptance, with no new themes emerging (for detailed breakdown, see Supplemental Figures 2 and 3, and Supplemental Tables 2 and 3).

Table 1

Demographic characteristics and vaccine attitudes.

	Baseline ***n* (%)**	**Wave 2** ***n* (%)**	**Wave 3** ***n* (%)**
Total *N* completers	893 (100%)	540 (100%)	476 (100%)
Age (mean, SD)	20.7 (3.4)		
Gender	889 (99.6%)		
Male	333 (37.5%)		
Female	556 (62.5%)		
Ethnicity	893 (100%)		
White – British, Irish, other	589 (66.1%)		
Ethnic minority background	303 (33.9%)		
Asian/Asian British – Indian, Pakistani, Bangladeshi, other	102 (11.4%)		
Black/Black British – Caribbean, African, other	43 (4.8%)		
Chinese/Chinese British	82 (9.2%)		
Middle Eastern/Middle Eastern British – Arab, Turkish, other	12 (1.3%)		
Mixed race	34 (3.9%)		
Other ethnic group	20 (2.2%)		
Prefer not to say	10 (1.1%)		
Level of study	893 (100%)		
Undergraduate	789 (88.4%)		
Postgraduate	94 (10.5%)		
Other	10 (1.1%)		
Vaccine attitude responses ('If offered a vaccine, would you take it?')[a]	893 (100%)	540 (100%)	476 (100%)
Yes	631 (70.7%)	491 (90.9%)	334 (70.2%)
No	56 (6.3%)	15 (2.8%)	7 (1.5%)
Unsure	206 (23.1%)	34 (6.3%)	21 (4.4%)
Already had a COVID-19 vaccine	N/A	N/A	114 (24.0%)
Participants providing codable free-text responses[b]	699 (78.3%)	369 (68.3%)	226 (47.5%)
One code	487 (69.7%)	249 (67.5%)	143 (63.3%)
Two codes	190 (27.2%)	102 (27.6%)	72 (31.9%)
Three or more codes	22 (3.1%)	18 (4.9%)	11 (4.8%)

[a] Total *N* completing each time point.
[b] *n* providing codable responses out of total *N* completing time point.

DISCUSSION

Vaccine hesitancy may serve as a limiting factor in national and global attempts to control the COVID-19 pandemic. Young adults play an integral role in the effectiveness of vaccination programmes; understanding the reasons for hesitancy and acceptance is key to successful rollout.[4] This short report illustrates, reassuringly, that in a student population, rates of hesitancy significantly declined during the vaccine rollout. Despite the short period of time between waves 2 and 3, a continued decline in hesitancy was still observed. Our work echoes the final ONS 'Coronavirus and vaccine hesitancy' report (9 August 2021) which demonstrated a substantial decrease in young adults' vaccine hesitancy over the first two years of the pandemic and that the majority of young adults were supportive of receiving a COVID-19 vaccine as of August 2021.[2] Rollout of the vaccines has allowed the accrual of evidence on safety and long-term effectiveness, along with observable declines in infection and death rates. As baseline hesitancy themes were strongly tied to confidence in the vaccines and perceived personal risk, vaccine rollout has perhaps allayed these concerns.

Interestingly, while changes to the rate of hesitancy were observed over time, the key reasons behind acceptance and hesitancy remained consistent. Recent research shows beliefs about the collective importance of vaccination, vaccine efficacy, concern about side effects, and speed of vaccine development are key to targeting COVID-19 vaccine hesitancy,[6] with these factors explaining a substantial amount of variance (86%) in a large sample of British adults.[7] Our data suggest those who continue to experience hesitancy do so for the same reasons as those who were hesitant prior to the vaccines' rollout. Similarly, the primary reasons behind vaccine acceptance did not change over time, although overall rates of acceptance increased. Taken together, these findings suggest that the reasons for both hesitancy and acceptance in young adults are similar to those found in the general public, and that while the number of people who appear to have these concerns is declining, the core reasons for hesitancy remain. As this age group, and those under the age of 18, are currently eligible for COVID-19 vaccination in the UK, future work should continue to monitor changes to hesitancy, particularly given the observed discrepancy between reported willingness to accept a vaccine and uptake in this age group.[2,3] Given the alignment of these concerns with those of the wider population, evidence-based interventions targeting vaccine hesitancy in the general public[6] might prove helpful.

Our findings also demonstrate young adults are motivated to accept a vaccine for pro-social reasons, although this form of messaging framing has been largely underutilised to date. Social media has been used to improve uptake of other vaccines,[8] with younger adults frequently relying on social media for health information.[9] However, the potential for misinformation to fuel hesitancy concerns on these platforms is high, particularly as government-produced posts about COVID-19 only account for a small fraction (approx. 11%) of those available on social media outlets.[10] We must therefore ensure public health campaigns which utilise these communication pathways should do so effectively.

While our findings provide a step towards understanding hesitancy in young adults, limitations are noted. Our sample comprised university students who may demonstrate greater health literacy and lower levels of vaccine hesitancy than the general population, perhaps explaining the higher rate of vaccine acceptance (94.1%) found in this sample compared with ONS data collected during the same time period (87%).[2] This limits the generalisability of our findings to young adults more broadly. Over the course of the study, 417 participants were lost to follow-up by time point 3. Unfortunately, we were unable to follow-up with those who did not complete all time points; however, our data identified that non-responders were more likely to be from an ethnic minority background. Recent research shows individuals from certain ethnic minorities are more likely to demonstrate higher rates of vaccine hesitancy and report concerns that vary from their White counterparts.[11] Future research should examine contributors to vaccine hesitancy in young adults outside of tertiary education, with a focus on exploring the concerns of those from ethnic minorities and diverse socioeconomic backgrounds.

ACKNOWLEDGEMENTS

The authors thank Pamela Pepper for her administrative assistance.

AUTHOR CONTRIBUTIONS

Conceptualisation: H.K., R.J., K.A., and K.V.; data curation: H.K, R.J., K.A., and K.V.; formal analysis: H.K, R.J., K.A., and K.V; funding acquisition: K.V., H.B., J.R.M., and J.C.; investigation: H.K. and R.J.; writing – original draft: H.K., R.J, K.A., and K.V.; writing – review and editing: H.K, R.J., K.A., H.B., J.M., A.V., J.C., C.D., J.B., K.B., C.C., G.F., D.M., P.T., and K.V. All authors have read and agreed to the published version of the manuscript.

CONFLICT OF INTEREST

The author(s) declared the following potential conflicts of interest with respect to the research, authorship, and/or publication of this article: All authors were employees of University of Nottingham (UoN), the institution at which data were collected. J.C. sits on the Executive Board for UoN. No other conflicts of interest were declared.

FUNDING

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: The study was funded by the Medical Research Council (Reference: MC_PC_20027, Principal Investigator J.B.) and the Institute for Policy and Engagement at the University of Nottingham (QR Duning Award, H.B., J.R.M., and K.V.). K.A. was supported by NIHR School of Primary Care Research funding.

J.R.M. receives salary support from a Medical Research Council Clinician Scientist Fellowship (grant number MR/P008348/1). The sponsors had no involvement in the study design, the collection, analysis and interpretation of data, or the preparation of the article. The views expressed are those of the authors and not necessarily those of the funders.

INSTITUTIONAL REVIEW BOARD STATEMENT

The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Research Ethics Committee of the University of Nottingham Faculty of Medicine and Health Sciences.

INFORMED CONSENT STATEMENT

Informed consent was obtained from all participants involved in the study.

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DATA AVAILABILITY STATEMENT

The data presented in this study are available on request from the corresponding author. The data are not publicly available.

SUPPLEMENTAL MATERIAL

Supplemental material for this article is available online.

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