

Evaluating digital health campaigns

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2023

A thesis submitted in fulfilment of the requirements
for the degree of Doctor of Philosophy

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Statement of Originality

This thesis is submitted to the University of Sydney in fulfilment of the requirement for the degree of Doctor of Philosophy (PhD). The work presented in this thesis is, to the best of my knowledge and belief, original, except where acknowledged in the text. I hereby declare that I have not submitted this material, either in full or in part, for a degree at this or at any other institution. I certify that the intellectual content of this thesis is the product of my own work and that all the assistance received in preparing this thesis and sources have been acknowledged. I further declare that I have been the lead author on the conceptual work underpinning this thesis and its implementation and have led the analysis and writing of all publications included herein. Author contributions are outlined in Appendix 1.

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Acknowledgements

Completing this PhD has been a privilege, and I absolutely would not have been able to do so without the help and support of some very important people.

To start with, my wonderful team of supervisors:

Blythe – you have been an amazing supervisor, and I honestly could not have asked for more in a supervisor. Your incredible support has been indispensable; you have always been selfless with your time, willing to be hands-on when needed, but also equally encouraging in giving me space and opportunities to explore ideas that haphazardly pop-up in my mind. You have an amazing ability to bring cohesion to concepts, and your humility downplays your expertise – I have really appreciated the practical perspective that you have brought to this research. Thank you for taking me on as a PhD student. I really hope that you will take on another PhD student sometime in the future, so that more people can benefit from your amazing mentorship.

Becky – it has been an absolute privilege to have you as one of my co-supervisors, with your expertise in both tobacco control and social media. You have a wonderful ability to guide research to ensure it is practical with real-world implications, and your experience in this field has been invaluable. You've also helped me to become a better researcher by encouraging me to be precise and focused in developing research questions, and challenging me to really clarify my conclusions.

Adrian – it truly is an honour to have you as one of my co-supervisors. Your incredible expertise in campaigns and evaluation is unparalleled, and the contributions you've made to this field are incredible, so it is an honour to learn from you, especially through working with you on actual campaign evaluations. I've learnt many lessons about organising campaign evaluations from you (probably half of which are not lessons any textbook could teach!) You've always been available to chat about this research, and your passion for the topic is so evident.

PH – thank you for offering me the opportunity to do this PhD; you were the one who brought this opportunity together in the first place. True to the role of a supervisor, you have been an invaluable guide along this PhD journey – making sure that I reach all the check-points, ensuring I keep the big picture in mind, and always making yourself available to respond to any question or situation.

People have often been amazed and slightly sympathetic when I've told them that I have four supervisors, as though it was a challenge to manage – but honestly, I think the four of you have been the perfect mix of skills, expertise, strengths and perspectives – very much a fantastic four 😊 – so a huge thank you to you all in guiding me through this journey.

I genuinely think that my PhD is not really made up of the research and papers that have been included in this dissertation, but rather of the people I have collaborated with – so many of whom hold, and have shared, a lot of experience and expertise in what they do. I am reluctant to list names for fear of leaving people out, but equally I want to make sure people are properly acknowledged. So in this list, I include: Ben Harris-Roxas, Nina El-Haddad, Lisa Woodland, Joanne Corcoran, Klara Giourgas, Ross MacKenzie, Adrienne Gordon, Christine Andrews, Vicki Flenady, Clare Hughes, Korina Richmond, Jane Dibbs, Nina Tan and everyone else I have collaborated with on these projects. I also want to thank the PRC group, especially Lisa Avery, Bronwyn McGill, Karen Lee, Tracy Nau, Susan Luo and everyone else in the EMCR group who have made me feel like part of a group, and made this whole PhD experience much less solitary.

Finally, as I said this PhD would not have been possible without some important people, and that could not be more true than for my family.

Jase – thank you for all the support you’ve given me in completing this PhD: for taking up extra housework, keeping the kids entertained, making sure I’m well stocked up on snacks, listening to me ramble/complain/muse aloud about this research, and most of all always being supportive of the idea of me taking up this endeavour. To my parents and my sister – thank you for always encouraging me to learn and instilling in me the importance of knowledge and education, but even more so of persistence and dedication, and giving me the confidence to take on these academic pursuits. To both my parents and Jason’s parents – thank you for being so supportive over these few years, especially by helping to look after the kids – truly, truly, this PhD would not have been possible without your support. Finally, to Felicity and Nate – thank you to you both for understanding that Mummy has to work on her ‘big project’, and Felicity for even helping me choose the colours for this project 😊, and Nate this project is even older than you! You have both played a very important role in this, in helping me to keep everything in perspective – you were both my constant reminders of what was most important in life. You’ve both spurred me to take on this challenge, so that I hope one day you both will take on something that you’re equally challenged and passionate about too.

Funding acknowledgement

I also thankfully acknowledge the scholarship funding provided for my PhD by the New South Wales Ministry of Health through the Prevention Research Support Program, without which this research would not have been possible.

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Abbreviations

| | |
|----------------|--|
| AIDS | Acquired Immune Deficiency Syndrome |
| aOR | Adjusted odds ratio |
| AUD | Australian Dollars |
| CCNSW | Cancer Council New South Wales |
| CEO | Chief Executive Officer |
| CI | Confidence interval |
| CINAHL | Cumulative Index to Nursing and Allied Health Literature |
| COVID-19 | Coronavirus Disease 2019 |
| CPHCE | Centre for Primary Health Care and Equity |
| CWA | Country Women's Association |
| DFM | Decreased fetal movements |
| GRPs | Gross Rating Points |
| HIV | Human Immunodeficiency Virus |
| HREC | Human Research Ethics Committees |
| ID | Identification |
| IP | Internet Protocol |
| LHD | Local Health District |
| MEDLINE | Medical Literature Analysis and Retrieval System Online |
| NSW | New South Wales |
| OOH | Out-of-home |
| OR | Odds ratio |
| P&C | Parents and Citizens' Association |
| PhD | Doctor of Philosophy |
| PR | Public relations |
| SBB | Safer Baby Bundle |
| SESLHD | South Eastern Sydney Local Health District |
| SLHD | Sydney Local Health District |
| SMS | Short Message Service |
| Stillbirth CRE | Centre of Research Excellence in Stillbirth |
| SWSLHD | South Western Sydney Local Health District |
| TARPS | Targeted Audience Rating Points |
| TV | Television |
| UK | United Kingdom |
| US | United States |
| USA | United States of America |

Publications arising from thesis

The following peer-reviewed publications report on research conducted as part of this PhD candidature:

1. **Chan L, O'Hara B, Phongsavan P, Bauman A, Freeman B. Review of Evaluation Metrics Used in Digital and Traditional Tobacco Control Campaigns.** *Journal of Medical Internet Research* 2020;22(8):e17432. doi: 10.2196/17432 (Chapter 2)
2. **Chan L, Gordon A, Warrilow K, Wojcieszek A, Firth T, Loxton F, Bauman A, Flenady V. Evaluation of Movements Matter: A Social Media and Hospital-Based Campaign Aimed at Raising Awareness of Decreased Fetal Movements.** *Australian and New Zealand Journal of Obstetrics and Gynaecology*. 2021 Dec;61(6):846-854. doi: 10.1111/ajo.13360 (Chapter 3)
3. **Chan L, Owen KB, Andrews CJ, Bauman A, Brezler L, Ludski K, Mead J, Birkner K, Vatsayan A, Flenady VJ, Gordon A. Evaluating the Reach and Impact of Still Six Lives: A National Stillbirth Public Awareness Campaign in Australia.** *Women and Birth* (published online ahead of print 27 Feb 2023). doi: 10.1016/j.wombi.2023.02.006 [article in press] (Chapter 3)
4. **Chan L, El-Haddad N, Freeman B, O'Hara BJ, Woodland L, Harris-Roxas B. A Case Study of an SMS Text Message Community Panel Survey and Its Potential for Use During the COVID-19 Pandemic.** *JMIR Formative Research* 2021;5(11):e28929; doi: 10.2196/28929 (Chapter 4)
5. **Chan L, El-Haddad N, Freeman B, MacKenzie R, Woodland L, O'Hara BJ, Harris-Roxas BF. Evaluation of 'Shisha No Thanks' - a Co-Design Social Marketing Campaign on the Harms of Waterpipe Smoking.** *BMC Public Health*. 2022 Feb 24;22(1):386. doi: 10.1186/s12889-022-12792-y (Chapter 4)
6. **Chan L, Harris-Roxas B, Freeman B, MacKenzie R, Woodland L, O'Hara BJ. Attitudes Towards the 'Shisha No Thanks' Campaign Video: Content Analysis of Facebook Comments.** *Tobacco Induced Diseases*. 2022;20(October):88. doi:10.18332/tid/153543 (Chapter 5)

The following papers are under the peer-review process:

- **Chan L, Freeman B, Richmond K, Hughes C, Dibbs J, Tan N, O'Hara BJ. Online Engagement and Perceptions of a Nutrition Website and Campaign Aimed at Helping Families Pack a Healthy Lunch Box.** *Submitted to Public Health Nutrition* (Chapter 6)
- **Chan L, Freeman B, Hughes C, Richmond K, Dibbs J, O'Hara BJ. How and Why do People Engage with Health Campaigns on Social Media?** *Under review with Health Promotion International* (Chapter 6)

Conference presentations arising from thesis

The following conference presentations were delivered as part of this PhD candidature:

- Analysis of Facebook comments in response to *Shisha No Thanks* Social Media Campaign. *Digital Health Week 2021*, 8-11 February 2021 [Oral Presentation]
- Impact evaluation of *Shisha No Thanks* - a project about waterpipe smoking harms. *Preventive Health Conference 2021*, 10-12 May 2021 [Oral Presentation]
- Co-designing an intervention with young Arabic-speaking adults to raise awareness of the harms of waterpipe (shisha) smoking. *13th Asia Pacific Conference on Tobacco or Health (APACT) 2021*, 2-4 September 2021 [Poster Presentation]
- Understanding the response to the *Shisha No Thanks* campaign through analysing Facebook comments. *Charles Perkins Centre Early-Mid Career Research Symposium 2021*, 16 September 2021 [Oral Presentation]
- Evaluating Public Health Mass Media Campaigns in the 21st Century. *3-Minute Thesis in the Charles Perkins Centre Early-Mid Career Research Symposium 2021*, 16 September 2021 [Awarded 2nd place]
- A co-design project to raise awareness of the harms of shisha smoking among young people. *Australasian Professional Society on Alcohol and other Drugs (APSAD) Conference 2021*, 7-10 November 2021 [Oral Presentation]
- How and why do people engage with health campaigns on social media? *Preventive Health Conference 2022*, 11-13 May 2022 [Oral Presentation]
- Evaluating Digital Health Campaigns. *Visualise Your Thesis Competition - University of Sydney 2022*, 13 July 2022
- How and why do people engage with health campaigns on social media? *Faculty of Medicine and Health Higher Degree Research Student Conference 2022*, 20 July 2022 [Oral Presentation]
- Still Six Lives: Post-campaign evaluation. *National Safer Baby Bundle Forum*, 22 July 2022 [Oral Presentation]

Abstract

Evaluating digital health campaigns

Health campaigns are one of the most visible activities of public health and have long been an important component of initiatives to improve population health behaviours. While in the past, health campaigns used traditional mass media channels such as television, radio and billboards; these days, health campaigns are increasingly reliant on digital media channels, such as social media, digital display advertisements and online public relations. Many characteristics of digital media make them fundamentally different to traditional mass media, such as the interactive nature of digital media, and the associated metrics that quantify online ‘engagement’ – such as clicks, ‘likes’ and comments. There has been scant research conducted on how these differences of digital media should be reflected in evaluating health campaigns. Often digital metrics are ‘shoehorned’ into a conventional evaluation approach, with seemingly little consideration given to whether this is appropriate, and particularly, whether online engagement metrics are relevant for health campaign evaluations.

The purpose of my thesis is to explore how health campaigns that use digital channels should be evaluated. My first research question asks, how do we currently evaluate health campaigns with a digital component? To understand this, I conducted a systematic literature review which showed that there are assumptions that digital engagement metrics can be added to the traditional campaign evaluation approach as an intermediary step between process and impact measures, and that large amounts of digital engagement are indicative of campaign success. Utilising the approach identified in the literature review of adding digital metrics to a traditional campaign evaluation, I evaluated three campaigns that used digital channels (*Movements Matter*, *Still Six Lives* and *Shisha No Thanks*). These case studies included process evaluations, and impact evaluations which were pre-post studies. Whilst the evaluations showed considerable reach and online engagement, two of the campaigns showed only increases in awareness of the health issue, but no significant changes in behaviours. These findings suggest that online engagement is not necessarily a linear stage between reach and behavioural change, and raise questions on how engagement metrics should fit within the overall campaign evaluation.

This led to my second research question, which asks, how should digital-specific measures, particularly engagement, be understood in relation to the overall health campaign evaluation? To address this question, I conducted a further two studies in relation to public health campaigns using mixed methods: a content analysis study of Facebook comments (for *Shisha No Thanks*) and

thematic qualitative analysis of focus group discussions about online campaign engagement (with *Healthy Lunch Box's Back-to-School* campaign), to explore people's meanings and motivations for taking digital engagement actions. These studies found that digital engagement actions did not always represent a precursor to making the behaviour change advised by the campaign.

The final section of this dissertation brings together the findings of the above studies to address the third research question of how should we evaluate health campaigns with a digital component? I outline that digital metrics should not be added to the conventional concept of a progression of campaign effects, but rather reframed as six key evaluation areas in which data should be collected for a campaign evaluation. These six key evaluation areas are: campaign activities, reach, campaign recall, initial engagement, deeper engagement and outcome evaluation. This approach of six key evaluation areas allows for a more nuanced approach to understanding engagement metrics and reflects the current lack of understanding of how they relate to campaign effects.

My thesis addresses the existing knowledge gap of how the conventional approach to health campaign evaluations relates to digital health campaigns. The research presented here starts the process of highlighting the differences of evaluating digital campaigns, and there is a need for ongoing exploration as digital media continue to evolve. However, the insights of this thesis will begin to enable researchers and practitioners to conduct more appropriate and meaningful campaign evaluations, and contribute to the evidence base on how we can effectively use digital health campaigns to improve population health.

PART A:
CURRENT PRACTICES

CHAPTER 1

INTRODUCTION

Health education campaigns are one of the most visible activities of public health. They can act as the public face of government agencies' health efforts, and increase community awareness of issues. Health campaigns that are aimed at reducing health harms are sometimes seen as the 'bare minimum' of what the community expects from government authorities. For one of the health issues included in my dissertation (waterpipe smoking), existing focus group research had found that the absence of health promotion campaigns on the behaviour reinforced the misconception that it was not harmful [1].

Health campaigns occupy an intersection between public health, health communication and advertising. Their creative execution can give them longevity in people's minds – with people in Australia today still recalling campaigns from decades ago, such as the Life Be In It 'Norm' physical activity campaign of the 1970s [2], the Grim Reaper HIV/AIDS campaign of the 1980s [3], and the visceral imagery of tar being poured over a lung in the national anti-smoking advertisements in the early 2000s [4]. The prominence and memorable nature of health campaigns makes them an enduring and important tool for public health organisations, and they are "key components of comprehensive approaches to improving population health behaviours" [5, p.1268].

1.1 What are public health campaigns?

Campaigns can be defined as activities that "intend to generate specific outcomes or effects in a relatively large number of individuals, usually within a specified period of time, and through an organized set of communication activities" [6, p.419]. Public health campaigns can vary greatly in terms of scale – from small scale (e.g. a specific sociodemographic group in a small geographical region) to large-scale (e.g. national and population-wide). Health campaigns can also range in duration – from very short bursts, to multi-phased multi-year campaigns [5]. Traditionally, health campaigns used a common set of communication channels – television (TV) (including paid advertisements and community service announcements), print (newspaper and magazines), radio, out-of-home (OOH) media (e.g. billboards, posters, banners, bus stop advertisements, etc.), and public relations (PR). They may be conducted in isolation, but they are ideally part of a wider set of health promotion activities to promote a particular health-related behaviour [7].

Public health campaigns have been used to target a diverse range of issues, including tobacco [8, 9], alcohol [10-12], illicit drug use [13], sexual health [14, 15], cancer prevention [16-18], road safety [19, 20], and in recent years there have been many aiming to address chronic diseases through promoting physical activity and healthy eating [21, 22]. Tobacco control campaigns are often considered as an exemplar of health campaigns, in part due to the significant resources invested in them, including their evaluation. Tobacco control campaigns have been the subject of the most campaign evaluation studies of any public health issue [5].

1.2 The role of mass media campaigns in public health

Bauman and colleagues state that “campaigns employ defined mass media channels to *inform, persuade or motivate* whole populations or large population segments to *modify their behavior* [emphasis added]” [7, p.312]. This demonstrates that campaigns aim to influence health-enhancing practices of populations; most commonly in encouraging individuals within the population to make personal behavioural changes. Campaigns are often perceived to play the role of “an important first step in raising awareness” about specific health-enhancing practices among people in a population [7, p.312]. Taking a broader view, mass media campaigns have been described as impacting on individual behaviour changes through both direct and indirect paths – the former describing the effect of the campaign on an individual’s decision to modify their health behaviour, often through priming steps to behavioural change such as awareness; and the latter describing the effect of the campaign on influencing interpersonal conversations, changing social norms within one’s social networks, and prompting changes to health policies [5]. With this role in mind, there is some evidence of the effectiveness of health campaigns in changing population behaviours [5, 23, 24]; recognising that this is often a small magnitude of change in an individual [25], which may potentially represent significant improvements across the population.

1.3 Theories of health campaigns

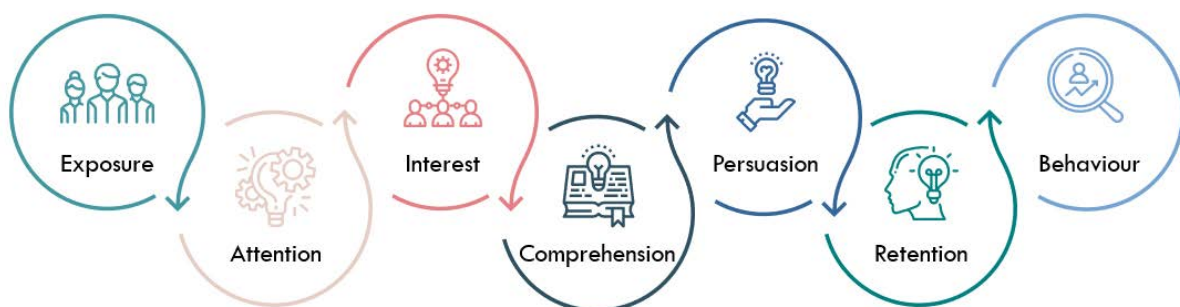
Health campaigns often draw on theories from health promotion, communications and marketing. From the health promotion space, health campaigns are sometimes based on behaviour change theories such as the stages of change (transtheoretical) model, theory of planned behaviour, health belief model, diffusion of innovations, social cognitive theory and social norms theory [25, 26]. The two most commonly used theories in health campaigns – the stages of change (transtheoretical) model and theory of planned behaviour [26] – are very clearly focused on individual behaviour

change. While some of the other theories, such as social cognitive theory and social norms theory, do consider factors external to the individual (such as social influences or environmental reinforcements), their ultimate focus is also usually on effecting change in an individual's behaviour.

The purpose of this section is not to discuss specifically how theories are used to inform the development of health campaigns, but rather to consider the perspective that the theory underpinning a campaign will then inform the measures used in campaign evaluation. The fact that campaigns often draw upon these health promotion theories shows that usually the evaluations of campaigns include measures such as attitudes, behavioural intention, perceived susceptibility and benefits, self-efficacy (i.e. 'priming steps' in an individual to make behaviour change more likely according to the theories); and the ultimate evaluation measures of the campaign are whether individuals report behaviour change as a result of the campaign.

Drawing from the communications sector, a commonly referred to model for public health campaigns is McGuire's model of processes mediating communication impact [27, 28]. This model theorises that once a message is disseminated, people must progress through a series of steps to eventually reach the desired action. McGuire's model posits that someone must first be exposed to the message (exposure), the message needs to attract their attention and gain their interest, they must understand the message (comprehension), they must then accept it as true (persuasion), then they must remember it (retention), and finally they then take appropriate action (see Figure 1.1)[27-29].

Figure 1.1 - McGuire's model of processes mediating communication impact



Drawing from the marketing sector, Kotler and Zaltman outlined the concept of 'social marketing', describing the use of marketing concepts to promote behavioural changes that would improve society or people's health [30]. There is sometimes ambiguity about the key characteristics of social marketing campaigns, but the general concept is that it has a focus on the 'consumer' [31], and that

it draws upon the marketing principle of the '4Ps – product, place, price and promotion' [32]. In practice, many campaigns labelled as 'social marketing' do not have all the features necessary for a social marketing campaign [33], and so often the term 'social marketing campaign' is misused synonymously with health campaigns. Due to the different uses of the term 'social marketing campaigns', the term 'health campaigns' is used preferentially throughout my dissertation.

1.4 Evaluating health campaigns

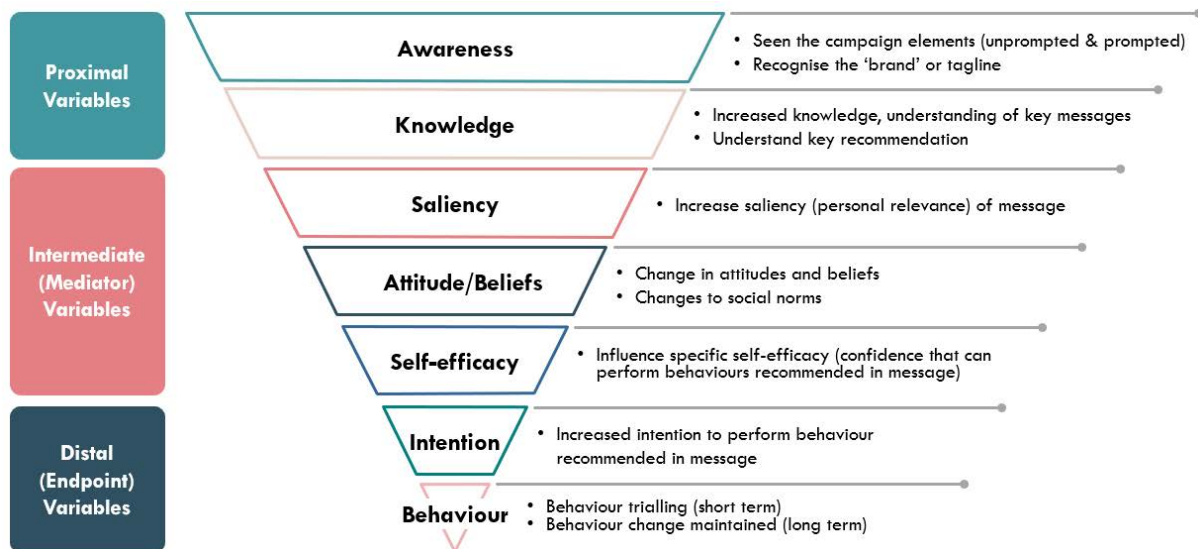
Given the resources required to develop and implement health campaigns (particularly the high costs of broadcast TV advertising), and the limited resources available in public health, health campaigns should be thoroughly evaluated to ensure that their use produces improvements in population health [5]. All stages of campaign evaluation – formative, process, impact, and outcome evaluation – provide valuable information [34].

However, evaluating health campaigns can be challenging. People's behaviour changes are often not a result of one exposure to a campaign, but rather due to a mix of both intrinsic factors (e.g. attitudes, beliefs, motivations), and extrinsic factors (e.g. social, cultural, and environmental factors). Therefore, best-practice health promotion recognises that health campaigns should not be implemented in isolation, but rather as part of a program of work. In addition, the nature of health campaigns is that they are interventions that reach a large proportion of the population, but the specific campaign effects on an individual may be small (i.e. exposure to a campaign may only slightly increase the likelihood that someone changes their behaviour). As such, isolating and measuring the effect of health campaigns can be difficult [5].

Due to the difficulties in measuring health campaigns effects, campaign evaluations draw upon theoretical frameworks to develop proximal measures of impact. These evaluation frameworks combine the theories of health campaigns and communications described above, to outline steps that precede individual behaviour change, which is sometimes called the Hierarchy of Effects Model (see Figure 1.2) [21, 35, 36]. Although such frameworks have not been extensively validated, they have been generally accepted and used for health campaign evaluations [37]. Having a consistent approach to evaluating health campaigns is vastly beneficial, as it allows for comparisons and synthesis of evaluation findings, and in some instances, the development of an understanding what is considered 'best-practice'. For example, in the field of tobacco control, the US Centers for Disease Control and Prevention was able to provide specific guidance on how much exposure was needed in the form of TV TARPs (Targeted Audience Rating Points – a measure of the proportion of the population exposed to an advertisement) to produce notable changes in population smoking levels

[38]. Similar research has been undertaken in Australia that recommended TARP levels and weeks-on-air in regard to tobacco control campaigns [39].

Figure 1.2 - Hierarchy of Effects Model for Mass Media Campaigns



Adapted from Grunseit et al. [21] and Cavill and Bauman [35]

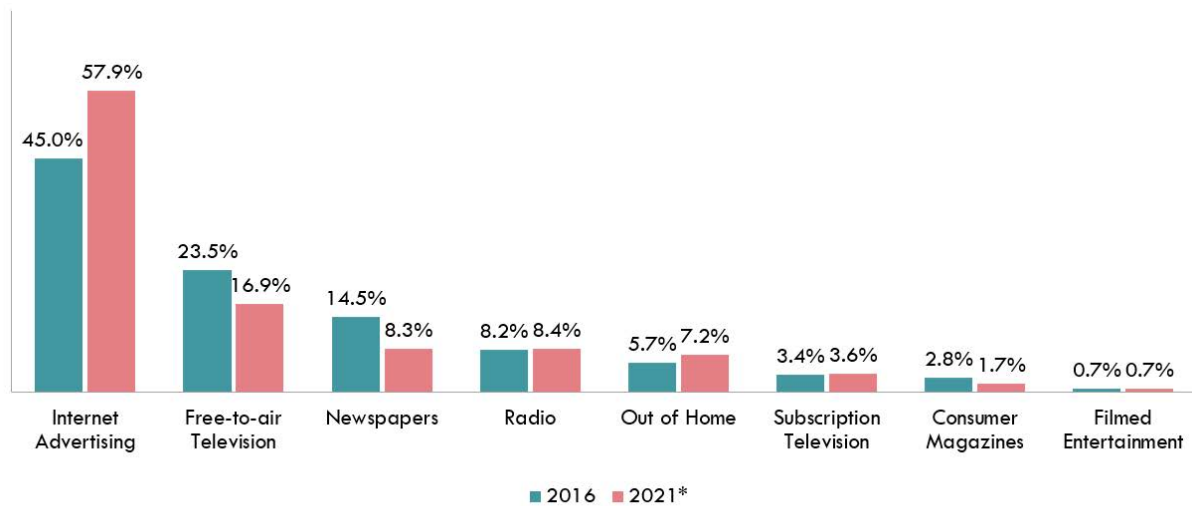
1.5 The rise of digital media

In 2022, a report of digital global trends showed that worldwide 4.95 billion people were internet users (62.5% of the global population), and 4.62 billion were active social media users (58.4% of the population) [40]. In Australia, internet use is ubiquitous, with 91% of the population reported as being internet users (23.6 million Australians), and 83% social media users [40]. On average, an adult internet user spent 6 hours and 13 minutes on the internet per day, including 1 hour and 57 minutes on social media [40]. Even while watching TV, many Australians used the internet simultaneously on another device such as their smartphone or laptop ('multi-screening') [41]. These figures point to the incredible prominence of digital media in people's lives. Where 'traditional' forms of media, such as TV, print and radio, were once the only ways to disseminate a message to a broad population, people now spend overwhelmingly more time being exposed to messages on digital media channels.

The trends in media consumption have been followed by a shift in advertising strategies. Globally in 2021, an estimated US\$521 billion was spent on digital advertising [42]. In Australia that same year, almost \$13 billion was spent on online advertising, reflecting a 36% growth on the previous year [43]. Internet advertising now takes up the largest proportion of the advertising market share in

Australia (Figure 1.3) [44], with the 2022 forecast predicting that digital advertising will represent 73% of total advertising spend [45].

Figure 1.3 - Advertising market in Australia in 2016 and 2021



Additional Information: Australia, PwC, 2016
Sources: PwC, Business Insider © Statista 2022

Source: Hughes [44]
*denotes forecasted share

In terms of health campaigns, there is limited publicly available data on the proportion of campaign budgets spent on digital advertising. One of the most studied health campaigns – a quit smoking campaign in the United States of America (USA) called *Tips from Former Smokers* – cost US\$490 million from 2012-2018. Of this, the main spending was on broadcast TV and radio (\$307.4 million), but \$50.5 million was spent on digital video, and \$29.8 million on mobile and online display ads [46].

The rise of digital media in health campaigns has led to several challenges for campaign evaluations. Firstly, one of the major challenges is the rapidly changing nature of digital media platforms. Even in the course of this PhD dissertation (2018-2022), a new social media platform of TikTok has risen to prominence to become the most downloaded social media app in 2021 [47], social media rules of engagement have changed (for example, Facebook briefly suspended all Australian government and news organisation accounts on its platform in 2021 [48]), and major international legislation on online data privacy has been implemented [49]. These are just a few examples of major changes that have occurred in the past four years that affect how health campaigns are implemented and evaluated; and the unstable nature of the digital landscape means that it is often difficult for research to keep up with practice.

Another major challenge to health campaign implementation and evaluation is the interactive, two-way relational nature of digital media platforms. Traditional media is generally used as broadcast media – i.e. the health organisation sends the message out, and there are minimal opportunities for people to respond back. On the other hand, digital media, particularly social media, have been developed to allow interactions and conversations – e.g. people posting comments, showing their endorsement, or even creating related content (positive or negative). This leads to a blurring of lines of what would traditionally be considered a paid advertising campaign on mass media, to now a wide spectrum of activities ranging from paid advertising, paid PR, earned media¹, and word-of-mouth influence. For example, on social media alone, a campaign could set up a campaign account, post organic (unpaid) content, ‘boost’ that organic content (i.e. pay for that content to be shown to more people), publish a paid ad, ask supporters to share the content with their networks, or pay social media influencers to promote the content to their networks. This has prompted a re-assessment of what we now mean by the term ‘mass media campaigns’, with Willoughby and Noar proposing that mass media campaigns are not defined by the communication channel(s) used, but rather “on the intent of the messaging, with mass mediated health campaigns being those campaigns in which a message was designed to reach a wide audience through a mediated form of communication in an attempt to promote health-related attitudes and behaviors” [25, p.2].

Another significant challenge brought about by digital media platforms for campaign evaluations is in the sheer number of media platforms that are now available for campaigns to use. Traditionally, there were only a limited number of media platforms – TV, print, radio and OOH. Now with digital media, campaign advertisements can be placed on websites, online videos, social media, emails, mobile apps, search engines, and podcasts. For each of these types of media, there are various major branded digital platforms, each with its own range of advertising formats. For example, on social media, the type of content a health campaign would place on Facebook would be very different to that of Twitter, YouTube, Instagram and TikTok. These digital media platforms are often not used as a replacement for traditional media channels, but rather in conjunction. Therefore, the number of media channels that must be considered in a campaign evaluation can become overwhelming. As a result, many health campaigns in the past decade have resorted to simply reporting ‘digital media spend’, with an absence of specifying what exactly the budget was spent on

¹ Earned media is content that has not been paid for, and is not on the campaign’s owned media accounts. Examples of earned media can include: a feature story on an online news website, or a Twitter tweet or Facebook post by a third-party that has not been paid for by the campaign.

[50]. This is a substantial limitation in reporting and evaluation, and presents a significant barrier for the sector in understanding what works for digital health campaigns.

It is worth noting that these challenges of evaluating campaigns on digital platforms are not specific to the health sector and health campaigns. The advertising and marketing sector has also been grappling with these issue [51]. However, the challenges for health campaigns are even greater, as health campaign outcomes such as knowledge, attitudes and behavioural changes are harder to measure than product purchases and profits.

1.6 The need for research into digital health campaign evaluations

As described earlier, in the pre-digital era of campaigns, there were sufficient evaluation findings to help health campaign planners know what works. For example, there was evidence to show that TV is an important media channel for health campaigns, that sufficient media placements over a defined time period are required, and that earned media activities are important [38]. There has since emerged some preliminary research that has shown social media campaigns to be effective at improving health outcomes [25]. But while there is general acceptance that digital media are important channels for health campaigns, there is insufficient evidence to provide any recommendations on how these channels should be used effectively [38]. The US Centers for Disease Control and Prevention advocates that “the measurement and evaluation of digital media interventions are critical to help build an evidence base, to gauge their effectiveness, and to optimise future digital media interventions” [38, p.32] Evidence is required to answer questions such as: how does use of digital media channels compare to traditional media channels, which digital media channels are most effective for health campaigns, what sorts of campaigns (and targeted at which audiences) are best suited to digital campaigns, how much investment is required for an effective digital campaign, and what is the best mix of digital and traditional media channel investment? In order to begin to address these questions about digital media channels, we need to know how to evaluate their use.

In the past decade, health campaigns have applied the traditional model of evaluation outlined earlier (Figure 1.2) to health campaigns that use digital media; however, these evaluations have encountered the challenge of interpreting how some digital metrics² fit with the traditional

² While the term ‘metric’ usually has the specific meaning of a measure that is used to track or assess performance, this thesis uses the term metric when referring to social media, digital and engagement measures, as these are the commonly accepted industry terms (i.e. ‘social media metrics’, ‘digital metrics’ and ‘engagement metrics’).

evaluation framework, particularly the role of online engagement metrics in evaluating the impact of a campaign [25]. Online engagement is widely known as social media actions such as ‘likes’, retweets, and comments. They are a form of interaction (albeit virtual) that did not exist in pre-digital media campaign evaluations, and have only come about due to the two-way relational nature of digital media. Online engagement can be considered as “a quality of user experience with web-based technologies that enable users to interact with, create, and share content with individuals and organizations in their social networks” [52, p.200]. This definition shows that online engagement can encompass a diverse range of experiences and actions; and in the current approach to digital health campaign evaluations, they are often reported with the presupposition that they are important, with assumptions made on how they may fit with the traditional framework of health campaign evaluations.

1.7 Purpose of this research

Given the changes that digital media platforms have created, it is no longer adequate for public health campaigns to simply assume that the traditional campaign evaluation framework is an appropriate approach for evaluations. The purpose of this research is to critically examine the assumption that it is logical to simply ‘add’ digital metrics to the traditional campaign evaluation approach, and explore the significance of online engagement metrics that are commonly reported for health campaigns.

The research questions of this dissertation are:

- How do we currently evaluate health campaigns with a digital component?
- How should digital-specific measures, particularly ‘engagement’, be understood in relation to the overall health campaign evaluation?
- How should we evaluate health campaigns with a digital component?

This dissertation will answer these research questions by:

1. Conducting a literature review of how campaigns with a digital component are evaluated (Chapter 2).
2. Conducting evaluations of three health campaigns with digital components (*Movements Matter*, *Still Six Lives* and *Shisha No Thanks*) based on the current approaches identified in the literature review, and identifying learnings from using these approaches (Part B – Chapter 3 and Chapter 4).

3. Investigating in detail the meanings underlying online engagement with health campaigns through two further studies of health campaigns (*Shisha No Thanks* and *Healthy Lunch Box*) (Part C – Chapter 5 and Chapter 6).

The overall purpose of this research is to explore how digital health campaigns should be evaluated, so that campaign planners and evaluators are able to develop a generally accepted understanding on what evaluations should entail (discussed in detail in Part D) . In the long term, a consistent and robust approach to evaluating digital health campaigns will help campaign planners and evaluators compare campaigns and understand the elements required for effective digital health campaigns.

1.8 Structure of this thesis

Part A of this thesis provides the background to the topic and an overview of current evaluation practices. *Chapter One* introduces the topic of health campaign evaluations and a background to why we need to examine the evaluation approach in light of the use of digital media. *Chapter Two* provides a literature review of current practices of campaign evaluations for campaigns that have a digital component, specifically focusing on tobacco control campaigns; and provides a summary of the current conceptual framework of how digital metrics fit into a campaign evaluation model.

Part B of this thesis reports on evaluations conducted as part of my dissertation on campaigns in two diverse areas of health – stillbirth and waterpipe tobacco (shisha) use. For these campaigns, the current approaches of evaluating digital health campaigns were used, in order to understand whether these are appropriate and justifiable approaches. *Chapter Three* describes the evaluation of two campaigns related to the issue of stillbirth. The first is the *Movements Matter* campaign, a state-based campaign that aimed to raise awareness among pregnant women of the importance of recognising decreased fetal movements. The second is a progression on the first, and is an evaluation of the *Still Six Lives* campaign, which is a national campaign that aimed to raise awareness of stillbirth among the general population and pregnant women. *Chapter Four* reports on the evaluation of a campaign that aims to raise awareness of the harms of waterpipe smoking – the *Shisha No Thanks* campaign. This chapter includes the reporting of the innovative digital-based evaluation approach used for data collection for the evaluation (an SMS community panel), as well as a report of the campaign's impact evaluation.

Part C of this thesis then further explores the underlying meaning of engagement metrics – one of the biggest new grouping of measures used in digital campaign evaluations. *Chapter Five* presents an extension of the *Shisha No Thanks* campaign evaluation, by analysing the social media comments that were a major part of the campaign's online engagement, to understand whether these

engagements did in fact fit with the commonly accepted assumptions of digital campaign evaluations. *Chapter Six* further explores the meaning of engagement metrics through qualitative focus groups of people who have engaged with the Cancer Council NSW's *Healthy Lunch Box – Back to School* campaign. This chapter comprises of two components – the first is a practical proposition of how engagement actions can be understood in the wider campaign evaluation context, as applied specifically to this campaign case study, and the second is an exploration of the underlying meaning of online engagement with health campaigns more broadly.

The final part of this thesis, *Part D (Chapter Seven)*, is a discussion that brings together the learnings and insights from this body of research. It provides a summary of the findings of whether the assumed approach of simply adding digital metrics to a traditional campaign evaluation is valid, summarises the findings on the meaning of online engagement and therefore how we should interpret it, and concludes by discussing the unique contributions of this research towards improving the practice of evaluating digital health campaigns and proposing the key evaluation areas that need to be included for digital health campaigns.

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CHAPTER 2

A SYSTEMATIC LITERATURE REVIEW OF EVALUATIONS OF TOBACCO CONTROL CAMPAIGNS THAT HAVE A DIGITAL COMPONENT

2.1 Introduction

This chapter aims to address the first research question of this dissertation – namely to understand how health campaigns with a digital component are currently evaluated. In reviewing current practice, this research identifies the assumptions that have been made in the evaluation approach, the current issues and challenges in evaluating digital campaigns, and the gaps in our understanding of how health campaigns with a digital component should be evaluated.

I have chosen to specifically focus the review to include campaigns on only one health topic area, so that evaluation measures of the identified campaigns, such as priming steps and campaign outcomes, are more comparable. In selecting one health issue, tobacco control was selected, as outlined in Section 1.1, tobacco control campaigns are among the most well-funded and most well evaluated of health campaigns [1], have been in existence for many decades [2, 3], use a wide range of campaign creatives [4], and are considered to be an exemplar of health campaigns.

2.2 Review of Evaluation Metrics Used in Digital and Traditional Tobacco Control Campaigns (published paper)

This paper reports on a systematic literature review of the evaluations of tobacco control campaigns that use digital media. I conceptualised this study, and designed the research question and search strategy (searching both peer-reviewed articles and grey literature). After conducting the literature review, I interpreted and synthesised the findings, and developed a conceptual framework that illustrates the current approach to contextualising digital metrics within the overall campaign evaluation.

This literature review was published in the *Journal of Medical Internet Research*. The multimedia appendices listed in this paper can be found in Appendix 2.1 and 2.2 of this dissertation.

Chan L, O'Hara B, Phongsavan P, Bauman A, Freeman B. Review of Evaluation Metrics Used in Digital and Traditional Tobacco Control Campaigns. *Journal of Medical Internet Research* 2020;22(8):e17432. doi: 10.2196/17432

Link: <https://www.jmir.org/2020/8/e17432/>

Review

Review of Evaluation Metrics Used in Digital and Traditional Tobacco Control Campaigns

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Abstract

Background: Mass media campaigns for public health are increasingly using digital media platforms, such as web-based advertising and social media; however, there is a lack of evidence on how to best use these digital platforms for public health campaigns. To generate this evidence, appropriate campaign evaluations are needed, but with the proliferation of digital media-related metrics, there is no clear consensus on which evaluation metrics should be used. Public health campaigns are diverse in nature, so to facilitate analysis, this review has selected tobacco control campaigns as the scope of the study.

Objective: This literature review aimed to examine how tobacco control campaigns that use traditional and digital media platforms have been evaluated.

Methods: Medicine and science databases (Medical Literature Analysis and Retrieval System Online [MEDLINE], EMBASE, PsycINFO, Cumulative Index to Nursing and Allied Health Literature [CINAHL], and Scopus), and a marketing case study database (World Advertising Research Center) were searched for articles published between 2013 and 2018. Two authors established the eligibility criteria and reviewed articles for inclusion. Individual campaigns were identified from the articles, and information on campaigns and their evaluations were supplemented with searches on Google, Google Scholar, and social media platforms. Data about campaign evaluations were tabulated and mapped to a conceptual framework.

Results: In total, 17 campaigns were included in this review, with evaluations reported on by 51 articles, 17 marketing reports, and 4 grey literature reports. Most campaigns were from English-speaking countries, with behavioral change as the primary objective. In the process evaluations, a wide range of metrics were used to assess the reach of digital campaign activities, making comparison between campaigns difficult. Every campaign in the review, except one, reported some type of engagement impact measure, with website visits being the most commonly reported metric (11 of the 17 campaigns). Other commonly reported evaluation measures identified in this review include engagement on social media, changes in attitudes, and number of people contacting smoking cessation services. Of note, only 7 of the 17 campaigns attempted to measure media platform attribution, for example, by asking participants where they recalled seeing the campaign or using unique website tracking codes for ads on different media platforms.

Conclusions: One of the key findings of this review is the numerous and diverse range of measures and metrics used in tobacco control campaign evaluations. To address this issue, we propose principles to guide the selection of digital media-related metrics for campaign evaluations, and also outline a conceptual framework to provide a coherent organization to the diverse range of metrics. Future research is needed to specifically investigate whether engagement metrics are associated with desired campaign outcomes, to determine whether reporting of engagement metrics is meaningful in campaign evaluations.

(*J Med Internet Res* 2020;22(8):e17432) doi: [10.2196/17432](https://doi.org/10.2196/17432)

KEYWORDS

mass media; internet; evaluation studies as topic; smoking cessation; public health

Introduction

Background

By 2019, advertising on the internet made up over half of all media spending in 8 countries, including the United Kingdom, China, the United States, and Australia [1]. The growing trend toward digital advertising has extended into public health mass media campaigns, with the majority of these campaigns now using digital media platforms, such as web advertising and social media, in addition to traditional media platforms [2].

Despite the increasing popularity of digital media use, there is a lack of robust evidence on how best to use digital platforms for public health campaigns, including questions around which platforms, or combinations of platforms, are most effective for driving behavioral change [3]. Developing a body of evidence in this area is vital to ensure public health campaigns are effective, that they reach intended audiences, and that there is appropriate investment of resources.

To generate this evidence, appropriate evaluations of campaigns are needed. With the proliferation of digital media platforms, metrics such as likes, engagements, impressions, and click-through rates have become commonplace in evaluations [3-8]. Despite the prevalence of their use, their meaning in public health is not completely understood, and there are currently no clear guidelines on which, if any, of these metrics are relevant for public health campaign evaluations. This situation will continue to become a greater challenge, as the continual emergence of new platforms, such as the recent popularity of Tik Tok (ByteDance) [9], leads to an ever-increasing number of digital evaluation metrics. In addition, the growing number of digital media platforms means that campaigns can use multiple media platforms, creating the additional challenge for practitioners to understand which platform, or combination of platforms, should be used for public health campaigns.

Given varied objectives, strategies, and activities of public health campaigns, this review focuses on campaigns relating only to tobacco control to facilitate comparison. Today, some tobacco control campaigns are among the most advanced public health campaigns in terms of funding, strategy, and evaluation, and have a large underpinning evidence base that describes effective campaigns [10]. Despite this, there is limited evidence on what constitutes effective digital media use in tobacco control campaigns, with the US Center for Disease Control and Prevention's Best Practices for Comprehensive Tobacco Control Programs acknowledging that there is insufficient evidence to make any recommendations on how to best use digital media channels [11]. This gap in knowledge is the background for this review.

Objectives

This paper examines how tobacco control campaigns that use traditional and digital media platforms have been evaluated in the published literature. A better understanding of how to

evaluate these campaigns will enable practitioners and researchers to develop greater insight into how to effectively use digital media platforms for tobacco control campaigns, and more widely, for public health campaigns.

Methods

Data Collection

Data were collected through 3 search approaches: (1) in medicine and science journal databases, (2) in a marketing case studies database, and (3) through internet searches for grey literature, campaign websites, and social media sites.

For medicine and science journals, a search was conducted using the Medical Literature Analysis and Retrieval System Online (MEDLINE) via OvidSP (Wolters Kluwer Health), EMBASE via OvidSP, PsycINFO via OvidSP, and Cumulative Index to Nursing and Allied Health Literature (CINAHL; EBSCO) and Scopus (Elsevier). The search strategy used the following terms: (smok*.mp OR tobacco/) AND (campaign.mp OR mass media.mp) AND (digital.mp OR online.mp). Search results were limited to articles in English and published in the last 5 years (2013-2018). This timeframe was selected to ensure the relevance of this review because of the fast-changing nature of digital platforms and their usage patterns.

The review was supplemented with a search of the marketing database WARC (World Advertising Research Center). For this search, the keyword terms were smoking OR tobacco, with results limited to the last 5 years, within the *Non-profit, public sector, and education* database category.

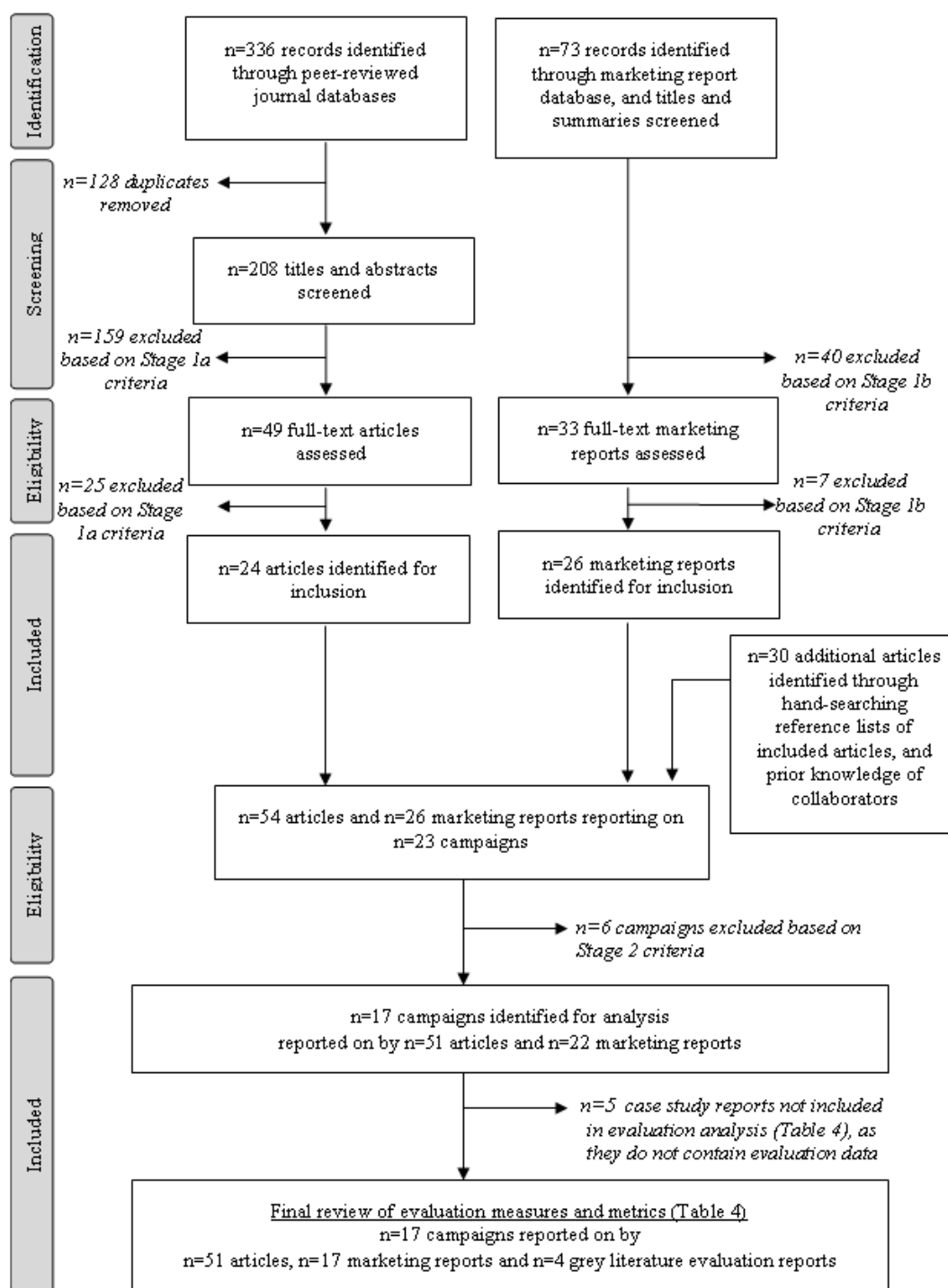
Subsequently, the reference lists of included articles and systematic reviews identified in the literature search were reviewed for additional relevant references.

The first stage of this review involved 2 authors (LC and BH) independently reviewing the same subset (25%) of all identified database search results to establish and test the eligibility criteria (see [Multimedia Appendix 1](#)). One author (LC) then reviewed the remaining search results against the criteria to identify literature that warranted full-text review. The same 2 authors then independently reviewed all full-text articles against the eligibility criteria.

Campaign Identification

The second stage of the literature review involved the identification of individual campaigns from the included articles (see [Figure 1](#)). Each identified campaign was searched on both Google Scholar and Google for evaluation reports, press releases, or other evaluation materials. Campaign websites and social media pages were also searched and examined. Based on these multiple sources, campaigns were assessed for inclusion in the review against the eligibility criteria (see [Multimedia Appendix 1](#)). One author (LC) conducted the additional searches and performed the initial assessment against the eligibility criteria. Two authors (BH and BF) independently reviewed any unresolved campaigns.

Figure 1. Flowchart of search strategy and campaign selection.



Data Extraction

All articles identified throughout the data collection process were recorded using Endnote (Version X8, Clarivate Analytics). Information from multiple sources was then tabulated by campaign to provide a complete picture of the evaluation measures and methods used by each campaign. To provide context for the evaluations, data on each campaign’s objectives,

target audience, and details of media usage (both paid and unpaid) were also collected.

Data Analysis

To summarize evaluation measures used by different campaigns, data were mapped to a conceptual framework (Table 1). This framework includes evaluation metrics that were commonly reported for the digital components of campaigns, alongside measures that have conventionally been used in campaign

evaluations [12,13]. The conceptual framework is based on the different levels of evaluation—process, impact, and outcome. Building on other campaign evaluation models [12,13], this framework incorporates several levels of impact evaluation: measures of campaign awareness, engagement, priming steps, and trialing behaviors (Table 1). Actions within each level of

evaluation are not necessarily equal in value to the overall campaign outcome but are grouped together based the nature of the action. Information on whether and how campaigns measured which media platforms contributed to outcomes was also collected. Formative, precampaign, and message development evaluations were not included in this review.

Table 1. Conceptual framework of campaign evaluation metrics and measures

| Process evaluation | Impact evaluation | | | | Outcome evaluation |
|--|---|--|---|--|--|
| | Awareness | Proximal impact I: Engagement | Proximal impact II: Priming steps | Distal impact: Trialing behaviors | |
| <i>Delivery of campaign</i> | Seen the campaign and perception of the campaign | Showing interest in the campaign or message by taking an action | Priming steps of behavioral change | Initial trialing behaviors and antecedents of behaviors | Desired behavioral change |
| Delivery of <ul style="list-style-type: none"> Television ads (Target Audience Rating Points [TARPs] or Gross Rating Points [GRPs]) Digital video ads (digital GRPs or impressions or video views)^a Digital banner ads (impressions or exposures) Other | <ul style="list-style-type: none"> Campaign recall (including frequency) Media channel attribution (where campaign was viewed)^b Campaign response (eg, relevance, perceived effectiveness, believability)^b | <ul style="list-style-type: none"> Campaign website visits Engagement on social media (eg, likes, comments, shares, follows) Click through rates (on digital ads or social media posts) Information-seeking action on the internet (web search) Other action (eg, download mobile app, sign up to campaign) | <ul style="list-style-type: none"> Knowledge and beliefs Attitudes: about smoking, tobacco industry, etc Attitude: intention to quit Information-seeking action offline (spoke with health care provider) | <ul style="list-style-type: none"> Contact smoking cessation service or registrations to service Quit attempts | <ul style="list-style-type: none"> Sustained quit attempts Population smoking prevalence rates (For nonsmokers): Conversation with family or friend about smoking cessation |

^aAll italics indicate metrics and measures that relate to digital media platforms.

^bIn this review, media channel attribution and campaign responses were measured through both digital platform evaluation methods and traditional evaluation methods.

Results

Study Selection

The medicine or science database searches identified 336 articles. After removal of duplicates, 208 articles were screened. This identified 49 articles for full-text review, and subsequently 24 articles were included in this review. The marketing database search identified 73 reports, and after review, 26 were included. From hand-searching references of the included articles, 30 additional articles were identified for this review (see Figure 1).

Campaign Selection

After further searches for more information about the identified campaigns in grey literature reports, campaign websites and social media pages, 6 campaigns were excluded for the following reasons: insufficient information about the campaign, insufficient information about the digital aspects of the campaign, lack of evaluation data, campaign related to

e-cigarettes, and intervention assessed as not primarily a campaign. As a result, 17 campaigns were included in this review, reported on by 51 peer-reviewed articles and 22 marketing reports. However, 5 of the marketing reports provided contextual campaign information but did not contain unique evaluation data. Therefore, the analysis of evaluations of the 17 campaigns was based on 51 peer-reviewed articles, 17 marketing reports, and 4 grey literature evaluation reports.

Of the 17 identified campaigns, 7 were only located in marketing reports and grey literature, highlighting the benefit of using these additional sources of information for this review. Of the 51 peer-reviewed articles included in this review, 29 reported on the *Tips from Former Smokers* campaign, 7 reported on the *Truth FinishIt* campaign, and 7 reported on *The Real Cost* campaign.

Campaign Characteristics

Most campaigns were from high-income, English-speaking countries, with 6 from the United States, 4 from Canada, 3 from

Australia, and 2 from the United Kingdom. In all, 13 of the 17 campaigns had a primary objective of behavioral change, 2 were awareness-raising campaigns, and 2 were campaigns aimed at changing social norms.

Campaign Evaluation Measures

The types of evaluation measures used for campaigns are summarized in [Tables 2](#) and [3](#).

Table 2. Reported evaluation measures in behavioral change campaigns.

| Campaign | Process | Awareness | Proximal impact: engagement | Proximal impact: priming steps | Distal impact | Outcome |
|----------------------------------|---------|-----------|-----------------------------|--------------------------------|---------------|----------------|
| Tips from Former Smokers | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Stop before the suffering starts | ✓ | ✓ | ✓ | ✓ | ✓ | — ^a |
| Stoptober | — | ✓ | ✓ | ✓ | ✓ | ✓ |
| The Real Cost | ✓ | ✓ | ✓ | ✓ | — | ✓ |
| Be a Failure | ✓ | ✓ | ✓ | ✓ | — | — |
| 16 cancers | — | ✓ | ✓ | — | ✓ | — |
| SmokeFree Teen | ✓ | — | ✓ | — | ✓ | — |
| Fingerband campaign | ✓ | ✓ | ✓ | — | — | ✓ |
| Break it Off | — | — | ✓ | ✓ | ✓ | ✓ |
| Keep Trying | — | — | ✓ | — | ✓ | — |
| No judgments. Just help | — | — | ✓ | — | ✓ | ✓ |
| Personal Testimonies | — | — | ✓ | — | ✓ | — |
| The Smoking Kid | ✓ | — | — | — | ✓ | — |

^aNo data was available on these evaluation measures.

Table 3. Reported evaluation measures in awareness raising and social norm change campaigns.

| Campaign | Process | Awareness | Proximal impact: engagement | Proximal impact: priming steps | Distal impact or outcomes |
|-----------------------|---------|----------------|-----------------------------|--------------------------------|---------------------------|
| Truth FinishIt | ✓ | ✓ | ✓ | ✓ | ✓ |
| The Facts Now | ✓ | — ^a | ✓ | — | ✓ |
| Take it right outside | — | ✓ | ✓ | ✓ | ✓ |
| Quit the Denial | ✓ | ✓ | ✓ | ✓ | — |

^aNo data was available on these evaluation measures.

Process Evaluation Measures

The conceptual framework as described in [Table 1](#) emphasizes quantitative measures for process evaluations of campaigns. Of the 10 campaigns in this review that had a television advertising component, 4 reported the number of target audience rating points (TARPs) or gross rating points (GRPs) [14-23], which are both measures of reach, describing the estimated percentage of the population that viewed the ad.

The majority of campaigns (8/10) using digital videos reported a metric about the reach of the digital video [8,15,19,24-32]. The reach of digital videos was reported using a variety of metrics, including digital TARPs (the equivalent of TARPs for content delivered on a digital platform) [33], impressions (the number of times the content was delivered) [33], exposures (opportunities for the content to be seen [34]), or video views.

The reach of web banner ads was reported as impressions or exposures by 2 campaigns [8,24], and digital impressions by 1 campaign, but it was not clear whether this was for static banner ads and/or digital video ads (*Truth FinishIt*) [35]. One campaign reported measuring banner ad reach but did not report the result (*Be a Failure*) [36].

Campaign Awareness Measures

In all, 7 campaigns evaluated whether people recalled (ie, without prompting with campaign material) or recognized (after being shown campaign material) the campaign, which was primarily measured through sampled surveys or interviews [14,15,19,23,26,35,37-54]. A total of 7 campaigns reported evaluations on the audience’s response to the campaign, such as perceived effectiveness of the campaign or emotional reaction to the campaign. This was evaluated through surveys or interviews or content analysis of social media comments [14,15,25,30,36,51,53-58].

Proximal Impact Evaluation Measures I: Engagement

Proximal impact measures of engagement, such as the number of visits to a website or ad click-through rates (the percentage of times an ad is clicked) [33], represent intermediary steps between exposure to a campaign and the desired outcomes of a campaign (see Table 1).

All but one campaign in this review reported at least one proximal impact measure of engagement. Of all the evaluation measures identified in this review, campaign website visits was the most commonly reported measure (11/17 campaigns) [8,20,24,27,36,37,59-66]. Engagement on social media—broadly encompassing numbers of likes, shares, comments, or followers on any social media platform—was reported for 8 campaigns [8,25-27,29,30,32,35,52,60]. Two of these campaigns used aggregated metrics of engagement (social media engagement rate in *The Real Cost*, and social media conversation in *Quit the Denial*) [26,29].

The number of times an ad was clicked or the click-through rate were only reported in 2 of the 11 campaigns that used web static banner ads (*SmokeFree Teen* and *Tips from Former Smokers*) [8,24].

In all, 5 campaigns reported on whether people exposed to the campaign took an intermediary action of seeking more information about the issue on the internet [14,24,26,36,67,68]. This was either measured through survey questions or through analyzing campaign keyword search trends on search engines (*Tips from Former Smokers* and *Stoptober*) [67,68].

A total of 5 campaigns used other digital media-based measures as part of the evaluation of proximal impact. These included measuring mobile phone app downloads [8,14,60,63], sign ups to the campaign [32], views of email marketing messages [69], and campaign resource downloads [63].

Proximal Impact Evaluation Measures II: Priming Steps

In all, 3 of the 17 campaigns measured knowledge-related outcomes, such as about the health-related harms of smoking or of second-hand smoke [26,40,46,50,70]. A total of 8 campaigns measured attitudes related to smoking, the tobacco industry, and the quitting process [14,23,26,36,39,40,42,43,45,46,51-54,64,67,70,71]. Overall, 8 campaigns specifically measured attitudes around intention to quit smoking [14,21,26,36,39,45,47,48,50,53,60,63]. Changes in knowledge and attitudes were measured by surveys or interviews. In addition, 3 campaigns identified whether people had spoken to a health care professional for more information on quitting [14,26,36].

Distal Impact Evaluation Measures: Trialing Behaviors

The number of people contacting smoking cessation services was reported in 9 of the 13 behavioral change campaigns [8,14,18,22,28,37,59,61,65-67,72,73]. In all, 6 campaigns evaluated the number of people making quit attempts [14,17,21,40,44,46,47,50,60,63,67,72,74,75].

Outcome Evaluation Measures

Finally, 4 campaigns evaluated the number of people with sustained quit attempts [44,47,60,63,72,76]. *The Real Cost*,

which aimed to reduce smoking initiation rates in young people, evaluated smoking initiation behavior [41]. *Tips from Former Smokers*, which had nonsmokers as a secondary target audience, also measured the number of nonsmokers who had initiated conversations about smoking cessation with friends or family [44,50]. These outcomes were all measured by surveys or interviews. In addition, 2 campaigns (*Fingerband Campaign* and *The Facts Now*) used population smoking prevalence rates [25,27], and 1 campaign (*Stoptober*) measured cigarette sale volumes as part of the outcome evaluation [67].

Media Platform Attribution

In all, 7 campaigns attempted to measure media platform attribution, that is, where the audience was exposed to the campaign [8,14,19,35,37,38,40,44,59]. A total of 4 campaigns used surveys or interviews to ask participants where they recalled seeing the campaign (*Stop before the suffering starts*, *Tips from Former Smokers*, *Take it right outside*, and *Truth FinishIt*) [14,19,35,40,44], 2 campaigns used correlations between timings of campaign outcome events with waves of the campaign that used different media formats (*16 Cancers* and *Personal Testimonies*) [37,59], and 1 campaign used unique website tracking codes for ads shown on different media formats (*SmokeFree Teen*) [8].

Discussion

So Many Metrics, Which Ones to Use?

This review found that there is a wide range of metrics used in tobacco control campaign evaluations, as a consequence of the diversity of media platforms and activities employed by campaigns (see [Multimedia Appendix 2](#) [5,8,15-32,35-63,65-85]). While this gives the impression that there is a lot of information about how a campaign performed, in reality the large number of metrics makes it difficult to meaningfully interpret the reported numbers. For process evaluations, there was a gap between evaluations of traditional media use, such as television ads which used the standardized metrics of GRPs or TARPs, compared with digital media platforms which used a variety of metrics including reach, impressions, exposures, video views, and digital GRPs. The diversity in metrics is partially because of the fragmented media landscape, with each digital media platform having its own reporting system. As all the metrics refer to slightly different measures, it makes comparisons between campaigns difficult. In addition, these raw reach metrics on social media may not reflect a broad generalized reach, as one of the criticisms of organic social media activity is that it perpetuates echo chambers, where messages are often only shared between like-minded individuals. This is less of an issue when campaigns use paid social media strategies, where they can choose the target audience of the campaign ads based on demographics, stated interests, and previous online behavior.

Another group of metrics identified in this review were engagement metrics, which result from digital media activities, and were not present in traditional broadcast media. Examples of these metrics included likes, comments, and retweets. The sheer number of these engagement metrics is overwhelming, and it is challenging to know which are meaningful [86,87]. An

additional type of metric identified in this category are metrics which are amalgamations of other metrics, such as social media engagement and social conversation. These have usually been created by advertising companies, and the calculation of these metrics is usually not transparently described. Finally, digital metrics are usually provided by the platforms themselves, which raises a number of issues. First, the platforms are constantly changing their reporting systems. For example, in 2019 Facebook and Instagram began hiding the number of likes publicly displayed [88,89]. Second, the metrics are not open to independent scrutiny as the platforms are not transparent in how the metrics are calculated. For example, Facebook has previously been reported to have inflated its video view metrics [90]. With these factors in play, campaign practitioners are faced with the great challenge of deciding which metrics to use.

There are currently moves to try to create more uniform digital metrics across the board [91-93]; however, this is a complex undertaking and it is unlikely that a standardized system will be developed in the near future. In the meantime, a published glossary explaining commonly used metrics could provide practitioners and evaluators with a greater understanding of the specific definitions of metrics. In addition, when practitioners and evaluators select metrics, they should be guided by certain principles, as opposed to overloading the reader with numbers that may or may not have relevance to the evaluation. Principles to guide the use of metrics include the following:

1. Metrics should be consistent with the objectives of the campaign [87,94]. For example, reach (the number of people who have seen a campaign) would be appropriate for awareness-raising campaigns that aim to reach as many people as possible, whereas impressions (the number of times the campaign has been shown to the target audience) could be more relevant for behavioral change campaigns that aim to communicate a message many times to a targeted audience.
2. Reported metrics should be the simplest metric available for reporting the intended concept, that is, the metric understood by most people. While complex metrics may help practitioners understand how campaigns are performing at the time, they are usually not widely understood. Furthermore, combined metrics, such as “the campaign produced XXX impressions in total,” should be avoided, as they are ambiguous about how the number is calculated across different media.

Contextualizing Evaluation Metrics Through the Conceptual Framework

The conceptual framework in Table 1 provides a starting point in organizing the range of metrics identified in this review. The framework is based on an established program evaluation framework, and for the purposes of planning and evaluating campaigns, provides a structured approach to grouping the metrics. In reality, the flow of events relating to the campaign-desired outcomes may not be linear as depicted in this framework. In the public health literature, several approaches have been used to organize social media metrics [93,95-97]; however, they focus on social media metrics alone, without demonstrating how the social media metrics fit with

other digital media measures or other mass media evaluation measures.

Through the use of this conceptual framework to review the range of metrics, we identified strengths and gaps in the evaluations in this review. A large proportion of campaigns reported proximal impact engagement measures, such as website visits, whereas a smaller proportion evaluated proximal impact priming step measures of health-related knowledge and attitudes. The review also identified that marketing reports generally focused more on process evaluation measures and proximal impact engagement measures, whereas peer-reviewed articles focused more on priming step measures. This distinction has practical implications, as campaigns with smaller evaluation budgets often rely on marketing reports to evaluate the effectiveness of a campaign. Conversely, researchers may only look at peer-reviewed articles to identify best practice in campaign development. As all levels of evaluation are of value, it is important that the full spectrum of evaluation measures is reported to understand the effectiveness of a campaign.

Many mass media campaigns are based on behavioral change theories that have priming steps of changes in knowledge, attitudes, or beliefs as intermediary stages before the behavioral change outcome [15,98]. This conceptual framework demonstrates that there is a gap in understanding of whether there is any relationship between proximal impact engagement measures (such as Facebook likes) and proximal impact priming steps of changes, or other impact or outcome measures. Social media is inherently performative, with the user's social network serving as an audience that observes what content users interact with and share. Motivations for engaging may or may not be linked to processing of campaign messaging. For example, it is possible that content that is highly engaging (eg, humorous or controversial content) does not drive behavioral change, that the desired behavioral change is not personally relevant to advocates who are keen to engage and promote the campaign (eg, ex-smokers), or that people do not engage (by liking, sharing, or commenting) with hard-hitting content that does drive behavioral change, as they may not want their peers to see their engagement with this type of content. Despite looking for indication of a relationship between engagement measures and priming step measures in this review, none of the included campaigns provided data that could allow for the analysis of correlations between these two types of measures. To understand whether engagement metrics are meaningful, future research studies need to specifically design campaign evaluations that look at whether people who undertake digital engagement actions are more or less likely to have changes in knowledge or attitudes, or even make the desired behavioral change [99]. It is only by gaining a greater understanding of the relationship of engagement measures with other evaluation measures that we know whether reporting engagement measures is at all meaningful [99,100].

Measuring Media Platform Attribution

One of the major challenges facing practitioners is knowing where to invest resources given the diverse media landscape. The number of platforms is overwhelming, and without evidence of which are more useful at achieving campaign objectives,

decisions are sometimes made based on opinions or trends. Therefore, this review examined whether campaign evaluations measured attribution, that is, how activity on each media platform used by the campaign contributed to the campaign's outcomes. Despite this being important information, only a low proportion of campaigns (7/17) measured attribution. The methods used to measure attribution included survey self-report, using unique website tracking codes for different media format ads, and using an ecological study approach of correlating exposure of different media use combinations with reported campaign awareness and outcomes.

The majority of mass media campaigns use more than one media platform, as reflected in the campaigns included in this review. Previous research has shown that advertising campaigns on multiple platforms produces higher return-on-investment, and campaigns in sectors that are higher-involvement, such as pharmaceuticals, benefit most from synergistic campaigns using both traditional and digital media [101]. Therefore, while the trend toward multiplatform campaigns is clear, there is a great deal of uncertainty on how to accurately measure attribution in cross-platform marketing campaigns [102-104]. This is an even greater challenge in public health campaigns in comparison to marketing campaigns, as the final outcome to determine return-on-investment is not a purchase, but rather an attitudinal or behavioral change.

In all, 4 of the campaigns in this review used surveys or interviews to determine where people had encountered the campaign. However, this method has widely been found to be inaccurate, particularly where different media interact with one another or are viewed at the same time, making it difficult for people to recall where they encountered the campaign [105]. The study by Pettigrew et al [38] identified that people would often attribute their encounter with a campaign to television, even if this was unlikely to be the case. One campaign in this review (*SmokeFree Teen*) used unique website tracking codes on different media format ads to identify attribution. While this has the benefit of being objective, ad click-throughs underestimate the true impact of campaigns. Ad click-through rates have been steadily dropping over time to an average of 0.1% and have been shown not to have any relationship with ad effectiveness [86]. This may be because people instead search for the campaign on a search engine or manually type in a website address at a later time, rather than clicking on an ad at the time of viewing [24]. In addition, using ad click-throughs to measure attribution only captures the most recent encounter that an individual has with the campaign, not taking into account that earlier encounters with the campaign could have influenced their decision to click on the ad. Other methods of measuring attribution include passive systems of tracking exposure to campaigns, such as household meters to record when the TV is on or computer meters that monitor what websites are visited [106]. These methods are used by market research companies for population samples but were not used by any of the campaign evaluations in this review and are not widely used in public health campaigns as they are expensive to implement.

Given the absence of practical methods for campaign evaluators to accurately measure attribution for individual campaigns, there needs to be guidance provided to practitioners on what are

generally the most effective combinations of media use. To develop such best practice guidelines, more studies examining the synergistic effects of different combinations of media platforms for public health mass media campaigns are required. The study design used by Allom et al [37] provides a good approach to developing a stronger understanding of the effectiveness of different combinations of media. By testing individual and combinations of media platform use at different times (such as TV only, TV and digital video, and web display and digital video) and then measuring campaign awareness and campaign-related events (website visits, calls to Quitline, registrations to quit program), the study provides an understanding of which combinations are more effective. This approach captures the synergistic effect of multiple media platforms, rather than attempting to simplify measurement to the first encounter with a campaign (eg, asking in a survey, "Where did you first see the campaign?") or the last touchpoint with a campaign (eg, tracking click-throughs to a quit website). Further research building on this study would help generate evidence for best practice in cross-platform tobacco control campaigns. This could include replicating the study design with another campaign to validate findings and developing it further by asking about priming steps (eg, attitudes toward smoking) and/or trialing behaviors (eg, quit attempts) in addition to campaign awareness. Furthermore, future studies could explore the effect of varying the order of campaign exposure on different platforms, as it has been shown in advertising campaigns that TV first, then followed by digital, has a much larger synergistic effect than vice versa [101].

Strengths and Limitations

One of the key strengths of this review is the use of peer-reviewed literature, marketing reports, grey literature, campaign websites, and social media sites to collect data for the campaigns. The triangulation of data provides a more comprehensive and practical view of how campaigns are currently evaluated.

This review included a wide range of campaigns in terms of scale, making comparison between campaigns difficult. However, the challenges in campaign evaluation identified in this review are common to all health-related campaigns, regardless of size and resourcing. The inclusion of English-only articles and the high representation of campaigns from English-speaking countries may limit the generalizability of this review's findings and miss potential advances in non-English speaking countries. In addition, the large number of evaluation studies emanating from one campaign (*Tips from Former Smokers*) may also unevenly influence the findings of this review. The exclusion of campaigns about the use of e-cigarettes and waterpipe smoking is another limitation of this review, particularly as these forms of tobacco use are increasing in many populations, and campaigns in these areas may contain advances in the evaluation of digital media. Another limitation of this review is that a large proportion of articles were identified through hand-searching reference lists of included articles. This highlights the complexities in defining appropriate keywords for searching in this area and also supports the value of using this snowball method to ensure the majority of relevant literature is captured. Of note, specific social media-focused keywords

were not included in the search strategy; however, many of the campaigns identified in this review use various social media platforms, suggesting that the overall approach has captured the main forms of social media use by mass media campaigns. In addition, future reviews could benefit from using PubMed searches to ensure newer journals not yet indexed by MEDLINE are included as well. The fragmented amount of information publicly available for some of the included campaigns is also a limitation of this review. Contacting organizations responsible for the campaign could provide more information; however, another review study found this method did not yield much additional information [107].

Conclusions

This review examined how recent tobacco control campaigns that used traditional and digital media platforms were evaluated. It found that in today's fragmented and rapidly evolving media environment, a wide and diverse range of measures and metrics were used in campaign evaluations, particularly for campaign activities relating to digital media use. Purposeful selection of metrics, and utilization of a conceptual framework can help practitioners and researchers make sense of the multitude of metrics and conduct evaluations that further our understanding of how best to use traditional and digital media to communicate health messages to target audiences.

Acknowledgments

LC received support for this research through a PhD scholarship under the Prevention Research Support Program, funded by the New South Wales Ministry of Health.

Conflicts of Interest

None declared.

Multimedia Appendix 1

Eligibility criteria for literature review.

[\[PDF File \(Adobe PDF File\), 813 KB-Multimedia Appendix 1\]](#)

Multimedia Appendix 2

Tobacco control campaigns including a digital media component and their evaluation methods.

[\[PDF File \(Adobe PDF File\), 252 KB-Multimedia Appendix 2\]](#)

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Abbreviations

GRPs: gross rating points

MEDLINE: Medical Literature Analysis and Retrieval System Online

TARPs: target audience rating points

Edited by G Eysenbach; submitted 12.12.19; peer-reviewed by M Navarro, S Beasley; comments to author 01.01.20; revised version received 12.02.20; accepted 21.02.20; published 11.08.20

Please cite as:

Chan L, O'Hara B, Phongsavan P, Bauman A, Freeman B

Review of Evaluation Metrics Used in Digital and Traditional Tobacco Control Campaigns

J Med Internet Res 2020;22(8):e17432

URL: <https://www.jmir.org/2020/8/e17432>

doi: [10.2196/17432](https://doi.org/10.2196/17432)

PMID: [32348272](https://pubmed.ncbi.nlm.nih.gov/32348272/)

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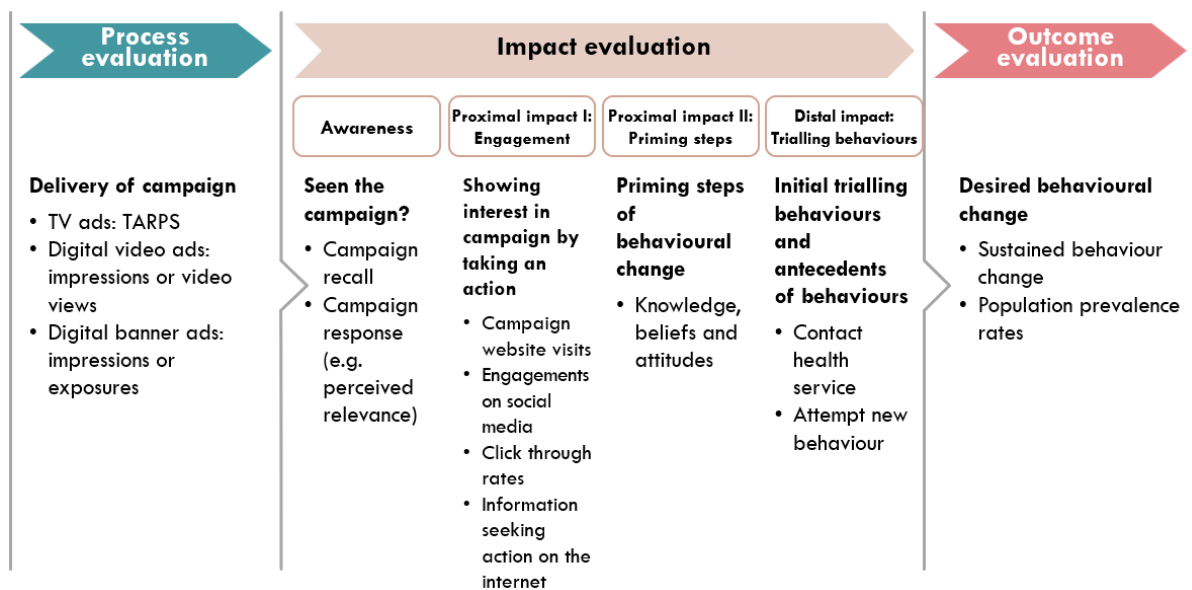
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PART B:
CAMPAIGN EVALUATIONS

INTRODUCTION TO PART B: CAMPAIGN EVALUATIONS

In the literature review described in Section 2.2, I presented a conceptual framework that represents the currently reported evaluation measures for digital health campaigns, and how they may fit with existing campaign evaluation models [1]. A simplified version of this conceptual model is presented below in Figure B.1, and demonstrates some of the assumptions that are currently made about how digital metrics such as engagement may fit with other evaluation measures.

Figure B.1 - Current conceptual framework of campaign evaluation metrics



In this section of my dissertation, I apply the concepts of this framework to the evaluation of campaigns on two different public health issues: stillbirth (Chapter 3) and shisha (waterpipe tobacco) smoking (Chapter 4).

The purpose of this phase of my dissertation research is to understand whether this approach to evaluating digital health campaigns is appropriate and fit for purpose. The use of case studies focusing on stillbirth and shisha (waterpipe) smoking reflect real-world campaign evaluations and their inclusion in this dissertation was opportunistic, based on selecting campaigns that were available for evaluation and that fit the selection criteria for this dissertation. The selection criteria were: that they used multiple media channels, with at least one being a digital channel; that I was able to work closely with the campaign's implementing partners to obtain access to process evaluation measures; and that the campaign's implementing partners were receptive to conducting a thorough evaluation. The different nature of these two public health issues, and differences in the campaigns' development and execution themselves, allowed for a range of considerations to be explored.

CHAPTER 3

EVALUATION OF CAMPAIGNS THAT RAISE AWARENESS OF THE MODIFIABLE RISK FACTORS OF STILLBIRTH

3.1 Introduction

In Australia, 2.6 per 1,000 births are stillborn (defined as the death of a baby in utero after 20 weeks of gestation) [2]. While there has been some improvement over the years, this rate is unacceptably high [3], and there are evidence-based modifiable risk factors that can reduce the risk of stillbirth [4]. The stigma and silence around the issue means that many people are not aware of the modifiable behaviours that can reduce the risk of stillbirth; and therefore, public health campaigns can potentially play an important role in raising awareness of the issue overall, and particularly in improving awareness of the behaviours that pregnant women can take to reduce their risk of stillbirth. A health campaign addressing the issue of stillbirth is likely to be most relevant for a specific target audience – women of child-bearing age, or even pregnant women specifically – which makes digital media channels appropriate choices of communication channels for these campaigns, as they allow for targeting and segmentation of specific demographic groups.

In this dissertation, the first campaign case study (The *Movements Matter* campaign – Section 3.2 and 3.3) evaluates a state-based campaign with a modest budget that aimed to raise awareness of the specific modifiable risk factor of encouraging pregnant women to seek medical attention if they notice a decrease in their baby’s fetal movements. Due to the modest budget, the campaign was mostly implemented on social media, supported by some in-hospital education materials. The thorough evaluation conducted for this first campaign bolstered the argument for, and informed the development of, a scaled-up national campaign – which is the second campaign case study of this dissertation. This second campaign (The *Still Six Lives* campaign – Section 3.4 and 3.5) focused on three modifiable behaviours (being aware of baby’s fetal movements, quitting smoking, and sleeping on side in late pregnancy) with a more substantial budget, and was mostly digital-led, with the campaign using digital advertising, online public relations, social media influencers and social media advertisements and content.

In the evaluation of both the *Movements Matter* campaign (Section 3.3) and the *Still Six Lives* campaign (Section 3.5), it is worth noting that all campaign digital metrics are reported as process evaluation measures, which is different to the categorisation that digital engagement metrics are given in the conceptual framework (Figure B.1). This discrepancy results from the challenges of disentangling digital campaign delivery metrics from engagement metrics, and for the sake of clarity

in the journal manuscripts, they were reported together in the process evaluation sections. This issue is further explored in the Discussion (Section 7.4).

3.2 Background to the *Movements Matter* campaign

The *Movements Matter* campaign was initiated by SaferCare Victoria (an arm of the Victorian state government's Department of Health) in collaboration with the Centre of Research Excellence in Stillbirth (Stillbirth CRE), as a communications campaign to support other clinical stillbirth reduction initiatives. The *Movements Matter* campaign had two main components – the first being an awareness raising campaign targeting pregnant women living in Victoria, and the second was a clinical education campaign targeting clinicians such as midwives, nurses and doctors. The former component used the strategies of social media (paid and unpaid/organic content), targeting pregnant women in Victoria, as well as some in-hospital patient education materials. The key message of the *Movements Matter* campaign was to advise pregnant women to notice their baby's fetal movements, and to seek medical attention immediately if they notice decreased fetal movements (DFM) [5]. Examples of the social media posts featured in the *Movements Matter* campaign are shown in Figure 3.1.

Figure 3.1 - Social media posts from the *Movements Matter* campaign



3.3 Evaluation of *Movements Matter*: A social media and hospital-based campaign aimed at raising awareness of decreased fetal movements (published paper)

My role in the evaluation of the *Movements Matter* campaign was in conceptualising the process evaluation, and co-designing, managing and conducting the impact evaluation. This involved collecting process evaluation measures for the social media, media and in-hospital activities, working with clinicians and other researchers to develop the survey tool to collect data on impact measures from pregnant women and clinicians, overseeing the data collection process, conducting the data analysis to identify differences between baseline and post-campaign responses, and interpreting and reporting the results.




The findings of the process and impact evaluation of the *Movements Matter* campaign have been published in the following article in the *Australian and New Zealand Journal of Obstetrics and Gynaecology*. The appendices listed in this paper can be found in Appendix 2 of this dissertation (Appendix 2.3, 2.4, 2.5, 2.6, 2.7 and 2.8).

Chan L, Gordon A, Warrilow K, Wojcieszek A, Firth T, Loxton F, Bauman A, Flenady V.
Evaluation of Movements Matter: A social media and hospital-based campaign aimed at raising awareness of decreased fetal movements. *Australian and New Zealand Journal of Obstetrics and Gynaecology*. 2021 Dec;61(6):846-854. doi: 10.1111/ajo.13360

Link: <https://obgyn.onlinelibrary.wiley.com/doi/abs/10.1111/ajo.13360>

ORIGINAL ARTICLE

Evaluation of Movements Matter: A social media and hospital-based campaign aimed at raising awareness of decreased fetal movements

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Conflicts of interests: Lilian Chan, Adrienne Gordon, Kara Warrilow, Aleena Wojcieszek, Adrian Bauman and Vicki Flenady are involved with the National Health and Medical Research Council Stillbirth Centre of Research Excellence. Felicity Loxton is employed by Safer Care Victoria, and Tracy Firth was employed by Safer Care Victoria at the time of this research.

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Received: 18 November 2020;

Accepted: 24 March 2021

Background: The Movements Matter campaign aimed to raise awareness of decreased fetal movements (DFM) among pregnant women and inform clinicians of best practice management.

Aim: To conduct a process evaluation of campaign implementation, and an impact evaluation of the campaign's effects on knowledge and experiences of pregnant women, and attitudes and practices of clinicians in relation to DFM.

Methods: This study used a cross-sectional before-after design. Pregnant women and clinicians were sampled at five hospitals. Women were surveyed about their knowledge of DFM, and actions to take if they noticed DFM. Clinicians were asked about their current practices and attitudes about informing women about DFM. Logistic regression was used to calculate campaign effects on outcome measures.

Results: The Movements Matter campaign reached 653 262 people on social media, as well as being covered on news media and popular women's websites. The evaluation surveyed 1142 pregnant women pre-campaign and 473 post-campaign, and 372 clinicians pre-campaign and 149 post-campaign. Following the campaign, women were more likely to be aware that babies should move the same amount in late pregnancy (adjusted odds ratio (aOR) 1.81, 95% CI 1.43–2.27), and were more likely to contact their health service immediately if their baby was moving less (aOR 1.52, 95% CI 1.22–1.91). Clinicians were 2.84 times more likely to recommend women should come in for assessment if they experience DFM (95% CI 1.35–5.97).

Conclusions: This evaluation has shown that a campaign using social media and in-hospital education materials led to some increases in knowledge about fetal movements among pregnant women.

KEYWORDS

fetal movement, patient education as topic, pregnancy, social media, stillbirth

INTRODUCTION

Maternal perception of decreased fetal movement (DFM) is a known risk factor for stillbirth,¹ but many women do not receive information about the importance of promptly reporting DFM to their healthcare provider.^{2,3} Women who experience stillbirth are less likely to have been told to monitor fetal movements by their healthcare provider.⁴ Pregnant women are given a myriad of advice, and much about fetal activity is inaccurate,^{5,6} so ensuring they receive and retain evidence-based advice about monitoring and reporting DFM is a challenge.

The Movements Matter campaign aimed to raise awareness among pregnant women of the importance of seeking advice immediately if they notice DFM. This campaign employed social media and public relations, in addition to in-hospital education methods. The campaign was initiated by SaferCare Victoria, with the intention of running an awareness campaign aligned with a collection of interventions in clinical settings targeting stillbirth (the Safer Baby Bundle (SBB)). Victoria in Australia was targeted, as the state was an early-adopter of the SBB. The Centre of Research Excellence in Stillbirth (Stillbirth CRE) was asked to collaborate in the running and evaluation of the campaign. The campaign ran from October–December 2018.

Social media are increasingly used as communication channels for health campaigns,^{7,8} as it is a cost-effective way of reaching specific target audiences, such as women of childbearing age. However, the effectiveness of using social media in campaigns has not been well evaluated.^{9,10} This study describes the implementation of the Movements Matter campaign and evaluates its effectiveness in promoting awareness of DFM among pregnant women and clinicians.

MATERIALS AND METHODS

The Movements Matter campaign

The Movements Matter campaign comprised two components: one targeting pregnant women in Victoria who were ≥ 28 weeks gestation, and the other targeting clinicians in Victoria who provided care to pregnant women.

The component targeting pregnant women focused on raising awareness that slowing of their baby's movements toward the end of pregnancy was not normal, and to contact their healthcare provider immediately if they noticed DFM. Campaign material was adapted by the Stillbirth CRE with its communications agency (89° East), drawing on consultations with women and clinicians, and a review of existing materials used in Australia and the UK.^{11,12} During the campaign, 500 posters and flyers were distributed in Victorian hospitals. The paid social media campaign targeted women aged 18–45 years in Victoria, and consisted of nine boosted posts on Facebook and Instagram (Appendix S1). One social media post was translated into numerous languages.

The paid social media expenditure was 25 000 AUD. The campaign established a website (movementsmatter.org.au) and social media accounts (twitter.com/MovesMatter, facebook.com/movementsmatterAU, instagram.com/movementsmatterau) which shared paid and organic content, promoted the hashtag #movementsmatter, and pitched articles to popular Australian websites.

The clinicians' component aimed to reinforce best practice management of DFM presentations, including promoting clinical guidelines produced by the Stillbirth CRE in partnership with the Perinatal Society of Australia and New Zealand, and endorsed by the professional colleges of the Royal Australian and New Zealand College of Obstetricians and Gynaecologists and the Australian College of Midwives.^{13,14} Clinicians were provided with e-learning materials, including a webinar, e-newsletter material, and professional development workshops. These resources were made available on the SaferCare Victoria website and promoted to clinicians in Victoria through emails to Victorian maternity service chief executive officers (CEOs), clinical network e-newsletters and the SaferCare Victoria social media channels.

Study design, participants, and data collection

This evaluation employed a before-after design. The pre-campaign data were collected from 14 to 28 August 2018, the campaign was launched on 8 October, and the post-campaign data were collected from 19 November to 3 December 2018. This post-campaign data collection period was toward the end of the two-month campaign, but before the end of the year, during which some sites functioned at reduced capacity. Data were collected from five sites in Victoria, consisting of three metropolitan, one regional, and one rural hospital. The study was approved by the Mater Misericordiae Ltd Human Research Ethics Committee (HREC 14/MHS141). Further jurisdictional ethics approval was obtained from the Victorian HRECs, Melbourne Health HREC and the Mercy Health HREC.

Two surveys were developed for data collection – one for pregnant women (Appendix S2), and one for clinicians (Appendix S3). The surveys were developed by the Stillbirth CRE, drawing upon questions from the My Baby's Movements study, and the evaluation of a campaign run by Tommy's in the UK. The survey was piloted with the Perinatal Society of Australia and New Zealand Consumer Panel and the Still Aware Consumer Group.

Pre- and post-campaign, women were asked about their knowledge of baby movements, and the appropriate action if they noticed DFM. Questions also sought attitudes toward monitoring baby's movements, barriers to seeking advice, and what information they had received so far. Clinicians were asked what advice about fetal movements should be given to women, how this advice should be provided, how frequently they explain the link with stillbirth, the importance of providing information about DFM, and whether this could have adverse effects of increasing anxiety or unnecessary hospital presentations.

Women attending antenatal clinics at any of the five sites were invited to complete the survey through an online link. Participants were eligible if they were at ≥ 28 weeks gestation and had been receiving antenatal care at one of the sites. Clinicians were sampled from the same sites, and were invited to complete the survey by their clinical directors through an online link.

Data about reach and engagement on social media were collected from Facebook and Instagram.

Data analysis

Analyses were descriptive for the survey data. Differences between pre- and post-campaign sample characteristics were assessed using χ^2 tests. Campaign effects for women were estimated as the likelihood of understanding of fetal movements, comparing post-campaign with pre-campaign samples, using forced entry logistic regression and adjusting for potential confounders (age, primiparous status, gestation, language, and education). Campaign effects for clinicians were estimated as the likelihood of changes in practice and attitudes about informing women of DFM, and were adjusted for potential confounders (length of practice, geographical category and profession). Responses about agreement with statements were dichotomised, with 'disagree/strongly disagree/neutral' as the reference category. Adjusted odds ratios (aORs) with 95% confidence intervals are reported, analysed using IBM SPSS Statistics v24. Free-text responses about message recall were coded manually using Microsoft Excel.

RESULTS

Process evaluation

The estimated combined organic and paid Facebook and Instagram reach was 653 262 people. The paid campaign, which targeted women 18–45 years in Victoria, reached 620 536 women, which represented 85% of the target audience using Facebook. There were over 2.4 million impressions of the paid Facebook posts, which translates to each woman seeing a paid post 3.9 times on average (see Appendix S4 for additional details).

The campaign garnered six media stories, featuring testimonies of pregnant women who experienced DFM, which were published in print and online news (The Guardian and The Courier Mail) and popular women's issues websites (Mamamia and 9Honey).

The clinicians' component was promoted to Victorian clinicians through six e-newsletters to clinical networks (including the Victorian Maternity and Newborn Clinical Network, Australian Nursing & Midwifery Federation, and SaferCare Victoria Midwifery Newborn Clinical Network) and presented at three education events and nine workshops. The email invitation for the webinar was opened by 37% of Victorian maternity service CEOs. There were 165 clinicians registered for the webinar and 69 participated in the live webinar. The webinar was also recorded and placed on the Better Safer Care website.

Impact evaluation

Women's survey

The pre- and post-campaign survey samples of women are shown in Table 1. Samples were similar by age group, gestation and parity, but differed for whether they were born in Australia and spoke English as a first language.

At the post-survey, unprompted recall of the campaign (ie asking women if they had seen any advertising about baby's movements) was reported by 32.6% of women (95% CI 28.4–36.9%), and prompted recall (ie showing campaign images in the survey, and asking women if they had seen it) was 39.1% (95% CI 34.8–43.6%). Prompted recall was similar across age groups, and by gestation (Fig. 1). However, unprompted recall was low among women <25 years old (16.7%). The most frequently reported sources of encountering the campaign were at hospital clinics (84.9%), followed by Facebook (29.7%). The most frequently cited origins of the campaign were clinical professional organisations (58.4%), and the Victorian Government (20.0%). Most (94%) reported the message was relevant, 99% said it was perfectly or somewhat clear, and 95% felt confident and likely to contact their healthcare provider if concerned about DFM (see Appendix S5).

Of the people who responded they had seen advertising about baby's movements, 34% provided the campaign name or key message when prompted for details. However, 17% responded with the name of a concurrent DFM intervention (My Baby's Movements app).

Table 2 shows responses to campaign-specific knowledge and attitude questions. Following the campaign, women were significantly more likely to be aware that 'babies moved about the same amount in late pregnancy' (aOR 1.81, 95% CI 1.43–2.27), and more likely to contact health services immediately if their baby was moving less (aOR 1.52, 95% CI 1.22–1.91). Women were more likely to report having received both written and verbal information after, compared to before the campaign (aOR 2.33, 95% CI 1.86–2.92) (see Appendix S6 for more detailed results of these survey items). Women were also significantly more likely to report that their clinician had explained the risk (aOR 1.70, 95% CI 1.35–2.14).

Clinicians' survey

The clinicians' survey data are shown in Tables 1 and 3. More regional/rural clinicians participated in the post-survey ($n = 91$) than the pre-survey ($n = 25$).

During the post-survey, 76.5% (95% CI 69.1–82.6%) of clinicians recalled seeing a campaign about DFM. Post-campaign, 43.6% (95% CI 35.9–51.6%) reported receiving information about patient education on the topic. SaferCare Victoria, the Stillbirth CRE and/or the Victorian State Government were reported by 63.2% of respondents as the organisation(s) which had delivered the campaign. Of respondents who had seen the campaign, 89.5%

TABLE 1 Demographic characteristics of women and clinicians for pre- and post-campaign samples

| | Pre-campaign | | Post-campaign | | χ^2 | P-value |
|---|--------------|------|---------------|-------|----------|---------|
| | n | % | n | % | | |
| Women | n = 1142 | | n = 473 | | | |
| Age | | | | | - | - |
| <25 years | 92 | 8.1 | 48 | 10.1 | | |
| 25–34 years | 714 | 62.5 | 273 | 57.7 | | |
| ≥35 years | 336 | 29.4 | 152 | 32.1 | | |
| Weeks of gestation | | | | | 0.23 | 0.63 |
| 28–36 weeks | 791 | 69.3 | 334 | 70.6 | | |
| ≥37 weeks | 351 | 30.7 | 139 | 29.4 | | |
| First pregnancy (Yes) | 533 | 46.7 | 249 | 52.6 | 4.54 | 0.03 |
| Born in Australia (Yes) | 603 | 52.8 | 299 | 63.2 | 14.28 | <0.001* |
| First language English (Yes) | 755 | 66.1 | 382 | 80.8 | 33.75 | <0.001* |
| University education (Bachelor, Graduate Certificate or Postgraduate) | 706 | 62.0 | 290 | 61.3 | 0.04 | 0.84 |
| Location of care | | | | | - | - |
| Mercy Hospital | 230 | 20.1 | 50 | 10.6* | | |
| Royal Women's Hospital | 616 | 53.9 | 297 | 62.8* | | |
| The Northern Hospital | 259 | 22.7 | 9 | 1.9* | | |
| La Trobe Regional Hospital | 38 | 3.3 | 6 | 1.3 | | |
| Ballarat Base Hospital | 10 | 0.9 | 114 | 24.1* | | |
| Clinicians | n = 372 | | n = 149 | | | |
| Length of time in clinical practice | | | | | 3.36 | 0.07 |
| ≤5 years | 182 | 48.9 | 59 | 39.6 | | |
| >5 years | 190 | 51.1 | 90 | 60.4 | | |
| Gender | | | | | 0.23 | 0.63 |
| Male | 15 | 4.0 | 4 | 2.7 | | |
| Female | 357 | 96.0 | 145 | 97.3 | | |
| Professional discipline | | | | | - | - |
| Midwifery | 310 | 83.3 | 118 | 79.2 | | |
| Obstetrics and/gynaecology | 49 | 13.2 | 25 | 16.8 | | |
| Other nursing or medical | 13 | 3.5 | 6 | 4.0 | | |
| Geographic location of health facility | | | | | 178.47 | <0.001* |
| Metropolitan | 347 | 93.3 | 58 | 38.9 | | |
| Regional/rural | 25 | 6.7 | 91 | 61.1 | | |

*Statistically significant, with P-value set at <0.01.

had seen it at a healthcare setting and 49.1% on social media (see Appendix S5 for more details).

Table 3 shows responses to statements about their clinical practice regarding DFM. Clinicians were twice as likely post-campaign to explain the link between DFM and stillbirth all/most of the time (aOR 2.11, 95% CI 1.29–3.46). Post-campaign, clinicians were 2.84 times as likely to recommend that women should come in immediately if they experience DFM (95% CI 1.35–5.97).

Post-campaign, fewer clinicians agreed that women need information about fetal movements (aOR 0.15, 95% CI 0.04–0.53) and that providing women with DFM information should be part of routine care (aOR 0.13, 95% CI 0.04–0.42). In addition, clinicians

were more likely to consider that providing women with DFM information would increase anxiety (aOR 2.64, 95% CI 1.43–4.86). A greater proportion of clinicians also felt providing women with information would increase unnecessary hospital presentations, and that women reported DFM because they want an induced labour, but these differences were not statistically significant (Table 3).

DISCUSSION

This evaluation found that the Movements Matter campaign was somewhat effective in increasing awareness of DFM among

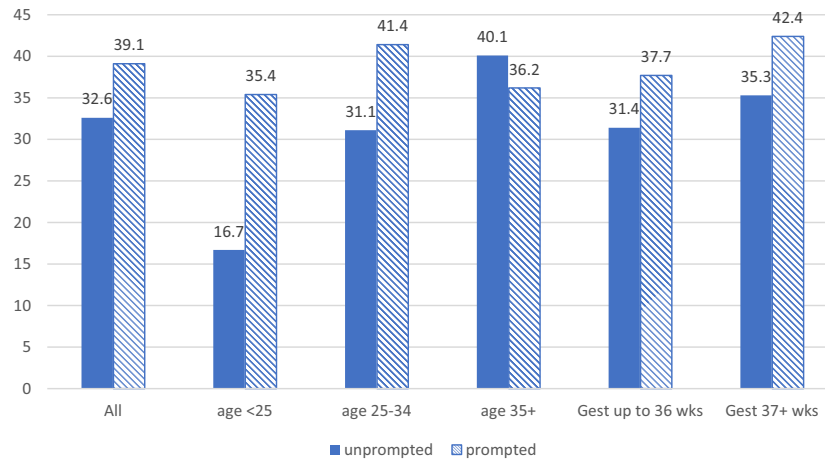


FIGURE 1 Campaign recall (%) among women by demographic groups (post-campaign).

pregnant women. The campaign led to increases in knowledge about what is considered ‘normal’ movements, how much their babies move in late pregnancy and, importantly, increased awareness of contacting their healthcare provider immediately if they notice DFM. After the campaign, more women reported receiving both written and verbal information about the importance of babies’ movements and receiving explanations about the link between DFM and stillbirth. This was corroborated by the finding that clinicians were more likely to explain the link between DFM and stillbirth to pregnant women, and were more likely to recommend to women that they should come in immediately for assessment if concerned. However, there is still a need for more improvements, as after the campaign, the proportion of surveyed women who received both written and verbal information was just under half, and 11% of women still were not encouraged to seek medical attention if they were worried about their baby’s movements.

Almost 40% of women recalled seeing something about the campaign; however, unprompted campaign recall among women <25 years was lower than other age groups, suggesting the campaign did not resonate as strongly with this group. While many respondents reported seeing the campaign in hospital, process evaluation measures also suggested large reach from social media.

Previous studies have looked at the effect of using verbal instruction, brochures, leaflets, or websites to inform women about DFM.^{15–18} One study found that an information brochure alone was effective in increasing the likelihood of a woman seeking care immediately.¹⁵ The AFFIRM trial in the UK involving 33 hospitals, assessed the impact of an intervention package, which included a clinical management protocol and leaflet for pregnant women, and did not demonstrate any significant differences in stillbirth rates.¹⁶ However, no details were reported about distribution of the leaflet, and the intervention did not include a wider public awareness campaign, or measure changes in awareness among pregnant women.¹⁹ Other approaches to raising awareness of fetal movements among pregnant

women are currently being trialled, such as the Mindfetalness method.^{20,21} Future research needs to evaluate whether any interventions aimed at awareness of DFM goes beyond knowledge and attitudes, and leads to changes in maternal behaviour (eg regular monitoring of fetal movements, or reporting of changes in fetal movements).

It is worthwhile to note that the results of this study may be impacted by other concurrent events, such as a Senate inquiry into stillbirth research and education, and media coverage of the stillbirth experienced by a famous footballer’s partner. In addition, the My Baby’s Movement intervention, which comprised of a mobile phone application and educational program for clinicians,²² was launched during the Movements Matter campaign. As the timing of the Movements Matter campaign was determined by the initiating organisation, it was not possible to conduct the campaign at a different time; and while this evaluation study minimised the influence of this concurrent intervention by collecting data from hospitals that were not part of the My Baby’s Movements intervention, the free-text survey responses suggest there may still have been some confusion among women between the two interventions.

Over 90% of clinicians at pre- and post-campaign agreed that pregnant women need information about fetal movements, and its importance in routine antenatal care; this is greater than previous studies that found over 80% of clinicians thought asking about fetal movements should be part of routine care.²³ In this study, a relatively low proportion of clinicians recalled receiving information about patient education. Process evaluation showed that the clinician component did not have great reach, particularly with low webinar attendance. The increase in proportion of clinicians to up to one in five, who felt that providing DFM information could lead to increased anxiety warrants further exploration. The timing of the post-campaign survey coincided with the publications of the AFFIRM trial results showing the intervention was associated with more obstetric interventions,¹⁵ which may have influenced the attitudes of clinicians in this study.

TABLE 2 Women's knowledge, attitudes, barriers and previous experience relating to main messages of campaign at pre- and post-campaign

| | Pre-campaign, <i>n</i> = 1142 | | Post-campaign, <i>n</i> = 473 | | Odds ratio (95% CI) | |
|---|----------------------------------|------|----------------------------------|------|---------------------|-------------------|
| | <i>n</i> | % | <i>n</i> | % | Unadjusted | Adjusted† |
| Knowledge | | | | | | |
| Around how many baby movements should you feel each day after 28 weeks? | | | | | | |
| No specific number, but whatever feels normal for my baby | 551 | 48.2 | 267 | 56.4 | 1.39 (1.12–1.73)* | 1.30 (1.04–1.62) |
| Other (5/10/15 or more/I don't know) | 591 | 51.8 | 206 | 43.6 | 1.0 (ref) | 1.0 (ref) |
| Knowledge | | | | | | |
| What happens to baby's movements toward the end of pregnancy? | | | | | | |
| Babies move the same amount toward the end of pregnancy | 354 | 31.0 | 224 | 47.4 | 2.00 (1.61–2.50)* | 1.81 (1.43–2.27)* |
| Other (Movements stop/Move less/Move more/I don't know) | 788 | 69.0 | 249 | 52.6 | 1.0 (ref) | 1.0 (ref) |
| Knowledge | | | | | | |
| What should you do if you feel your baby is moving less than usual? | | | | | | |
| Contact your doctor or midwife immediately | 400 | 35.0 | 206 | 43.6 | 1.43 (1.15–1.78)* | 1.52 (1.22–1.91)* |
| Other | 742 | 65.0 | 267 | 56.4 | 1.0 (ref) | 1.0 (ref) |
| Attitudes | | | | | | |
| Being aware of my baby's movements during pregnancy... | | | | | | |
| Helps me to know if my baby is well | 1074 | 94.0 | 454 | 96.0 | 1.51 (0.90–2.55) | 1.26 (0.74–2.14) |
| Barriers | | | | | | |
| What would prevent you from calling your doctor or midwife if you were worried that your baby was moving less? | | | | | | |
| Uncertainty about whether my baby really was moving less | 566 | 49.6 | 254 | 53.7 | 1.18 (0.95–1.46) | 1.13 (0.91–1.41) |
| Worry about wasting my doctor's or midwife's time | 246 | 21.5 | 124 | 26.2 | 1.29 (1.01–1.66) | 1.15 (0.89–1.48) |
| Worry about being a 'nuisance' because I had called or gone in previously and it had been fine | 206 | 18.0 | 107 | 22.6 | 1.33 (1.02–1.73) | 1.21 (0.92–1.58) |
| Someone I trust told me it's normal for babies to move less toward the end of pregnancy | 117 | 10.2 | 24 | 5.1 | 0.47 (0.30–0.74)* | 0.54 (0.34–0.86)* |
| None of the above | 318 | 27.8 | 134 | 28.3 | 1.02 (0.81–1.30) | 1.06 (0.83–1.35) |
| Experiences | | | | | | |
| Has your doctor or midwife given you information about the importance of babies' movements during pregnancy? | | | | | | |
| Yes, both verbal and written information | 323 | 28.3 | 227 | 48.0 | 2.34 (1.88–2.92)* | 2.33 (1.86–2.92)* |
| Other (including: Yes written information, Yes verbal information, No, Can't remember/not sure) | 819 | 71.7 | 246 | 52.0 | 1.0 (ref) | 1.0 (ref) |
| Experiences | | | | | | |
| Has your doctor or midwife explained that decreased fetal movements is linked with stillbirth? | | | | | | |
| Yes | 335 | 29.3 | 190 | 40.2 | 1.62 (1.29–2.02)* | 1.70 (1.35–2.14)* |
| No or can't remember/not sure | 807 | 70.7 | 283 | 59.8 | 1.0 (ref) | 1.0 (ref) |
| Experiences | | | | | | |
| Has your doctor or midwife encouraged you to contact them or come to hospital if you are worried about your baby's movements? | | | | | | |
| Yes | 1010 | 88.4 | 421 | 89.0 | 1.06 (0.75–1.49) | 1.12 (0.79–1.60) |
| No or can't remember/not sure | 132 | 11.6 | 52 | 11.0 | 1.0 (ref) | 1.0 (ref) |

*Statistically significant, with *P*-value set at <0.01.

†Odds ratio adjusted for age group, primiparous status, gestation, first language English and level of education (university education).

TABLE 3 Clinicians' attitudes and practices pre- and post-campaign

| | Pre-campaign, <i>n</i> = 372 | | Post-campaign, <i>n</i> = 149 | | Odds ratio (\pm 95% CI) | |
|--|------------------------------|------|-------------------------------|------|----------------------------|-------------------|
| | <i>n</i> | % | <i>n</i> | % | Unadjusted | Adjusted† |
| Statements about practice | | | | | | |
| Do you explain to pregnant women that decreased fetal movement is linked with stillbirth? | | | | | | |
| Never/rarely/sometimes | 211 | 56.7 | 62 | 41.6 | 1.0 (ref) | 1.0 (ref) |
| Always or most of the time | 161 | 43.3 | 87 | 58.4 | 1.84 (1.25–2.70)* | 2.11 (1.29–3.46)* |
| Advice to give women about knowing fetal movements | | | | | | |
| Know usual movements, act urgently if decrease | 362 | 97.3 | 146 | 98.0 | 1.34 (0.37–4.96) | 1.86 (0.34–10.17) |
| Form of advice given about decreased fetal movement risks | | | | | | |
| Other | 25 | 6.7 | 9 | 6.0 | 1.0 (ref) | 1.0 (ref) |
| Verbal and written advice | 347 | 93.3 | 140 | 94.0 | 1.12 (0.51–2.46) | 1.51 (0.56–4.11) |
| Advice if women notices decreased fetal movements | | | | | | |
| Other | 88 | 23.7 | 13 | 8.7 | 1.0 (ref) | 1.0 (ref) |
| Come in for immediate assessment | 284 | 76.3 | 136 | 91.3 | 3.24 (1.75–6.01)* | 2.84 (1.35–5.97)* |
| Statements: 'How much do you agree with the following statement?' | | | | | | |
| Pregnant women need information about the importance of being aware of fetal movements | | | | | | |
| Strongly agree/agree | | 98.7 | | 93.3 | 0.19 (0.06–0.56)* | 0.15 (0.04–0.53)* |
| Neutral/disagree/strongly disagree | | 1.3 | | 6.7 | 1.0 (ref) | 1.0 (ref) |
| Providing women with information about decreased fetal movements should be part of routine antenatal care | | | | | | |
| Strongly agree/agree | | 98.7 | | 92.6 | 0.17 (0.06–0.50)* | 0.13 (0.04–0.42)* |
| Neutral/disagree/strongly disagree | | 1.3 | | 7.4 | 1.0 (ref) | 1.0 (ref) |
| Providing women with information about decreased fetal movements will increase their anxiety during pregnancy | | | | | | |
| Strongly agree/agree | | 10.5 | | 28.2 | 3.36 (2.06–5.46)* | 2.64 (1.43–4.86)* |
| Neutral/disagree/strongly disagree | | 89.5 | | 71.8 | 1.0 (ref) | 1.0 (ref) |
| Providing women with information about decreased fetal movements will increase unnecessary presentations to hospital | | | | | | |
| Strongly agree/agree | | 10.5 | | 16.8 | 1.72 (1.00–2.96) | 1.42 (0.71–2.82) |
| Neutral/disagree/strongly disagree | | 89.5 | | 83.2 | 1.0 (ref) | 1.0 (ref) |
| Women often report decreased fetal movements because they want an induction of labour | | | | | | |
| Strongly agree/agree | | 12.6 | | 22.8 | 2.04 (1.25–3.33)* | 1.34 (0.71–2.54) |
| Neutral/disagree/strongly disagree | | 87.4 | | 77.2 | 1.0 (ref) | 1.0 (ref) |

*Statistically significant, with *P*-value set at <0.01.

†Odds ratio adjusted for length of practice, metro/rural and professional group.

Strengths and limitations

A key strength of this study was the inclusion of women and clinicians, enabling data collection from multiple perspectives and opportunity to corroborate results. Another strength was the inclusion of a detailed process evaluation, enabled by close collaboration between campaign organisers, media planners and evaluators, and this was useful in interpreting the impact evaluation results.

This study has several limitations. There were significant differences in number of participants recruited from several sites in

the pre- and post-campaign surveys, which could influence these findings. The larger number of women and clinicians from regional/rural sites in the post-survey was due to a more concerted study recruitment push at one of the regional/rural sites (Ballarat Base Hospital) during the post period. Another limitation is that the majority of women in the post-survey spoke English as a first language. Future targeting campaigns to women from culturally and linguistically diverse backgrounds are important, as these groups may experience a higher risk of stillbirth.^{24,25} In regard to the clinicians' survey, one limitation is that few clinicians were obstetricians or gynaecologists, which could limit the generalisability

of the results to all clinicians. Furthermore, as some clinicians worked at more than one of the study sites, hospital site could not be included in the analysis of the clinician results. In addition, while this study examined process and impact evaluation measures, it was not possible to measure objective outcomes of the campaign (eg DFM presentations). Finally, a sample size calculation was not performed for this study, as a pragmatic approach was required for the study to fit with existing campaign schedules. Therefore, this study is viewed as a pragmatic evaluation, providing preliminary evidence of the effects of a regional campaign, which can inform future national campaigns.

This evaluation presents some evidence that a short, targeted DFM awareness campaign may increase pregnant women's awareness of the importance of contacting their healthcare provider in the event of DFM. While further evidence is needed regarding changes in maternal behaviour, and ultimately reducing stillbirth rates and other clinical outcomes, this mass-reach campaign approach should be sustained, and may improve pregnant women's confidence for contacting their healthcare provider when they experience DFMs.

ACKNOWLEDGEMENTS

We thank the staff at sites involved in recruiting participants for this study, and particularly Robyn Matthews (Royal Women's Hospital, Melbourne), Jackie Free (Mercy Hospital for Women), Nicole Carlon (Northern Hospital), Carolyn Robertson and Anne-Marie McKenzie (Ballarat Base Hospital), and Darvi Kelly (LaTrobe Regional Hospital). The Movements Matter campaign was funded in conjunction by the National Health and Medical Research Council (NHMRC) Centre of Research Excellence in Stillbirth and Safer Care Victoria. We gratefully thank the Mater Foundation for their contribution. We also acknowledge the involvement of the following organisations in the development and implementation of the Movements Matter campaign material: Tommys, Still Aware, Safer Care Victoria, Perinatal Society of Australia and New Zealand, Australia College of Midwives, Stillbirth Foundation, Royal Australian College of Obstetricians and Gynaecologists and NHMRC Centre of Research Excellence in Stillbirth. Lilian Chan receives support from the Prevention Research Support Program, funded by the New South Wales Ministry of Health.

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Appendix S1. Campaign material.

Appendix S2. Survey for pregnant women.

Appendix S3. Survey for clinicians caring for pregnant women.

Appendix S4. Social media account engagement.

Appendix S5. Responses among women and clinicians who had seen the campaign (prompted recognition in post-campaign survey).

Appendix S6. Detailed response categories for selected questions in women's survey.

SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

Relevance of this research to thesis objectives

As noted in the introduction to this section (Introduction to Part B: Campaign Evaluations), the purpose of this evaluation research study was to understand whether the evaluation approach identified through the literature review (Figure B.1) is appropriate and fit for purpose. This evaluation used the approach outlined in Figure B.1, collecting both digital media process metrics (e.g. social media reach and impressions) and impact evaluation measures (e.g. knowledge and attitudes). However, even though the evaluation used this approach, it was not able to demonstrate whether the digital media evaluation metrics were relevant to the campaign's impact. This suggests that additional research is required to understand how such digital-specific metrics are related to overall campaign evaluations.

3.4 Background to the *Still Six Lives* campaign

The *Still Six Lives* campaign was developed as a result of a recommendation from the 2018 Australian Stillbirth Senate Inquiry Report calling for a national stillbirth public awareness campaign [6]. A consortium of agencies (Red Nose Australia, Sands Australia, Stillbirth Foundation Australia, and the Centre of Research Excellence in Stillbirth) were funded to develop, implement and evaluate the campaign. The campaign drew upon messages and learnings from the *Movements Matter* campaign that had been conducted in one state jurisdiction only.

Shortly after commencing as a Senior Research Officer with the Centre of Research Excellence in Stillbirth (Stillbirth CRE), I joined the research team led by Professor Adrienne Gordon (the Research Lead for Public Awareness CRE). The Stillbirth CRE provided advice on best practice campaign design, development and evaluation to the *Still Six Lives* campaign project team. The recommendations we provided are summarised in **Appendix 5.1**:

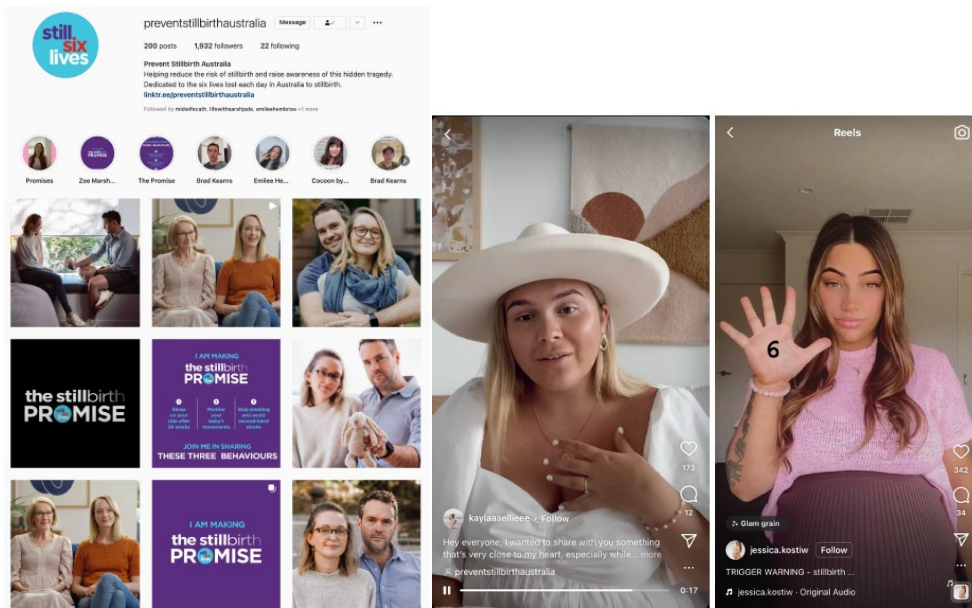
Gordon A, **Chan L**, Andrews C, Ludski K, Mead J, Brezler L, Foord C, Mansfield J, Middleton P, Flenady VJ, Bauman A. **Stillbirth in Australia 4: Breaking the Silence: Amplifying public awareness of stillbirth in Australia**. *Women and Birth*. 2020 Nov;33(6):526-530. doi: 10.1016/j.wombi.2020.09.010.

Link:

<https://www.sciencedirect.com/science/article/abs/pii/S1871519220303280?via%3Dihub>

The main objective of the *Still Six Lives* campaign was to increase public awareness of stillbirth, reduce stigma on the issue, and increase awareness of three modifiable behaviours pregnant women could do to reduce their risk of stillbirth – being aware of baby’s movements and seeking medical attention if they decrease, quitting smoking, and sleeping on side in late pregnancy. The campaign predominately used digital media (including digital advertising, video advertising, social media) and earned media (including media coverage in women’s and news media outlets, and engaging social media influencers). Examples of the campaign’s social media activities (posts and influencer engagement) are shown in Figure 3.2.

Figure 3.2 - Social media posts and influencer engagement from the *Still Six Lives* campaign



3.5 Evaluating the reach and impact of *Still Six Lives*: A national stillbirth public awareness campaign (Article in press)

As a Senior Research Officer with the Stillbirth CRE, I was responsible for the overall evaluation of the *Still Six Lives* campaign. My roles in the evaluation were in co-leading the conceptualisation and design of the impact evaluation, managing the study, designing the survey collection tools, organising ethics and governance approvals, overseeing data collection processes at each research site, managing the external data collection organisation for the community survey. I also interpreted and reported the findings to all relevant stakeholders.

The evaluation approach to the *Still Six Lives* campaign involved a process evaluation of collecting detailed data on website usage, social media reach and engagement and digital advertising engagement, and two separate surveys to assess the campaign's impact – the first was being a survey among a sample of nationally representative Australian women, and the second was a survey among pregnant women at antenatal clinics. As this evaluation included two different surveys to measure impact, for the purposes of clarity in reporting in the manuscript, all digital metrics (including reach and engagement) were reported as process evaluation measures. As noted in Section 3.1, this complexity in delineating process and impact evaluation measures when reporting digital metrics will be discussed further in the Discussion (Section 7.4).

The findings of the *Still Six Lives* campaign evaluation are reported in a manuscript that has been accepted for publication to the journal *Women and Birth*. The appendices cited in this manuscript can be found in Appendix 2.9 and Appendix 2.10 of this dissertation. The surveys used for data collection for this evaluation can be found in Appendix 3.1, 3.2 and 3.3 of this dissertation.

Chan L, Owen KB, Andrews CJ, Bauman A, Brezler L, Ludski K, Mead J, Birkner K, Vatsayan A, Flenady VJ, Gordon A. Evaluating the reach and impact of Still Six Lives: A national stillbirth public awareness campaign in Australia. *Women and Birth* (published online ahead of print 27 February 2023). doi: 10.1016/j.wombi.2023.02.006 [article in press]

Link:

[https://www.womenandbirth.org/article/S1871-5192\(23\)00038-0/fulltext](https://www.womenandbirth.org/article/S1871-5192(23)00038-0/fulltext)



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Evaluating the reach and impact of Still Six Lives: A national stillbirth public awareness campaign in Australia

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ARTICLE INFO

Keywords:
Stillbirth
Campaign
Public awareness
Prevention
Evaluation

ABSTRACT

Background: The *Still Six Lives* campaign aimed to increase awareness of stillbirth among Australian women and educate people about three modifiable behaviours that pregnant women could take to reduce the risk of stillbirth. The campaign used earned media, digital advertising and social media.

Aim: The aim of this study is to evaluate the impact of the campaign on Australian women's awareness of stillbirth, and knowledge of the three modifiable behaviours.

Methods: The study collected process evaluation data about campaign implementation from digital platforms. The impact evaluation comprised of two components: a three-wave community survey of Australian women aged 18–50 years old, and a pre-post cross-sectional maternity service survey of pregnant women.

Results: The campaign gained significant reach, including 2,974,375 completed video views and 910,000 impressions via social media influencers. The community surveys had 1502 participants at baseline, 1517 mid-campaign and 1598 post-campaign. Participants were slightly more likely to have encountered messages about stillbirth after the campaign (aOR 1.30, 95% CI 1.09–1.55). There were increases in awareness of each behaviour after the campaign: be aware of baby's movements (aOR 1.26, 95% CI 1.08–1.47), quit smoking (aOR 1.27, 95% CI 1.10–1.47) and going-to-sleep on side (aOR 1.55, 95% CI 1.32–1.82). The antenatal clinic survey had 296 participants at baseline and 178 post-campaign. Post-campaign, there was an increased likelihood that women were aware of side-sleeping (aOR 3.11, 95% CI 1.74–5.56).

Conclusions: The national campaign demonstrated some evidence of change in awareness of three modifiable behaviours that can reduce the risk of stillbirth.

Statement of significance**Problem or Issue**

The stigma that surrounds stillbirth means that there is inadequate community awareness of modifiable behaviours that can reduce the risk of stillbirth, including: being aware of baby's movements, quitting smoking and side-sleeping in late pregnancy.

What is already known

Public awareness campaigns can be an effective way of raising awareness of specific issues, and a previous small-scale digital campaign was effective in raising awareness of fetal movements among pregnant women.

What this paper adds

This evaluation demonstrates that a national campaign using primarily digital media and earned media (e.g. media coverage) can have some effect on increasing awareness of three modifiable

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<https://doi.org/10.1016/j.wombi.2023.02.006>

Received 1 November 2022; Received in revised form 16 February 2023; Accepted 18 February 2023

1871-5192/© 2023 Published by Elsevier Ltd on behalf of Australian College of Midwives.

Please cite this article as: Lilian Chan et al., *Women and Birth*, <https://doi.org/10.1016/j.wombi.2023.02.006>

behaviours that reduce the risk of stillbirth.

1. Introduction

The persisting silence and stigma that surrounds stillbirth means that there is little conversation about stillbirth in the community [1], which leads to a low awareness of practical preventive actions pregnant women can take to reduce their risk, persisting misinformation about what is normal for baby's movements towards the end of pregnancy [2], and a lack of community support for bereaved parents. In Australia, six babies are stillborn each day (using the Australian definition of stillbirth of a foetal death at >20 weeks gestation and/or weighing >400 g) [3], and the impact of each stillbirth on parents and families is immense [4]. International comparison of the stillbirth rate in Australia of 2.6 per 1000 births (using the World Health Organization definition of >28 weeks gestation) [3] shows that stillbirth rates in Australia could be lower, and that more needs to be done [5]. Evidence from international studies suggest that almost a quarter of stillbirths (>20 weeks gestation) are likely to be preventable [6], and that there is low community awareness of stillbirth, its risk factors and causes [7]. For these reasons a public awareness campaign in Australia can potentially play an important role in encouraging conversations about stillbirth, reducing stigma, and raising awareness of preventive actions to reduce the risk of stillbirth [2,8].

In 2018, an Australian Stillbirth Senate Inquiry Report called for a "national stillbirth public awareness campaign that educates parents and the general public about the risks of stillbirth, and encourages public conversations about stillbirth as a public health issue" [9] (p.104) with \$3 million provided to fund stillbirth education and a national public awareness campaign [5]. In response to this, a consortium of agencies consisting of Red Nose Australia, Sands Australia, Stillbirth Foundation Australia and the Centre of Research Excellence in Stillbirth, developed and delivered a national campaign to raise awareness of stillbirth – the *Still Six Lives* campaign.

1.1. The *Still Six Lives* campaign

The *Still Six Lives* stillbirth public awareness campaign ran from February to November 2021, with a target audience of Australian women, and two specific subgroup target audiences of women aged 18–50 years old, and women who are pregnant. The campaign aimed to increase public awareness of stillbirth, encourage conversations, reduce stigma and inform people about three key behaviours that pregnant women could take to reduce the risk of stillbirth: smoking cessation, going to sleep on your side in the last trimester, and being aware of baby's movements and contacting your midwife or doctor if movements change. These messages were developed from evidence-based research and the messages of the concurrent *Safer Baby Bundle* clinical initiative [10], to ensure consistency in messaging about stillbirth [8]. The campaign conveyed the key messages through media resources and testimonials from parents who had experienced stillbirth [11]. The key strategies of the campaign included: earned media (media coverage in women's media outlets, news coverage and paid editorials), engaging influencers on social media, digital advertising, and paid and organic social media. The campaign was developed to address the gaps in knowledge about practical evidence-based behaviours that reduce the risk of stillbirth, by using simple and consistent messaging [8].

1.2. Purpose of this study

Evaluation of this national campaign, including a robust analysis of the campaign execution, is an important activity to contribute to the evidence-base of interventions for stillbirth prevention [8]. While there are numerous studies published about the impact of educational

interventions targeting pregnant women and their health care provider in maternity care settings to reduce the risk of stillbirth [12–15], there is limited research about the impact of stillbirth awareness-raising campaigns at the community level. A recent small-scale campaign in Victoria, Australia that was largely social-media led, showed that it was possible to increase knowledge and change behaviours around seeking medical attention for decreased foetal movements [16], and therefore the purpose of this study is to evaluate the effects of a national campaign to address stillbirth prevention and empower the community and pregnant women to reduce the risk of stillbirth [8].

This research aims to understand the impact of the *Still Six Lives* campaign on Australian women's awareness of stillbirth and knowledge of the behaviours that can reduce the risk of stillbirth. The specific research questions of this evaluation are: what was the population reach of the *Still Six Lives* campaign, and what impact did the *Still Six Lives* campaign have on awareness of stillbirth and knowledge of preventive actions among Australian women and specifically among pregnant women?

2. Methods

The evaluation of the *Still Six Lives* campaign comprised 3 components: a process evaluation of campaign activities and reach, a three-wave community survey, and a pre-post survey conducted in antenatal clinics. All surveys were only conducted in English language. The community survey component of this research was approved by the Mater Misericordiae Ltd Human Research Ethics Committee (HREC/MML/67302(V3)). The antenatal clinic survey component was approved by Sydney Local Health District Human Research Ethics Committee (X20–0338). All components of the study were carried out in accordance with ethical guidelines of the corresponding research institute. Informed consent was obtained from all the participants involved in the study.

2.1. Process evaluation measures

Data about the delivery of the campaign was collected from the campaign team and communications agency contracted to deliver the campaign. This included: number of media articles, organic social media activity (reach and engagement), number of influencers engaged (and number of posts, and their reach and engagement), paid digital advertising results and website traffic.

2.2. Community survey

A repeat cross-sectional design was employed for this component of the evaluation, with online independent surveys conducted at baseline (January 2021), mid-campaign (May 2021) and post-campaign (November 2021). Participants were recruited through a Roy Morgan Consumer panel, and the inclusion criteria was women aged 18–50 years old. The sample of participants for each timepoint was nationally representative based on geographical location (by state/territory and by metropolitan/regional area).

The online surveys included questions to measure awareness of stillbirth, attitudes about whether stillbirth is preventable, knowledge of actions to reduce stillbirth risk, and recall of stillbirth campaign messages and images (see Supplementary file 1 for full community survey). The survey questions were derived from a survey used for a previous evaluations of a campaign about decreased foetal movements [16], and a campaign run by Tommy's in the UK.

2.3. Antenatal clinic survey

The third component of the evaluation was a pre-post cross-sectional survey of pregnant women. Participants were recruited from antenatal settings in two tertiary metropolitan public teaching hospitals in Sydney, Australia. Participants were recruited by a research midwife, clinic

midwives and obstetric medical officers from midwifery-led antenatal clinics, obstetric medical officer-led outpatient antenatal clinics, and antenatal classes, covering both women who had low-risk pregnancies and complicated pregnancies. The inclusion criteria were women aged 18 years or older, pregnant (of any gestation) and receiving antenatal care at one of the study sites. A baseline sample was recruited in November-December 2020, and an independent post-campaign sample was recruited in October-December 2021.

Participants were provided with a study flyer that had a QR code which they could scan with their mobile phone. This directed them to a website with an online survey that they could complete in the clinic waiting room or at home. The online survey contained questions about awareness of actions they can take to reduce the risk of stillbirth in later pregnancy (>28 weeks), knowledge of safe sleep positions, smoking status and exposure to secondhand smoke, knowledge of the significance of decreased foetal movements, awareness of stillbirth, stillbirth conversations, and recall of stillbirth messages in the media or online (see Supplementary file 2 for full antenatal clinic survey). The survey was based upon surveys used for a previous evaluation of a campaign about decreased foetal movements [16], a campaign by Tommy's in the UK, and a published study of sleep position among Australian women during pregnancy [17].

2.4. Analysis

Descriptive statistics, including frequencies and proportions, were calculated for each survey (community and antenatal) at each timepoint (baseline, mid-campaign and post-campaign). To assess changes in awareness of stillbirth and knowledge related to the preventive behaviours over time (post-campaign vs. baseline and mid-campaign vs. baseline) multivariate logistic regression models were conducted. The first analysis was unadjusted; the second analysis for the community survey was adjusted for age, education and income, and the second analysis for the antenatal survey was adjusted for age, language and hospital site. Results are reported as odds ratios (OR) with 95% confidence intervals. All analyses were conducted using SAS Enterprise Guide 9.4 (SAS Institute, Cary, NC, USA).

3. Results

3.1. Process evaluation

During the campaign period of February-October 2021, the *Still Six Lives* website received approximately 143,800 people visiting the site and 157,100 total site visits, with 89% of web traffic driven from search engine marketing and social media activity. The most visited webpages were the homepage, followed by pages for each prevention action (side sleeping, monitor movements and quit smoking), and pages featuring testimonials from people who had experienced stillbirth.

The media coverage of the campaign comprised 663 pieces across print, online and broadcast radio. The campaign engaged 17 influencers (7 paid, 10 unpaid), who posted 128 pieces of content. The paid influencer social media posts garnered 910,000 impressions (number of times content shown) in total, and 41,7000 likes. Paid media advertising (on Facebook, YouTube, video-on-demand ads, display ads and Google) spend was \$301,185 AU, which drove 142,204 clicks and 2,974,375 completed video views. For organic (unpaid) social media, Facebook activities included 115 organic posts, which had a total reach of 113,262, 6919 post engagements, 11,131 video views, and the Facebook page gained 733 followers. On Instagram, the campaign posted 119 organic posts, which had a total reach of 131,713, 4100 post engagements and 19,700 video views, and the Instagram account gained 1900 followers.

3.2. Community surveys

The community surveys recruited $n = 1502$ participants for the baseline, $n = 1517$ for the mid-campaign, and $n = 1598$ for the post-campaign survey. The demographic characteristics of participants of the baseline, mid-campaign and post-campaign community survey are shown in Table 1. There are similar proportions of women across the three age groups (18–29, 30–39 and 40–50 years old), and more than half of the women had a university-level education.

Details of participants' awareness of campaign messages, awareness of stillbirth and of the preventive actions is shown in Table 2. Participants were slightly more likely to recall seeing or hearing any messages about stillbirth in the media or online post-campaign (24.1%) compared with baseline (19.8%) (aOR 1.30, 95% CI 1.09–1.55). There was an increased likelihood participants recognised the specific campaign logo, though this specific logo recognition remained low throughout all waves of the survey (baseline 2.9%, mid-campaign 3.8%, post-campaign 4.7%; post-campaign vs. baseline aOR 1.59, 95% CI 1.07–2.36). The post-campaign survey wave also asked participants about their recognition of other images from the *Still Six Lives* campaign that had been used for social media and digital advertising. While the campaign logo was recognised by 4.7% of participants in the post-campaign survey, the proportion of participants who recognised the other campaign images was higher (7.5% recognised social media tile 1, 10.0% recognised the campaign video thumbnail, and 13.7% recognised social media tile 2) (see Appendix 1).

Post-campaign, younger age groups (18–29 years and 30–39 years old) were more likely to have seen campaign images compared to the older age group 40–50 years old (25.7% in 18–29 yo, 17.5% in 30–39 yo, and 6.6% in 40–50 yo). Similarly, people who knew someone who had experienced a stillbirth were more likely to recognise the campaign images compared with those who didn't (19.3% vs. 12.3%, aOR 1.67, 95% CI 1.20–2.32).

All post-campaign participants specified which (if any) of the campaign messages they had seen/heard. The behavioural messages of "Quit for baby, stop smoking during pregnancy" (41.9%), "Be aware of your baby's movements" (33.7%) and "Sleep on your side after 28 weeks" (20.8%) had the strongest recognition. This was followed by participants responding they had heard a couple sharing their story of having a stillbirth (24.2%) (See Appendix 2). Campaign message recognition was not asked in the baseline and mid-campaign survey.

There was a high baseline proportion of women who reported knowing someone who had lost a baby in late pregnancy, with an even greater likelihood after the campaign (baseline 60.5%, post-campaign 66.6%; aOR 1.32, 95% CI 1.13–1.54). There was no significant difference in the proportion of respondents who felt that stillbirth was preventable pre and post campaign (see Table 2).

Table 1
Demographic characteristics of community survey participants.

| | Baseline | | Mid-campaign | | Post-campaign | |
|----------------------|----------|-------|--------------|-------|---------------|-------|
| | n | % | n | % | n | % |
| All participants | 1502 | 100.0 | 1517 | 100.0 | 1598 | 100.0 |
| Age group | | | | | | |
| 18–29 years old | 533 | 35.5 | 546 | 36.0 | 568 | 35.5 |
| 30–39 years old | 492 | 32.8 | 495 | 32.6 | 515 | 32.2 |
| 40–50 years old | 477 | 31.8 | 476 | 31.4 | 515 | 32.2 |
| Education | | | | | | |
| School | 251 | 16.7 | 327 | 21.6 | 363 | 22.7 |
| Tertiary/TAFE | 285 | 19.0 | 392 | 25.8 | 389 | 24.3 |
| University | 944 | 62.9 | 790 | 52.1 | 826 | 51.7 |
| Prefer not to say | 22 | 1.5 | 8 | 0.5 | 20 | 1.3 |
| Income | | | | | | |
| < \$50,000 | 590 | 39.3 | 689 | 45.4 | 635 | 39.7 |
| \$50,000 or more | 793 | 52.8 | 755 | 49.8 | 876 | 54.8 |
| Can't say | 30 | 2.0 | 12 | 0.8 | 14 | 0.9 |
| Prefer not to answer | 89 | 5.9 | 61 | 4.0 | 73 | 4.6 |

Table 2
Community survey (baseline, mid-campaign, post-campaign).

| | Baseline (%) (N = 1502) | Mid- point (%) (N = 1517) | Post- campaign (%) (N = 1598) | Post-campaign vs. Baseline | | | Post-campaign vs. Mid-point | | |
|---|----------------------------------|---------------------------------------|--|----------------------------|-------------------|----------|-----------------------------|-------------------|---------|
| | | | | OR (unadjusted) | aOR* | p-value | OR (unadjusted) | aOR* | p-value |
| Campaign recall (seen or heard stillbirth message) | 19.8 | 22.7 | 24.1 | 1.30 (1.1, 1.55) | 1.30 (1.09, 1.55) | 0.004 | 1.08 (0.91, 1.27) | 1.05 (0.89, 1.25) | 0.58 |
| Campaign recognition (campaign logo) | 2.9 | 3.8 | 4.7 | 1.67 (1.14, 2.45) | 1.59 (1.07, 2.36) | 0.02 | 1.26 (0.89, 1.79) | 1.28 (0.89, 1.82) | 0.18 |
| Know someone who's lost a baby in late pregnancy | 60.5 | 62.9 | 66.6 | 1.36 (1.17, 1.59) | 1.32 (1.13, 1.54) | 0.0006 | 1.21 (1.03, 1.41) | 1.20 (1.02, 1.40) | 0.02 |
| Stillbirth is preventable [sometimes + mostly + always] | 52.2 | 49.0 | 52.8 | 1.02 (0.89, 1.18) | 1.08 (0.93, 1.24) | 0.32 | 1.16 (1.01, 1.34) | 1.17 (1.01, 1.35) | 0.03 |
| Advise to be aware of baby's movements | 66.1 | 69.9 | 70.6 | 1.23 (1.06, 1.44) | 1.26 (1.08, 1.47) | 0.004 | 1.03 (0.89, 1.2) | 1.04 (0.89, 1.22) | 0.61 |
| Advise to quit smoking | 57.0 | 61.4 | 62.5 | 1.26 (1.09, 1.45) | 1.27 (1.10, 1.47) | 0.002 | 1.05 (0.91, 1.21) | 1.06 (0.92, 1.23) | 0.42 |
| Advise to sleep on side | 25.3 | 33.7 | 33.5 | 1.49 (1.28, 1.74) | 1.55 (1.32, 1.82) | < 0.0001 | 0.99 (0.86, 1.15) | 1.01 (0.87, 1.17) | 0.90 |
| Encourage someone concerned to call doctor/ midwife/hospital immediately | 66.7 | 72.1 | 70.6 | 1.20 (1.03, 1.39) | 1.16 (1.00, 1.36) | 0.05 | 0.93 (0.8, 1.09) | 0.91 (0.78, 1.07) | 0.25 |

* OR adjusted for age, education, and income

While there was a low awareness of side-sleeping benefit throughout all surveys, there was a slightly increased likelihood that participants would advise pregnant women about each of the actions to reduce the risk of stillbirth post-campaign compared with baseline: be aware of baby's movements (baseline 66.1% vs. post-campaign 70.6%, aOR 1.26, 95% CI 1.08–1.47), quit smoking (baseline 57.0% vs. post-campaign 62.5%, aOR 1.27, 95% CI 1.10–1.47) and sleep on side (baseline 25.3% vs. post-campaign 33.5%, aOR 1.55, 95% CI 1.32–1.82) (see Table 2).

Post-campaign, participants who reported they had seen the *Still Six Lives* campaign images were significantly more likely to advise pregnant women about each of the actions to reduce the risk of stillbirth, compared to those who had not (see Table 3).

In asking participants who had seen the campaign videos about their responses, 22.9% (n = 11 out of 48) of respondents in the mid-campaign survey found the video emotionally disturbing/distressing (campaign video 1); compared with 8.7% (n = 20 out of 229) of respondents in the post-campaign survey (campaign video 2).

3.3. Antenatal clinic survey

The antenatal clinic survey recruited n = 296 participants at baseline, and n = 178 post-campaign. The demographics of pregnant women who participated in the antenatal clinic survey component of the evaluation is shown in Table 4.

The results of the antenatal clinic survey are shown in Table 5. Women were more likely to have seen or heard messages about stillbirth post-campaign (47.5%) compared with baseline (36.6%, aOR 1.69, 95% CI 1.13–2.53). The proportion of pregnant women who recalled seeing or hearing stillbirth messages in the media or online were much higher than in the general community for both baseline and post-campaign. Post-campaign, women were also more likely to recall seeing the specific campaign logo (aOR 4.06, 95% CI 1.19–13.83), but the proportions were consistently low in both surveys (baseline 1.4% vs. post-campaign 5.1%). The proportion of pregnant women who recognised any of the campaign images was 24.7%, with the proportion recognising each campaign image shown in Appendix 1.

In the post-campaign survey, there was good recognition of campaign messages among pregnant women, particularly of the behavioural messages of "Be aware of your baby's movements" (64.0%),

Table 3
Association of seeing *Still Six Lives* campaign image with knowledge of preventive actions.

| | Total (wave3) (N = 1598) (%) | Have not seen SSL (N = 1328) (%) | Seen SSL (N = 270) (%) | OR (unadjusted) | aOR | p-value |
|--|---------------------------------------|--|---------------------------------|----------------------|-------------------------|----------|
| Advise to be aware of baby's movements | 70.6 | 68.5 | 80.7 | 1.93 (1.39, 2.66) | 1.87 (1.34, 2.61) | 0.0003 |
| Advise to quit smoking | 62.5 | 60.3 | 73.3 | 1.81 (1.35, 2.42) | 1.74 (1.29, 2.35) | 0.0003 |
| Advise to sleep on side | 33.5 | 30.7 | 47.8 | 2.07 (1.59, 2.70) | 2.28 (1.72, 3.01) | < 0.0001 |
| Encourage someone concerned to call doctor/midwife/hospital immediately | 70.6 | 71.2 | 65.2 | 0.74 (0.56, 0.98) | 0.86 (0.64, 1.14) | 0.29 |

*OR adjusted for age, education, and income

Table 4
Demographic characteristics of antenatal clinic survey participants.

| | Baseline | | Post-campaign | |
|----------------------------------|----------|-------|---------------|-------|
| | n | % | n | % |
| All participants | 296 | 100.0 | 178 | 100.0 |
| Age group | | | | |
| 18–24 years old | 8 | 2.7 | 5 | 2.8 |
| 25–34 years old | 180 | 60.8 | 97 | 54.5 |
| 35 + years old | 106 | 35.8 | 76 | 42.7 |
| Gestation | | | | |
| 1–12 weeks | 11 | 3.7 | 0 | 0 |
| 13–26 weeks | 72 | 24.3 | 59 | 33.2 |
| 27 + weeks | 212 | 71.6 | 118 | 66.3 |
| Ethnicity | | | | |
| Caucasian | 148 | 50.0 | 94 | 52.8 |
| Other | 147 | 49.7 | 83 | 46.6 |
| English as first language | | | | |
| Yes | 186 | 62.8 | 121 | 68.0 |
| No | 109 | 36.8 | 56 | 31.5 |
| First pregnancy (Yes) | 119 | 40.2 | 67 | 37.6 |
| Mode of antenatal care | | | | |
| Public hospital | 180 | 60.8 | 111 | 62.4 |
| GP shared care | 59 | 19.9 | 26 | 14.6 |
| Midwifery group | 40 | 13.5 | 28 | 15.7 |
| Private obstetrician | 10 | 3.4 | 7 | 3.9 |
| Midwifery caseload | 2 | 0.7 | 4 | 2.3 |
| Private midwifery | 0 | 0 | 2 | 1.1 |
| Other | 4 | 1.4 | 0 | 0 |

Note. percentages do not add up to 100% due to missing data.

“Sleep on your side after 28 weeks” (64.0%) and “Quit for baby, stop smoking during pregnancy” (36.0%). Over a quarter of participants (28.1%) reported seeing or hearing a testimonial of a couple sharing their story of having a stillbirth (see Appendix 2).

The proportion of pregnant women who responded that they knew

Table 5
Antenatal clinic survey (baseline vs. post-campaign).

| | Baseline | Post-campaign | Post-campaign vs. Baseline | | p-value |
|--|------------------|------------------|----------------------------|--------------------|---------|
| | (% (N = 296)) | (% (N = 178)) | OR (unadjusted) | aOR* | |
| Seen or heard messages about stillbirth | 36.6 | 47.5 | 1.65 (1.12, 2.45) | 1.69 (1.13, 2.53) | 0.011 |
| Seen Still Six Lives campaign logo | 1.4 | 5.1 | 3.89 (1.18, 12.82) | 4.06 (1.19, 13.83) | 0.03 |
| Seen any Still Six Lives campaign image † | 1.4 | 24.7 | 24.0 (8.4, 68.1) | 22.3 (7.7, 64.3) | < 0.001 |
| Know of someone with stillbirth | 48.3 | 47.2 | 0.97 (0.67, 1.41) | 1.03 (0.70, 1.51) | 0.90 |
| Preventive action awareness: quit smoking | 86.5 | 84.3 | 0.84 (0.50, 1.41) | 0.78 (0.45, 1.36) | 0.39 |
| Preventive action awareness: Baby’s movements | 87.2 | 92.1 | 1.73 (0.91, 3.28) | 1.63 (0.83, 3.19) | 0.15 |
| Preventive action awareness: side sleeping | 73.3 | 90.5 | 3.45 (1.97, 6.05) | 3.11 (1.74, 5.56) | < 0.001 |
| Usual sleep position of left side, right side, or both left and right sides (i.e. a safe sleep position) | 96.3 | 96.1 | 0.94 (0.36, 2.45) | 1.08 (0.40, 2.92) | 0.89 |
| Avoid sleep position - back | 84.1 | 86.0 | 1.16 (0.68, 1.95) | 1.01 (0.58, 1.74) | 0.98 |
| Avoid sleep position - tummy | 74.0 | 69.7 | 0.81 (0.54, 1.22) | 0.77 (0.50, 1.17) | 0.22 |
| Avoid sleep position - sitting | 15.5 | 13.5 | 0.85 (0.50, 1.44) | 0.93 (0.53, 1.61) | 0.78 |
| Do not avoid any particular sleep positions | 4.1 | 3.9 | 0.97 (0.37, 2.51) | 1.12 (0.42, 2.99) | 0.81 |
| Knowledge that safe sleep position is sleeping on left side | 61.8 | 57.3 | 0.83 (0.57, 1.21) | 0.85 (0.58, 1.23) | 0.41 |
| Knowledge that safe sleep position is sleeping on right side | 29.7 | 33.2 | 1.17 (0.79, 1.75) | 1.10 (0.73, 1.67) | 0.65 |
| Knowledge that safe sleep position is on either left or right side | 49.7 | 64.6 | 1.85 (1.26, 2.71) | 1.67 (1.12, 2.49) | 0.012 |
| Babies move the same | 39.9 | 47.2 | 1.56 (1.05, 2.32) | 1.60 (1.06, 2.40) | 0.02 |
| Action if feel baby moving less | 53.7 | 64.6 | 1.63 (1.11, 2.42) | 1.54 (1.03, 2.31) | 0.04 |
| Smoke in past 12 months | 11.8 | 8.4 | 0.69 (0.37, 1.30) | 0.85 (0.44, 1.65) | 0.64 |
| Current smoker | 2.4 | 3.4 | 1.46 (0.48, 4.42) | 1.71 (0.55, 5.35) | 0.36 |
| Smoke exposure | 4.4 | 2.8 | 0.63 (0.22, 1.79) | 0.79 (0.27, 2.33) | 0.68 |
| Received sleep information | 64.1 | 80.9 | 2.78 (1.67, 4.63) | 2.18 (1.28, 3.70) | < 0.01 |
| Seen movement information | 77.7 | 82.0 | 1.56 (0.89, 2.72) | 1.39 (0.78, 2.47) | 0.26 |
| Seen information linking foetal movement with stillbirth | 45.9 | 64.0 | 2.55 (1.64, 3.89) | 2.30 (1.49, 3.55) | < 0.001 |
| Advised to contact doctor/midwife about decreased foetal movements | 82.4 | 87.1 | 1.37 (0.78, 2.42) | 1.21 (0.68, 2.17) | 0.52 |
| Seen smoking information | 85.1 | 88.1 | 1.65 (0.88, 3.09) | 1.39 (0.73, 2.66) | 0.32 |
| Stillbirth conversation with health professional | 25.0 | 44.1 | 2.47 (1.64, 3.72) | 1.80 (1.16, 2.81) | < 0.01 |
| Stillbirth conversation with family and friends – pre-pregnancy | 42.5 | 43.3 | 1.02 (0.70, 1.49) | 0.95 (0.64, 1.41) | 0.80 |
| Stillbirth conversation with family and friends – during pregnancy | 37.6 | 44.9 | 1.39 (0.95, 2.04) | 1.35 (0.91, 2.01) | 0.14 |

† The pre-campaign survey only asked about recognition of the campaign logo, but the post-campaign survey results included people who responded they had seen any of the 4 campaign images that were shown.

* OR adjusted for age, language, and hospital site

someone who had experienced a stillbirth was similar at baseline and post-campaign (48.3% and 47.2% respectively), lower than the proportion of women in the general population (60.5% and 66.6%).

Awareness of each preventative action at baseline was: quit smoking 86.5%, being aware of baby’s movements 87.2%, and side-sleeping 73.3%. Post-campaign, there was an increased awareness of the preventative action of side-sleeping (90.5%, aOR 3.11, 95% CI 1.74–5.56)(see Table 5).

For the specific behaviour of side-sleeping, when asked about their usual sleeping position, there were no differences in the proportion of women whose usual sleep position was one of the safe going-to-sleep positions (overall – either left side, right side or both sides). There was also no difference in the proportion of pregnant women who avoided non-safe sleep positions (back, tummy or sitting)(see Table 5). Post-campaign, women were more likely to correctly identify that sleeping on either side was a safe going-to-sleep position (baseline 49.7% vs. post-campaign 64.6%, aOR 1.67, 95% CI 1.12–2.49).

In regards to knowledge of the importance of baby’s movements, there was a statistically significant increase in the proportion of pregnant women who were aware that babies should move about the same amount towards the end of pregnancy (baseline 39.9% vs. post-campaign 47.2%, aOR 1.60, 95% CI 1.06–2.40); and who knew that they should contact a doctor or midwife immediately if baby’s movements decrease (baseline 53.7% vs post-campaign 64.6%, aOR 1.54, 95% CI 1.03–2.31)(see Table 5).

For smoking-related behaviours, at both baseline and post-campaign there were small proportions of pregnant women who were current smokers (baseline 2.4%, post-campaign 3.4%) or were exposed regularly to second-hand smoke at home (baseline 4.4%, post-campaign 2.8%), with no significant changes in these behaviours between the two surveys (see Table 5).

Post-campaign, women were more likely to have seen or received

information about each of the three preventive actions (see Table 5), with statistically significant increases in the proportion of women who had seen information about safe going-to-sleep positions (baseline 64.1% vs. post-campaign 80.9%, aOR 2.18, 95% CI 1.28–3.70), and information about the link between decreased foetal movements and stillbirth (baseline 45.9% vs. post-campaign 64.0%, aOR 2.30, 95% CI 1.49–3.55).

After the campaign, pregnant women were significantly more likely to report that a healthcare professional had discussed the risks of stillbirth with them (baseline 25.0% vs. post-campaign 44.1%; aOR 1.80, 95% CI 1.16–2.81). There were no significant changes in the proportion of women who reported that they had discussed stillbirth with family and friends prior to the pregnancy, or during their current pregnancy (see Table 5).

4. Discussion

This evaluation found that after the *Still Six Lives* campaign, Australian women were more likely to advise pregnant women about the three preventive actions to reduce the risk of stillbirth. Among pregnant women there was reasonable awareness of the preventive actions of quitting smoking and being aware of baby's movements before the campaign, and an increase in awareness of side-sleeping following the campaign. Post campaign, there were also increases in awareness of messages about stillbirth in the media and online among both Australian women in general and pregnant women specifically, but specific recognition of the *Still Six Lives* campaign tagline and logo remained low. There was also a high proportion of people who described knowing someone who had experienced a stillbirth, which is in line with other research [2,7], and possibly suggests a high level of cognisance of this issue.

4.1. Preventive behaviours

Of the three preventive actions included in the *Still Six Lives* campaigns, going to sleep on side after 28 weeks had the lowest levels of awareness pre-campaign (only 25.3% among Australian women and 73.3% among pregnant women). This is potentially because the evidence for this preventive action is more recent than the other two actions [18]. Awareness of this preventive behaviour showed the greatest improvement of all evaluation measures for this campaign, indicating that the campaign had a probable effect on increasing awareness of this preventive behaviour. However, given the proportion of Australian women who would advise a pregnant woman about side-sleeping was still only 33.5% post-campaign, sustained campaign activity is important to further increase community awareness.

Of the three preventive actions, the highest proportion of people knew awareness of baby's movements was important, and this increased post-campaign (70.6% among Australian women and 92.1% among pregnant women). However, only 47.2% of pregnant women knew that babies moved the same amount towards the end of pregnancy, and only 64.6% knew the correct course of action to take if they noticed decreased movements. These results are consistent with those obtained from other research findings of most pregnant women recognising the importance of monitoring baby's movements, but a great variation in what they described as expected movements [19]. Therefore, while people know that it is important to be aware of baby's movements, future campaigns need to focus on increasing knowledge about normal foetal movements and provide explicit messaging on what pregnant women should do if they notice decreased movements.

Our findings showed a lower proportion of pregnant women who smoked compared to the nationally reported prevalence of 9.6% [20], suggesting that pregnant women may have already quit smoking, or that the sample may not be nationally representative. While after the campaign Australian women were more likely to advise pregnant women to quit smoking, only 62.5% of participants responded they

would do so, and therefore there is potential for further improvement in promoting awareness of this preventive behaviour. Research has shown that there are specific demographic groups of women who are more likely to smoke during pregnancy, such as those who are younger, of Caucasian or Aboriginal and Torres Strait Islander background, or from disadvantaged socioeconomic areas [21,22], and therefore future campaigns could focus on these groups specifically.

4.2. Stillbirth conversations

One of the objectives of the campaign was to encourage conversations about stillbirth. The study asked participants whether they knew someone who had experienced a stillbirth as a measure of awareness of the issue of stillbirth in Australian society. The high proportion of people who reported knowing someone who had experienced a stillbirth was surprising. This could suggest that people do share their experience of stillbirth among family and friends; but there could also be other reasons for this result. These potentially include: an incidence of stillbirth may leave a strong impression on people who have heard about it in their social networks, hearing about celebrities who have experienced stillbirth might be reported as 'knowing someone' who has experienced stillbirth, a perception that miscarriage and stillbirth are synonymous, or that women who chose to participate in the survey may be those who have experienced stillbirth themselves or among their family/friends.

While the proportion of pregnant women who had conversations about stillbirth with health professionals and with family and friends increased post-campaign, further improvement is still needed. Changes to such socio-cultural practices require time, and therefore sustained campaigning on this issue is required. Increasing conversations about stillbirth in the community and with health professionals requires more than public awareness campaigns; capacity-building interventions in the clinical setting, such as education and training sessions for health professionals are also necessary.

4.3. Stillbirth campaigns

The evaluation of *Still Six Lives* suggest that the campaign helped to increase awareness of preventive behaviours, but ongoing sustained mass communication activities will be necessary to maintain these changes. The *Still Six Lives* campaign was run in parallel with a clinical intervention, the *Safer Baby Bundle* programme [10]. The messages of *Still Six Lives* were aligned with the *Safer Baby Bundle*, and this alignment was vital as both interventions targeted the same audience of pregnant women. The effect of this message congruence is seen in the strong recognition response of the three behavioural messages (which were identical between *Still Six Lives* and *Safer Baby Bundle*) (message recognition ranging between 20.8% and 41.9%), and which showed stronger recognition than the messages used in the *Still Six Lives* campaign only (recognition ranging between 2.5% and 11.1%).

This study also highlighted some of the important elements in the campaign. Firstly, among the general community, younger women, who were the priority target audience of the campaign, were more likely to see the specific campaign message. This demonstrates that the strategies of using digital media, social media, influencers, and choice of media outlets for PR, were appropriate. Secondly, the high proportion of people who recalled seeing or hearing something about a couple sharing their story of having a stillbirth, and the popularity of the pages of the website that featured people's experiences of stillbirth, demonstrate that testimonials were a powerful strategy to portray this issue, as the stories resonated strongly with the audience. Using testimonials from people about such a personal experience, and communicating their stories appropriately and with sensitivity, requires close collaboration with patient advocacy organisations during the development of the campaign. Finally, there were initially some concerns about stillbirth public awareness campaigns being too confronting for the general community. While a notable proportion of people found the first

campaign video to be distressing, this finding was based on only a small number of people who responded that they had seen that video, and the proportion of people who found the second campaign video distressing was much lower. Again, close collaboration with patient advocacy organisations and bereaved parents in the development of the campaign is necessary to prevent and monitor any adverse campaign effects.

4.4. Campaign mechanics

While there were significant increases in the proportion of participants who had seen or heard messages about stillbirth, the proportion who had seen or heard images or messages specific to the *Still Six Lives* campaign remained low. Campaign images, especially a logo, are very specific campaign brand recognition devices, but less sensitive in assessing campaign reach. One potential reason for the low campaign-specific recognition is that one of the key strategies of this campaign was PR, particularly through ‘earned’ media coverage in news, lifestyle and parenting websites, which drew attention to the issue, but may not act to increase brand recognition. These results also highlight the challenge of developing a new campaign brand; and so future campaigns need to consider: i) whether to use an existing stillbirth theme and message, and/or ii) planning for the longevity of a campaign, to maximise efficiency of resources invested in establishing the campaign brand. Another factor which may have impacted upon the lower than anticipated campaign recognition was the contemporaneous COVID-19 pandemic. It is possible that people’s attention to health messages was monopolised by COVID-related messages, and they paid less attention to messages about other health issues.

An innovation of this study was in methods for evaluation of campaigns that use digital media. Campaigns are now implemented in a variety of ways on the different digital platforms, with different images, videos, and messages tailored to specific communication platforms and audiences, which means it is no longer adequate for evaluations to measure campaign recognition using only one image (e.g. campaign logo) or message (e.g. campaign tagline). The post-campaign survey of this evaluation asked about numerous campaign images and messages, and the findings demonstrated that of all the images, the logo had the lowest recognition (4.7% vs. 13.7% for the most recognised campaign image). The comprehensive reporting of process evaluation measures of this campaign’s implementation on digital media is also an important, but infrequently communicated, activity. The campaign achieved substantial reach, particularly through influencer posts; and good engagement results, particularly in paid advertising clicks and completed video views. These indicate that the campaign delivery strategy was effective; but that such reach and engagement was not reflected in campaign brand recognition requires further exploration. There may be duplication in capturing people across the different digital platforms (i.e. the same people saw the influencers’ posts, as the video ad and organic social media post), or that due to the fast-paced and evanescent nature of digital media, the campaign message and creative may not have been salient enough to capture the viewer’s attention at the time. This highlights the importance for digital-based campaigns to use digital reach and engagement metrics as only one part of a robust campaign evaluation.

4.5. Implications for practice

The findings of this evaluation demonstrate there is a need to maintain public education communications in Australia to build upon this *Still Six Lives* campaign [8]. Public education campaigns should be implemented in combination with other strategies, such as those in clinical settings with health professionals, to ensure consistency of key messaging. Future work also needs to address population groups with higher rates of stillbirth, such as migrant populations and Aboriginal and Torres Strait Islander communities [3]. While drawing on this national campaign, health campaigns for these specific populations need to use

communication strategies that are specifically tailored for these communities.

4.6. Implications for research

The high prevalence of people who know someone who has experienced a stillbirth is disparate in proportion to the national prevalence of stillbirth; and this needs further exploration to understand whether the number of people reporting this is truly due to widespread sharing of experiences by people who have had a stillbirth. Secondly, while the digital metrics provide important insight into the campaign’s implementation, the incongruity between the strong reach metrics on social media, paid digital advertising and influencers, with the levels of campaign recognition identified in the evaluation surveys requires further exploration. The domain of digital advertising research, and particularly the use of influencers, is still in its infancy, and much more needs to be known about the level (and frequency) of reach required to impact upon a population’s awareness, the meaning behind people’s engagement on social media in relation to their uptake of the campaign’s messages, and the type of campaign messages and creatives that receive the most cut-through on digital platforms.

4.7. Strengths and limitations

The strength of this study is in the use of multiple methods and sources – process evaluation data from website analytics, social media metrics and PR reports, as well as surveys of samples from Australian women in general and pregnant women specifically. The use of a three-wave design for the community survey also clarifies trends in the data, strengthening post-campaign survey data. In addition, this evaluation collaborated with the campaign communications agency, which enabled changes to the evaluation so that campaign effects could be measured as accurately as possible; and also allowed access for detailed process evaluation measures.

One limitation of this study is in the participant sampling of the antenatal clinic survey. Only two hospitals in Sydney were used to recruit participants, which is not necessarily representative of the national antenatal audience, and this is reflected in the low smoking prevalence rates among pregnant women. Unfortunately, COVID-19 pandemic-related restrictions hampered study recruitment in the clinical environment, resulting in a small sample size which limits the interpretation of this component of the evaluation. As the recruitment process did not note the number of women who were approached to participate in the study and chose to decline, it is also not possible to know the response rate to antenatal clinic survey component. Furthermore, for the results of the antenatal clinic survey, it is not possible to know how much of the changes are due to the campaign or to the aligning clinical stillbirth prevention initiatives, such as the national *Safer Baby Bundle* activities. In addition, it is acknowledged that the surveys were only conducted in English language, restricting the ability of people who are not fluent in English in participating in this study. However, it is noted that the campaign itself was mostly conducted in English, so the evaluation targeted pregnant women in this same group. Finally, the community survey samples were not randomly sampled, but weighted to the population demographics; and as discussed earlier, the high proportion of people who know someone who’s experienced stillbirth may reflect selection bias. However, any sampling biases were non-differential across the three survey waves.

5. Conclusion

While there has been some reduction in late stillbirth rates in Australia, the unchanging rate of overall stillbirths necessitates continued action [5]. This evaluation shows that a national campaign using the main strategies of PR, social media and digital marketing showed some evidence of effectiveness in increasing the proportion of

Australian women who were aware of three evidence-based preventive actions that reduce the risk of stillbirth. Ongoing sustained public education on this issue is required to further increase awareness of the importance of going to sleep position in late pregnancy, and seeking medical assistance when reduced foetal movement is experienced. Of particular importance is the continued effort to increase community conversation and reduce stigma on this important issue. Future public awareness campaigns must continue to be closely aligned with other stillbirth prevention initiatives, such as the ongoing *Safer Baby Bundle* clinical initiative [10].

CRedit authorship contribution statement

Lilian Chan: Conceptualization, Methodology, Writing – original draft, Project administration. **Katherine Owen:** Formal analysis, Data curation, Writing – original draft. **Christine Andrews:** Methodology, Resources, Writing – original draft, Project administration. **Adrian Bauman:** Conceptualization, Methodology, Formal analysis, Supervision, Writing – original draft, Project administration. **Leigh Brezler:** Methodology, Writing – review & editing. **Keren Ludski:** Methodology, Writing – review & editing. **Jacquelyn Mead:** Methodology, Writing – review & editing. **Karin Birkner:** Investigation, Writing – review & editing. **Ajay Vatsayan:** Project administration, Resources. **Vicki Flenady:** Methodology, Writing – original draft, Supervision, Funding acquisition. **Adrienne Gordon:** Conceptualization, Methodology, Supervision, Writing – original draft, Project administration, Funding acquisition.

Funding

The campaign evaluation was funded by the Australian Government Department of Health – Primary Health Care Development Program: The Stillbirth Education and Awareness (GO2536). Lilian Chan receives support from the Prevention Research Support Program, funded by the New South Wales Ministry of Health.

Ethical statement

The community survey component of this research was approved by the Mater Misericordiae Ltd Human Research Ethics Committee (HREC/MML/67302(V3)). The antenatal clinic survey component was approved by Sydney Local Health District Human Research Ethics Committee (X20-0338). All components of the study were carried out in accordance with ethical guidelines of the corresponding research institute. Informed consent was obtained from all the participants involved in the study.

Conflict of interest

Lilian Chan, Adrienne Gordon, Christine Andrews, Leigh Brezler, Adrian Bauman and Vicki Flenady are involved with the NHMRC Stillbirth Centre of Research Excellence. Keren Ludski is CEO of Red Nose Australia. At the time of this research, Jacquelyn Mead was co-CEO of Red Nose Australia, and Leigh Brezler was CEO of Stillbirth Foundation Australia.

Acknowledgements

We would like to thank Dr Laura Claire Ayling, Dr Chandni Badlani, Associate Professor Tanya Nippita, Jodie Adams, Georgina Pigott and Isabella Burman for their valuable involvement in this study. We also thank Justin Mansfield for his support of this evaluation, and acknowledge the involvement of the following organisations in the development

and implementation of the Still Six Lives campaign: Red Nose, Stillbirth Foundation Australia, SANDS and the NHMRC Centre of Research Excellence in Stillbirth, as well as Icon Agency for their creative work in developing the campaign and in supporting the evaluation through providing process evaluation data.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.wombi.2023.02.006.

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Relevance of this research to thesis objectives

Similar to the evaluation study reported in Section 3.3, the purpose of this evaluation study was to understand whether the evaluation approach identified through the literature review (Figure B.1) is appropriate and fit for purpose. This evaluation study collected even more comprehensive digital media process and engagement metrics (e.g. website visits, social media influencer impressions, paid digital advertising spend and clicks, etc.) and impact evaluation measures. This evaluation showed an incongruence between the reported digital media metrics (which showed many people engaging with the campaign online) and the impact evaluation measures (which showed only modest campaign recognition and impact). This shows that additional research is required to understand how such digital-specific metrics, particularly online engagement, are related to overall campaign evaluations.

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CHAPTER 4:

EVALUATION OF A CAMPAIGN THAT RAISES AWARENESS OF THE HARMS OF WATERPIPE (SHISHA) SMOKING

4.1 Introduction

Waterpipe tobacco smoking, also known as shisha, argileh, narghile or hookah, is a form of tobacco smoking that originated in Middle Eastern countries, but is growing in popularity in some Western countries among Arabic-speaking communities. In Australia, while only 2.5% of adults smoke waterpipe tobacco [1], 11.4% of Arabic-speaking people in Sydney report using waterpipe [2]. Concerningly in some countries globally, waterpipe smoking is becoming increasingly popular among young people, surpassing cigarette smoking as the most common form of tobacco smoking [3]. There is less awareness of the harms of waterpipe smoking, with many myths perpetuated, such as: the water filters out the toxins, the fruit flavouring make it less harmful, and that it is safer than cigarette smoking [4]. As a behaviour, waterpipe smoking is distinct from cigarette smoking in that it is often seen as a social activity and carries cultural identity and meaning.

While there are innumerable campaigns that raise awareness of the harms of cigarette smoking, there are few published campaigns that specifically address waterpipe smoking [5], and therefore there is little evidence of what is effective to address this form of tobacco smoking. With the growing prevalence of waterpipe smoking among young people, and particularly of Arabic-speaking background, campaigns addressing this issue should target this specific segment of the population. As such, digital media channels are an appropriate strategy for campaigns addressing the issue of waterpipe smoking as they allow for targeting of specific demographic age groups and location.

4.2 Background to the *Shisha No Thanks* project

Formative research with people of Arabic-speaking background identified that health education and social marketing campaigns were acceptable interventions to address the issue of waterpipe smoking, and that the key focus should be on the health implications of waterpipe smoking [4].

Using the formative research, South Eastern Sydney Local Health District in NSW, in partnership with the Lebanese Muslim Association (a community organisation) developed the *Shisha No Thanks* project. The project aimed to raise awareness of the harms of waterpipe (shisha) smoking among young people (18-35 year old) of Arabic-speaking background in South East, South West and Western areas of Sydney. The project took a social marketing approach, and was informed by the formative research and co-design workshops with community members.

The *Shisha No Thanks* project mostly utilised social media, with a key campaign video and other social media posts which were mainly organic (unpaid)¹. The project also ran some in-person activities at local community events (e.g. community health expos). The main project messages conveyed the health harms of waterpipe smoking, with the key message being that “45mins [of waterpipe smoking] equals 100 cigarettes” [6].

¹ Organic social media posts refer to content published on a social media platform that has not been paid to be promoted (e.g. not an advertisement).

4.3 Social media engagement with the *Shisha No Thanks* project

To provide context to the impact evaluation (Section 4.5), this section of the dissertation provides a brief overview of the social media engagement response to the *Shisha No Thanks* project. As noted in Figure B.1, measures related to the delivery of a campaign and engagement are considered to be part of a comprehensive campaign evaluation.

The *Shisha No Thanks* project's main campaign activities were run on social media, using the two strategies of:

- Posting organic *Shisha No Thanks* content on the project's Facebook, Instagram and YouTube accounts
- Asking project partners and other organisations to share the main *Shisha No Thanks* resources (especially the project video) on their social media accounts

***Shisha No Thanks* accounts**

For the period from 20/09/2019 – 20/07/2020, the *Shisha No Thanks* Facebook account posted 109 pieces of content, which had:

- 121,004 people reached in total
- 10,415 engagements
- 21,345 video views
- 198 followers.

For the same period, the project's Instagram account posted 92 pieces of content, which had:

- 10,002 people reached in total
- 2,500 engagements
- 500 video views
- 82 followers.

The *Shisha No Thanks* YouTube account published 36 pieces of content, which reached 6,900 people and had 480 video views.

Partner organisation accounts

The second social media strategy of the *Shisha No Thanks* project was to ask project partners and other organisations to share the project content on their own social media accounts. Some of the partner organisations' posts received large numbers of reach and engagement, as shown in Table

4.1. Most notable was the reach and level of engagement on Western Sydney Local Health District’s Facebook page in response to the project’s main video (see Table 4.1), which prompted the research study described in the subsequent chapter (Chapter 5).

Table 4.1 - Social media metrics from partner organisations (20/01/2020)

| Organisation (type of post) | Reach | Video views (>3sec) | Shares | Comments |
|---|--------------|-----------------------------------|---------------|------------------|
| Lebanese Muslim Association – Facebook (video) | 6,027 | 1,991 | 30 | 32 |
| NSW Health – Facebook (reshare) | N/A | N/A | 67 | 284 |
| Western Sydney Health – Facebook (link) | N/A | N/A | 167 | 1,400 (approx.) |
| Western Sydney Health – Facebook (video) | 453,811 | 316,611 | 1,772 | 11,000 (approx.) |

4.4 Methodology for the impact evaluation of the *Shisha No Thanks* project: A case study of an SMS text message community panel survey and its potential for use during the COVID-19 pandemic (published paper)

Due to the target audience of the *Shisha No Thanks* project (i.e. young people aged 18-35 years old), an innovative approach to data collection was used to engage participants in the evaluation. As young people spend substantial time using mobile phones/smartphones each day, the impact evaluation used SMS (short messaging service) text messages to conduct the survey to collect data from participants.

As a member of the Evaluation Working Group for the project and who was engaged as a PhD candidate, I was part of the team that conceptualised and designed the methodology for the impact evaluation study. I worked with a colleague (Dr Nouhad El-Haddad) to develop the survey tool, ensuring that the questions were appropriate for the SMS text message format, and organising participant recruitment.

I conceptualised the manuscript in collaboration with Dr Ben Harris-Roxas, which reported on this innovative methodology. I drafted the manuscript to discuss rationale for its use, explanation of the recruitment process and survey development, challenges of using this methodology, and consideration of how it compares to other modes of data collection. This was published in *JMIR Formative Research*.

Chan L, El-Haddad N, Freeman B, O'Hara BJ, Woodland L, Harris-Roxas B. A Case Study of an SMS Text Message Community Panel Survey and Its Potential for Use During the COVID-19 Pandemic. *JMIR Formative Research* 2021;5(11):e28929; doi: 10.2196/28929

Link: <https://formative.jmir.org/2021/11/e28929/>

Viewpoint

A Case Study of an SMS Text Message Community Panel Survey and Its Potential for Use During the COVID-19 Pandemic

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Abstract

During the COVID-19 pandemic many traditional methods of data collection, such as intercept surveys or focus groups, are not feasible. This paper proposes that establishing community panels through SMS text messages may be a useful method during the pandemic, by describing a case study of how an innovative SMS text message community panel was used for the “Shisha No Thanks” project to collect data from young adults of Arabic-speaking background about their attitudes on the harms of waterpipe smoking. Participants were asked to complete an initial recruitment survey, and then subsequently sent 1 survey question per week. The study recruited 133 participants to the SMS text message community panel and the mean response rate for each question was 73.0% (97.1/133) (range 76/133 [57.1%] to 112/133 [84.2%]). The SMS text message community panel approach is not suited for all populations, nor for all types of inquiry, particularly due to limitations of the type of responses that it allows and the required access to mobile devices. However, it is a rapid method for data collection, and therefore during the COVID-19 pandemic, it can provide service providers and policymakers with timely information to inform public health responses. In addition, this method negates the need for in-person interactions and allows for longitudinal data collection. It may be useful in supplementing other community needs assessment activities, and may be particularly relevant for people who are considered to be more difficult to reach, particularly young people, culturally and linguistically diverse communities, and other groups that might otherwise be missed by traditional methods.

(*JMIR Form Res* 2021;5(11):e28929) doi: [10.2196/28929](https://doi.org/10.2196/28929)

KEYWORDS

data collection; mobile phone; short message service; tobacco; COVID-19; survey

Introduction

There is a high level of interest in communities' experiences and needs during the COVID-19 pandemic [1-4], and as people's lived experiences have been heterogeneous, more information is needed to understand what different subgroups within populations have been through. This is especially true of minority populations who are underrepresented in mainstream conversations. Traditional methods of collecting participant

data, such as intercept surveys or focus groups, are not feasible during a pandemic due to physical distancing requirements.

Establishing community panels that provide data through SMS text messaging is a potential method that could be used during the COVID-19 pandemic to provide information for support services, policy planning, and research studies. SMS text message community panels allow longitudinal data collection and involve the recruitment of a sample of the community to

form the community panel, and then sending a small number of survey questions via SMS text messages to the panel participants at regular short time intervals. Panel participants respond to the survey questions by sending a short response back via an SMS text message. This method allows tailoring of language to different community groups, and is particularly suitable to younger people who have been socialized to communicate using this channel. SMS text message surveys have been trialed in health research studies for data collection and have been found to be user-friendly and produce reasonable response rates [5-9].

While there are other noncontact methods of data collection that are useful during the COVID-19 pandemic, such as online surveys [10-13] and online focus groups [14], we propose that SMS text message community panels could be an additional useful tool. This report highlights an example of an SMS text message community panel, and then discusses how the approach could be used during the pandemic.

The “Shisha No Thanks” SMS Text Message Community Panel

Overview

“Shisha No Thanks” is a co-design project that aims to raise awareness about the harms of waterpipe (shisha) smoking among young adults (aged 18-35 years) of Arabic-speaking background in Sydney, New South Wales, Australia [15,16]. To evaluate the campaign, a community panel using SMS text message–delivered survey questions was established to identify changes in attitudes about the harms of waterpipe smoking. The survey questions were specifically designed for this study to measure awareness of project messages and attitudes toward risks of waterpipe smoking, and questions were adapted from the Cancer Institute NSW Tobacco Tracking Survey [17] and the Syrian Center for Tobacco Studies Narghile-Waterpipe Users Survey [18]. As 94% of young people (18-29-year olds) have smartphones [19], SMS text message–delivered survey questions were considered to be a useful way of engaging the target audience.

Recruitment Process

Recruitment advertisements directed people to an online recruitment survey which was built using Qualtrics software.

The recruitment survey had information about the study, and then asked for demographic information, a mobile phone number, and consent to participate in the study. People who completed the online recruitment survey were then added to the SMS text message community panel database.

To recruit and retain participants, financial reimbursements were provided. The recruitment material explained to participants that they would be compensated for their time with e-gift cards valued at AUD 50 (US \$37) each, which would be sent via SMS text messages at 3 different stages of the study if they answered 75% or more of the questions. To provide context, AUD 50 (US \$37) is equivalent to 6.5% of the minimum weekly wage in this country [20].

SMS Text Message Survey Development

SMS text message community panel members were then sent 1 survey question per week. In total, the study survey consisted of 22 questions—a set of 8 questions that were asked at the beginning of the study period, 6 other questions, and then the initial set of 8 questions were asked again. This was designed for longitudinal follow-up of the cohort, to detect changes in attitudes and awareness about the harms of waterpipe smoking before and after the project.

The survey questions were also set up using Qualtrics, which allows for questions to be sent via SMS text messages. While there are many tools available for SMS text message surveys, Qualtrics was selected for this study, as it is a platform available through research institution licensing, allows for secure data hosting arrangements, and provides a user-friendly process to build SMS text message surveys (as it uses the same interface as the one used to build online surveys). It is worthwhile to note that SMS text message distribution in Qualtrics is an add-on feature, and not part of its standard license.

Each question was set up as an individual survey, and an identification number was assigned to each participant to match his/her responses throughout the study. The survey questions were designed specifically for SMS text messages, with short and concise questions that can be responded to using either multiple choice or short-text answers. Study participants were able to participate in English or Arabic (see [Textboxes 1 and 2](#) for examples of the survey questions in English and Arabic).

Textbox 1. Questions from the Shisha No Thanks SMS text message survey (English language version).

How would you rate smoking shisha compared to cigarettes considering its health effects?

1. Same
2. Less harmful
3. More harmful
4. Don't know

What's the main reason(s) you smoke shisha (in a few words):

Have you recently talked to someone (eg, family or friend) about the harms of smoking shisha?

- A. Yes
- B. No
- C. Don't know

Textbox 2. Questions from the Shisha No Thanks SMS text message survey (Arabic language version).

ما هو تقييمك لتدخين الشيشة بالمقارنة مع تدخين السجائر من حيث تأثيراته على الصحة؟

- 1- الضرر ذاته
- 2- أقل ضررًا
- 3- أكثر ضررًا
- 4- لا أعرف

ما هو السبب الرئيسي (أو الأسباب الرئيسية) لتدخينك الشيشة؟
(بعدة كلمات)

هل تحدثت مؤخرًا مع شخص ما (مثل قريب أو صديق لك) عن مضار تدخين الشيشة؟

- أ - نعم
- ب - كلا
- ج - لا أعرف

Recruited Community Panel

The study was able to recruit 133 participants for the SMS text message community panel. This was roughly equivalent to the sample size that the project had planned for (n=100 paired responses for each response, anticipating that not all participants would respond to every question).

Community panel participants were recruited through the local community partner's communication channels, including email newsletters and social media pages; through active local community champions who shared the recruitment survey link with their own networks via email, SMS text message, or in person; and through printed flyers with the survey link at community events, such as tertiary education open days. The

recruitment survey was available on a tablet device for participants to complete at these events. Local community partners and active community champions were provided with all the recruitment materials that were used to promote the online recruitment survey.

The research team perceived the following factors to be influential in the recruitment and retention of community panel participants to the study: nature of the study by reducing the burden of participation, participants' age range, close engagement with the community during recruitment, participants being financially compensated for their time, and providing Arabic translations for individuals who do not speak English or prefer to participate in Arabic. Although standard SMS text messaging rates applied to the participants to answer each question, this did not hinder their response rate.

The SMS text message community panel participants' age ranged from 18 to 35 years (mean 25.8 [SD 5.1]), with 64.7%

(86/133) being female. In terms of language spoken at home, 12/133 (9.0%) spoke only Arabic, while 87/133 (65.4%) spoke English and Arabic. These demographics were consistent with the target group the research was designed to study. Only 5/133 (3.8%) participants opted to complete the survey in Arabic.

Response Rates

The SMS text message community panel participants received questions on their phone via SMS text messages. To respond to the question, they sent their response by replying to the same number via SMS text message and typing in either a multiple-choice response or a short text. The mean response rate for individual survey questions was 73.0% (97.1/133) (range 76/133 [57.1%] to 112/133 [84.2%]). This response rate is comparable to the rates reported in other studies using SMS text message surveys [6-9]. Table 1 shows the response rates for each question that was asked before and after the project. Response rates for 6 out of 7 questions were lower for the second round.

Table 1. Response rates for each survey question.

| Question ^a | Participants who responded (N=133) | |
|-----------------------|-------------------------------------|-------------------------------------|
| | First round (before project), n (%) | Second round (after project), n (%) |
| Q1 | 101 (75.9) | 89 (66.9) |
| Q3 | 105 (78.9) | 87 (65.4) |
| Q4 | 103 (77.4) | 87 (65.4) |
| Q5 | 112 (84.2) | 85 (63.9) |
| Q6 | 106 (79.7) | 93 (69.9) |
| Q7 | 76 (57.1) | 93 (69.9) |
| Q8 | 105 (78.9) | 87 (65.4) |

^aQ2 has not been included, as it was only sent to participants who answered yes to Q1.

Study Design Challenges

The main challenge encountered was related to the Arabic translation of participant material, including the participant information and consent form, online recruitment survey, and the SMS text message survey questions. An accredited translator translated these materials from English to Arabic. To check for accuracy and content, an Arabic-speaking researcher on the evaluation team compared the translated version with the original English version. However, during the initial recruitment phase, some Arabic-speaking participants who chose to complete the online recruitment survey in Arabic informally reported to the project officer that the participant information and consent form included complex research terminology that were difficult for the general community to understand in Arabic. To rectify this, the participant materials were re-translated using a different translation service and reviewed by 5 Arabic-speaking community members.

Potential Uses and Benefits of SMS Text Message Community Panels During COVID-19

The SMS text message community panel is a feasible approach that overcomes many barriers to data collection during a pandemic. SMS text message community panels allow for noncontact data collection, which is an important attribute during the COVID-19 pandemic, with physical distancing and isolation being key behavioral strategies in preventing COVID-19 spread. SMS text message community panels are potentially able to include people who are more difficult to reach using other data collection methods, such as people from culturally and linguistically diverse backgrounds and differing levels of language proficiency, young people, people who live in rural and remote locations, and people with no fixed address. The method allows for timely data processing, as the data are automatically populated into digital format for analysis, which is particularly pertinent during COVID-19 as situations change quickly. This approach could be used for relatively quick data collection on needs, perceptions, and self-reported behaviors in the context of COVID-19. It is not intended to be a replacement

for disease surveillance activities, but represents a potentially important additional method of collecting data.

SMS Text Message Community Panels in Comparison to Other Data Collection Methods

In comparison to online surveys, SMS text message surveys are more specifically tailored to mobile phones. Participants respond to SMS text message survey questions in the same phone app on which they receive the questions, and the app is built into the functionality of mobile phones. By contrast, for online surveys, participants are required to click on a link in an email or social media post, which takes them to a web browser application to complete the survey. While this is a small obstacle, removing any obstacle is beneficial for improving response rates. In addition, SMS text message enables people with mobile phones (not smartphones) to participate.

Online surveys are usually developed as 1 survey with numerous questions. SMS text message community panels send only 1 or 2 questions per week, which means that participants only require a short amount of time to respond to the question(s) each week. In this way, SMS text message community panel surveys are more beneficial for measuring repeated measures at short time intervals. As an example, questions could collect data on how people are feeling during each week, and track changes in relation to situational changes (eg, small outbreaks, changes in lockdown policies, or vaccine rollout announcements).

An important benefit of using SMS text message is that it does not rely on proprietary messaging platforms, such as Facebook or WhatsApp. These proprietary platforms may have privacy or data governance implications. SMS text messages also allow a degree of anonymity as participants can be identified only as their phone number, unlike proprietary platforms, which automatically display names and personal information.

The SMS text message survey method is not appropriate to address all areas of research, particularly those that require more in-depth and detailed inquiry. Closed questions are generally limited to simple ordinal or categorical responses, and responses to open questions are limited to 160 characters before they are split up into multiple messages.

Considerations for Use

Recruitment and Participant Demographics

The experience of the “Shisha No Thanks” project in recruiting SMS text message community panel members demonstrated that recruitment to an already engaged community is effective. Recruitment by texting random mobile numbers with invitations to an SMS text message panel may not be effective. The researchers propose that recruitment to SMS text message community panels should be through channels where people have already established an interest or relationship (eg, signed up to community organization’s database), or through regular recruitment methods (eg, advertisements in newsletters, social media, and personal networks). In addition, this method of data collection is most suitable for recruiting participants from

demographic groups who are confident with using SMS text message technology, and frequently use their mobile phone, such as the young people (18-35-year olds) who were the focus of the “Shisha No Thanks” project.

Incentives to Participate

In the “Shisha No Thanks” project, participants reported that reimbursements acted as reminders for people to respond to the survey. Distributing reimbursements using the same platform as was used for the survey questions also facilitated this approach. During COVID-19, easily redeemable reimbursements may be equally important, given the disruptions and other challenges people face.

Data Privacy and Security

In the “Shisha No Thanks” project, data collected were in a nonidentifiable format, and the platform used to create the SMS text message survey used firewall-protected systems and passwords to protect the data. However, SMS text message technology does not use end-to-end message encryption, and so SMS text messages do carry a risk of unauthorized access to the data. Therefore, this method of data collection may not be suitable for sensitive data. Despite the security limitations of SMS text message technology, it is worth noting that studies have found most people do not have privacy or security concerns with using SMS text messages [21,22].

Reducing Barriers

Not everyone will have high levels of literacy, health literacy, or digital literacy. As with all surveys, careful and considered design of the survey questions can help reduce some of these barriers. Enabling the option for people to participate in the “Shisha No Thanks” study in English or Arabic presented a range of challenges including ensuring accurate translation and difficulties in ensuring non-Roman characters displayed correctly when sent via SMS text message. However, the ability to address these challenges illustrates that if inclusiveness is meaningfully considered in design, SMS text message community panels can broaden participation when compared with cross-sectional surveys, as they can be more specifically tailored to the subgroup of interest.

Costs

An important consideration is whether the cost of SMS text message would be a potential barrier for participation. If this method is intended to be used with socioeconomically disadvantaged groups, then this issue needs to be investigated, and it may be important to use toll-free response numbers.

Limitations

This paper presents a case study demonstrating how SMS text message community panels were used for the “Shisha No Thanks” project. Being only 1 case study, there are several limitations in our understanding about how SMS text message community panels could work for other research, particularly in the COVID-19 context. The “Shisha No Thanks” project featured substantial community participation and engagement, which may have contributed to its ability to recruit and retain participants to the SMS text message community panel. It is unclear how important this initial engagement with the

community is to the success of SMS text message community panels. In addition, it is not known how important reimbursements were to the recruitment and retention success of the “Shisha No Thanks” SMS text message community panel. As reimbursement practices vary substantially between studies [23], establishing SMS text message community panels in the

future with reduced or no reimbursements would demonstrate whether substantial financial reimbursements are an essential component for this method of data collection. Finally, while we did notice some attrition during the study, further research is needed to identify how long people would be willing to be engaged on such SMS text message community panels.

Acknowledgments

The authors thank Dr Ross MacKenzie for his valuable comments on this paper. LC receives support from the Prevention Research Support Program, funded by the New South Wales Ministry of Health. The “Shisha No Thanks” project was funded by the Cancer Institute NSW.

Conflicts of Interest

None declared.

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Edited by G Eysenbach; submitted 18.03.21; peer-reviewed by S Brabyn, A Sudaryanto; comments to author 30.07.21; revised version received 09.08.21; accepted 19.09.21; published 03.11.21

Please cite as:

Chan L, El-Haddad N, Freeman B, O'Hara BJ, Woodland L, Harris-Roxas B

A Case Study of an SMS Text Message Community Panel Survey and Its Potential for Use During the COVID-19 Pandemic
JMIR Form Res 2021;5(11):e28929

URL: <https://formative.jmir.org/2021/11/e28929>

doi: [10.2196/28929](https://doi.org/10.2196/28929)

PMID: [34612824](https://pubmed.ncbi.nlm.nih.gov/34612824/)

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4.5 Evaluation of 'Shisha No Thanks' – a co-design social marketing campaign on the harms of waterpipe smoking (published paper)

As a member of the project's Evaluation Working Group, I was responsible for reviewing the relevant literature and evidence, and was part of the team who conceptualised the impact evaluation study of the *Shisha No Thanks* project. The impact evaluation data was collected using the innovative approach described in Section 4.4. I developed the analysis plan, and then analysed, interpreted and presented the data, facilitated a critical review of results by the Working Group and presented the results in a manuscript suitable for peer-review publication.

The findings of this impact and outcome evaluation are reported in the following article published in *BMC Public Health*. The appendices listed in this paper can be found in Appendix 2.11, 2.12, 2.13, 2.14, 2.15 and 2.16 of this dissertation.

Chan L, El-Haddad N, Freeman B, MacKenzie R, Woodland L, O'Hara BJ, Harris-Roxas BF. Evaluation of 'Shisha No Thanks' - a co-design social marketing campaign on the harms of waterpipe smoking. *BMC Public Health*. 2022 Feb 24;22(1):386. doi: 10.1186/s12889-022-12792-y

Link: <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-022-12792-y>

RESEARCH

Open Access



Evaluation of ‘*Shisha No Thanks*’ – a co-design social marketing campaign on the harms of waterpipe smoking

Lilian Chan^{1*}, Nouhad El-Haddad², Becky Freeman¹, Ross MacKenzie², Lisa Woodland³, Blythe J. O’Hara¹ and Ben F. Harris-Roxas⁴

Abstract

Background: Waterpipe (shisha) is becoming increasingly popular worldwide, particularly among young people; and in some countries, it is one of the few forms of tobacco use that is increasing. While there is a growing body of evidence of the harms of waterpipe smoke, there is a scarcity of research of interventions to address this form of tobacco consumption.

Methods: The *Shisha No Thanks* project was a co-design social marketing campaign that aimed to raise awareness of the harms of waterpipe smoking among young people from an Arabic speaking background in Sydney, Australia. The campaign distributed material through social media and community events. We evaluated the project through an SMS community panel using a longitudinal study design. The cohort were sent questions before and after the project asking about their awareness of messages of harms, attitudes, intention to reduce waterpipe smoking, and awareness of support services. Data was analysed as matched pre- post- data.

Results: The evaluation recruited 133 people to the panel. There was a significantly greater proportion of people who reported seeing, hearing or reading something about the harms of waterpipe smoking after the campaign (67.5%) compared with before (45.0%) ($p=0.003$). Post-campaign, there were higher proportions of people who strongly agreed that waterpipe smoking causes damage, and that it contains cancer-causing substances, but these increases were not statistically significant. There was low awareness of waterpipe cessation services at baseline and post campaign (22.5%).

Conclusions: The *Shisha No Thanks* project increased awareness of messages about the harms of waterpipe smoking. Although this is a small study, the longitudinal evaluation findings have international relevance and make a useful contribution to the understanding of the impact such interventions can have in addressing one of the few forms of tobacco use that is growing in both developed and developing countries.

Keywords: Waterpipe, Smoking, Tobacco control, Campaign, Social marketing

Background

The dramatic rise in prevalence and geographic spread of waterpipe use (also known as shisha, argile, nargile, hubbly bubbly) has been described as a “global phenomenon”, and has become more prevalent than cigarette smoking among young people in some Middle Eastern countries [1]. Suggested reasons for this dramatic

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increase in popularity, predominantly among young people, include the introduction of flavoured tobacco, widespread dissemination via social media, and frequent uncertainty around regulation and enforcement [1, 2].

Waterpipe use is particularly popular with Arabic speaking young people in North America, Europe and other western countries [1, 3]. In the United States, for example, a 2018 study estimated that 480,000 high school students and 150,000 middle school students used waterpipe in the past 30 days [4]. Among US adults, 16.4% were reported to have ever used a waterpipe to smoke tobacco, and of daily or weekly users, 66% were young adults (18-24 years) [5]. In Australia, waterpipe use accounts for a relatively small proportion of tobacco use, with 2.5% of people 14 years and older using waterpipes to smoke tobacco; [6] however, rates are much higher among Australian people of Arabic speaking background. A 2004 survey of Arabic speakers in Sydney reported that 11.4% of respondents used waterpipes and that 1% were daily users; [7] while a 2010 survey of Arabic speakers in Melbourne found that 38% of respondents had smoked a waterpipe, with 4% reporting daily use [8]. As is common elsewhere, [1] waterpipe use among Arabic speakers in Australia has powerful social and cultural dimensions, [2] and there is considerable skepticism regarding potential health risks, and a belief that it is less harmful than cigarette smoking [2].

The perception that waterpipe smoking is not harmful is a dangerous misconception that ignores related health risks, of both direct use and secondary exposure to waterpipe smoke, and discounts addiction. Studies have found that waterpipe smoking is associated with emphysema, chronic obstructive pulmonary disease, coronary artery disease and oesophageal, gastric and lung cancer [9]. Further, the social nature and communal use of waterpipes have been linked to the transmission of a range of infections, such as respiratory viruses, [10] and are “ideal for transmission and may exacerbate the risk for severe COVID-19 through shared use” [11].

The growing research into waterpipe use has primarily focused on prevalence, toxins and health effects, but there has been relatively little analysis on the effectiveness of health promotion interventions targeting waterpipe smoking. A scoping review of health promotion interventions targeting waterpipe smoking found only 10 published intervention studies – 5 policy interventions, 3 web-based educational interventions, 1 behavioural intervention, and only 1 community-level awareness campaign; [12] while a systematic review found only 3 controlled trials – 2 individual behavioural interventions, and 1 community-level intervention [13].

Given the lack of evidence-based interventions targeting waterpipe smoking, the ‘*Shisha No Thanks*’ project

was a novel intervention that drew upon practices that have been used in other areas of tobacco control. The ‘*Shisha No Thanks*’ project was a co-design, social marketing health promotion campaign targeting waterpipe smoking among young people of Arabic speaking background in Sydney, Australia. Social marketing is a widely used approach to reduce tobacco use, [14] and key strengths of such interventions include the mix of strategies, targeting of specific audiences, and the ‘client-oriented’ approach [15, 16]. The use of a co-design approach taken for the ‘*Shisha No Thanks*’ project aimed to ensure the intervention was culturally appropriate and acceptable.

This study evaluates the effectiveness of the ‘*Shisha No Thanks*’ project and contributes to the limited existing research on health promotion interventions aimed at waterpipe users. As the target audience of the project is young adults, who are more difficult to engage in research studies, [17] the evaluation also used a novel method of data collection, which was establishing an ‘SMS community panel’ who responded to evaluation survey questions through weekly SMS correspondence.

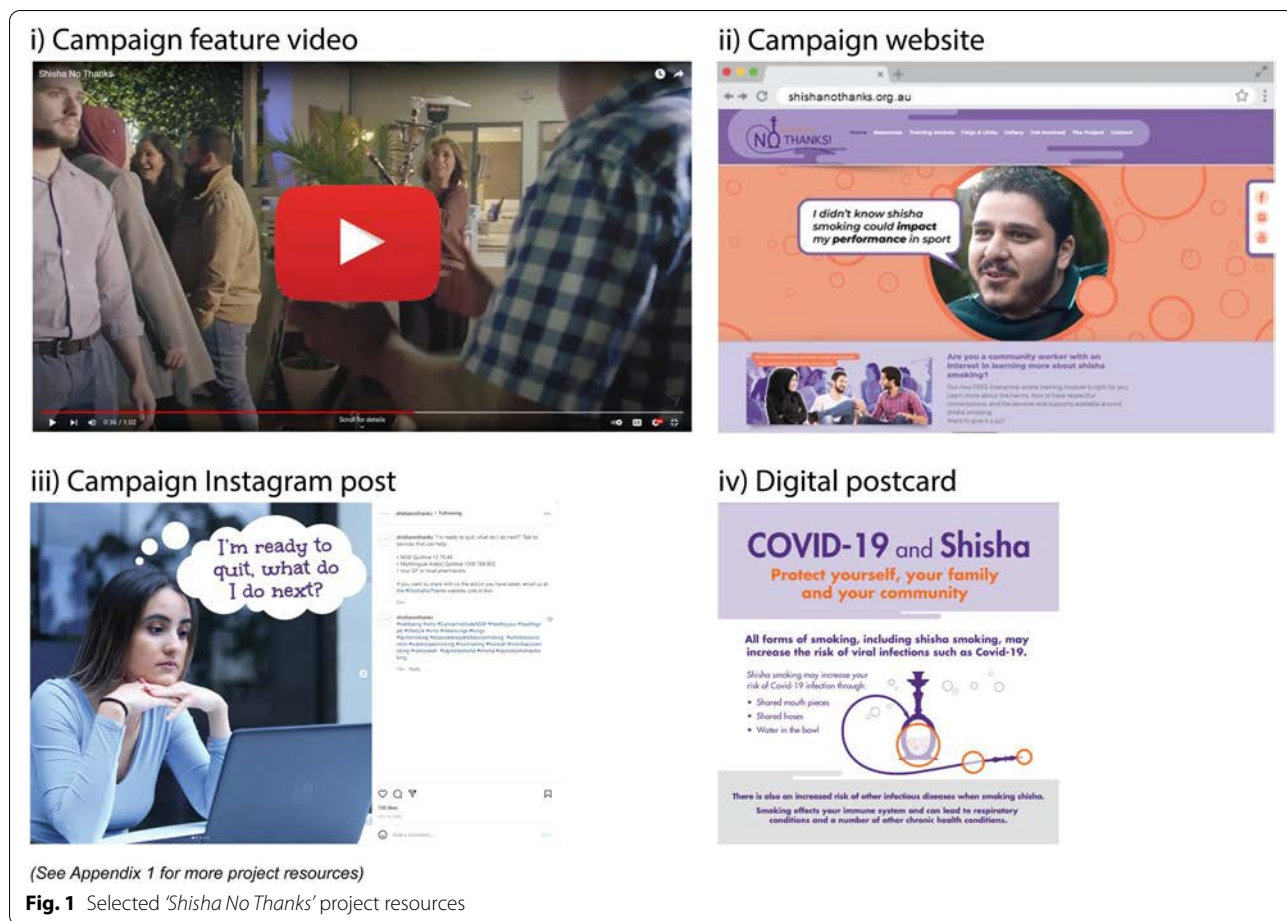
Methods

The *Shisha No Thanks* project

The aims of the *Shisha No Thanks* project were to highlight and raise awareness about the health risks of waterpipe smoking among young people (18-35 years old) from an Arabic speaking background and to encourage discussion around quitting or reducing waterpipe smoking. The project ran from October 2019 to June 2020, predominately in the South East, South West, and Western areas of Sydney, Australia, where there is a higher proportion of people who identify as being of Arabic speaking background. The project was run by a government local health district (South Eastern Sydney Local Health District), in partnership with a community organisation (Lebanese Muslim Association) and was funded by the Cancer Institute NSW (a state government cancer control agency).

Shisha No Thanks was a co-design project that involved the project team working closely with the community partner organisation, members of the community, community champions and health professionals to identify the key messages and strategies for the awareness raising campaign. The project team was mindful throughout the entire process to ensure that the campaign was run respectfully towards the community and was culturally appropriate.

Campaign resources were developed from the community co-design workshops and evidence-based research, and included a feature campaign video, [18] a large collection of social media content (such as short videos



clips, memes and graphics), and a suite of factsheets for young people, pregnant women and families, community workers and health professionals, which were available in English and Arabic [19] (See Fig. 1 and Appendix 1 for examples).

These campaign resources were disseminated to the community through the campaign’s website [19] and social media accounts (Facebook, [20] Instagram [21] and YouTube [22]). The project also engaged the community through local media coverage (English and Arabic speaking media; TV, radio and online), by attending community events (e.g. expos and information days) and conducting community worker information sessions.

Study design, participants and data collection

The impact evaluation used a cohort design to measure awareness before and after the project among the target audience. A community panel was recruited through the Lebanese Muslim Association’s communication channels (email newsletter, social media accounts), community champions, and flyers at events (see Appendix 2 for examples of recruitment material). Participants were

required to be 18-35 years old and either smoke water-pipe or know someone who does. Potential participants were directed to complete an online recruitment survey to confirm eligibility in the study, provide demographic details (including their waterpipe smoking activity) and their mobile phone number (See Appendix 3 for Recruitment Survey).

Participants were then sent a weekly SMS text message with a survey question about their knowledge and attitudes about waterpipe smoking. As most young people use their mobile phones frequently each day, an SMS survey was an effective way of easily reaching the target audience. Participants were sent a set of 8 questions before the project started, with 1 question being sent per week for 8 weeks from Aug-Oct 2019. Then the same 8 questions were sent towards the end of the project, again with 1 question being sent per week for 8 weeks from Jan-Mar 2020. In the interim period, participants were sent other questions related to waterpipe smoking to maintain communication between participants and the project. (See Appendix 4 for Survey Questions). This approach of sending 1 question per week was chosen to

reduce the perceived burden of responding to the survey questions. Main participant recruitment documents and all data collection surveys were produced in English and Arabic, and participants were given the option to choose to receive the SMS text messages in either English or Arabic.

Survey measures

The SMS survey questions were adapted from the Cancer Institute NSW Tobacco Tracking Survey [23] and the Syrian Center for Tobacco Studies Narghile-Waterpipe Users Survey [24]. The questions were related to participants' awareness of messages about the harms of waterpipe smoking, attitudes towards the health impacts of waterpipe smoking, intention to reduce waterpipe smoking, community conversations about waterpipe smoking, and awareness of services to support cessation of waterpipe smoking. Questions were designed to be short and succinct to fit with the SMS format, and were either multiple choice response, or short free-text response.

Participants were reimbursed for their involvement in the study with three \$50AUD e-vouchers. The survey used the Qualtrics platform which has the capacity to send SMS messages to the study participants' mobile phone number.

Analysis

Data extracted from Qualtrics was entered into an Excel spreadsheet file. Data was then analysed using IBM SPSS Statistics v26. For the 8 questions that were asked before and after the project, only paired data (i.e. data where the participant had responded to the same question at both baseline and post-campaign) were used for analysis and reported. Given the matched nature of the data, binary categorical responses were analysed using McNemar's test, [25, 26] and non-parametric scaled data was analysed using Wilcoxon Signed Rank test [27]. Subgroup analysis was also conducted based on age group, gender and waterpipe use. For the 6 questions that were asked only once (in the interim period), descriptive analysis was conducted.

Results

In total, 133 people were recruited to the study's SMS community panel (see Table 1). 86 (64.7%) were female, the mean age of the panel was 25.8 years old, and 87 (65.4%) participants reported speaking English and Arabic at home. 100 (75.2%) participants reported smoking waterpipe, with 22 reporting smoking waterpipe daily, 35 smoking waterpipe at least once per week (but not daily), and 37 reporting smoking waterpipe less than once per week. The number of participants who responded to

Table 1 Demographic characteristics of SMS panel participants (n=133)

| | n | % |
|---|-----|------|
| Age | | |
| 18-26 years old | 80 | 60.2 |
| 27-35 years old | 53 | 39.8 |
| Gender | | |
| Male | 47 | 35.3 |
| Female | 86 | 64.7 |
| Language spoken at home | | |
| English | 28 | 21.1 |
| Arabic | 12 | 9.0 |
| English and Arabic | 87 | 65.4 |
| Other | 6 | 4.5 |
| Smoking waterpipe at recruitment | | |
| Yes | 100 | 75.2 |
| No | 32 | 24.1 |
| Not sure | 1 | 0.8 |
| Frequency of waterpipe smoking^a | | |
| Daily | 22 | 16.8 |
| At least once per week, but less than daily | 35 | 26.7 |
| Less than once per week | 37 | 28.2 |
| Not applicable | 37 | 28.2 |

^a Data for 2 participants missing

each question both at baseline and post-campaign ranged from 70 to 92 (see Table 2 and Appendix 5).

When asked whether they had seen, heard or read anything about the harms of waterpipe smoking, there was an increase in the proportion who reported they had post-campaign ($n=54$, 67.5%) compared with baseline ($n=36$, 45.0%). This is the only statistically significant change identified in this study ($p=0.003$) (see Table 2). In the subgroup analyses, this result was significant among women, people in the older age group (27-35 year olds) and people who did not smoke waterpipe (see Fig. 2 and Appendix 6). When asked to describe what they had seen, heard or read, 34 of the 44 valid responses were

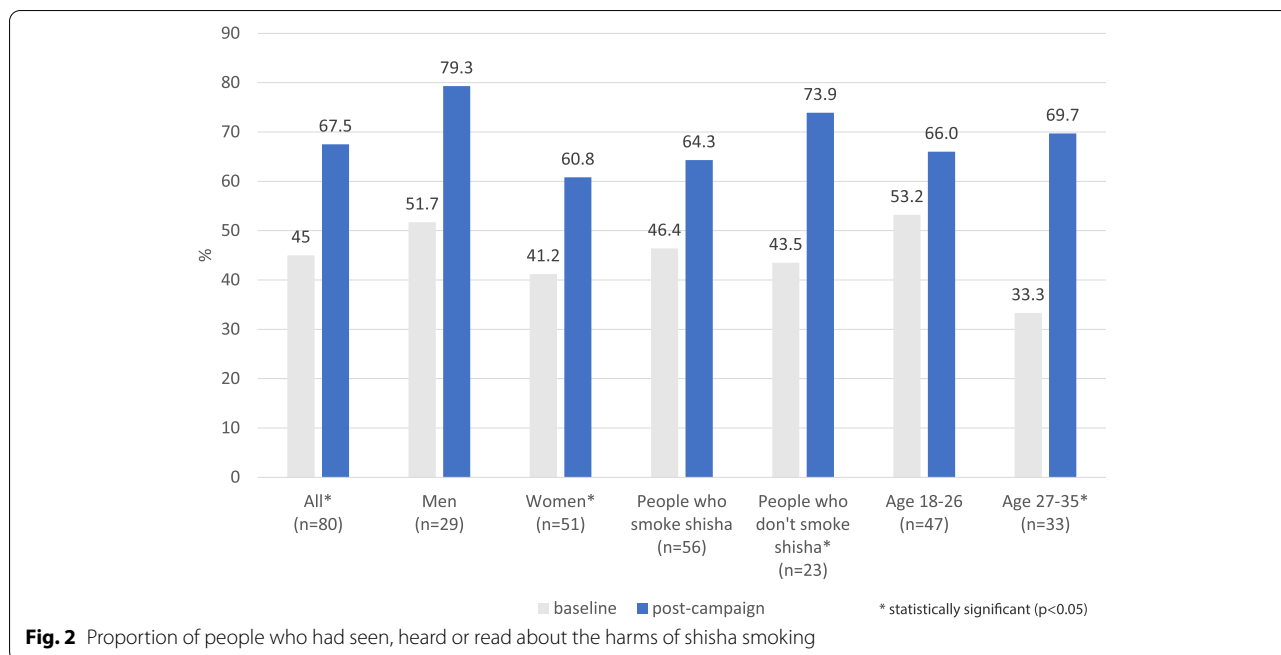
consistent with the main messages or resources of the *Shisha No Thanks* project.

When asked about the health harms of waterpipe smoking, there was a slightly higher proportion of people who strongly agreed that it could cause physical damage post-campaign; however this result was not statistically significant (see Table 2). Similar results were obtained when asked whether waterpipes contain cancer-causing substances (see Table 2). There were also no statistically significant changes for these questions in the subgroup analyses (see Appendix 6).

There were no statistically significant differences in the proportion of participants who considered reducing or

Table 2 Paired responses at baseline and post-campaign

| | Baseline | | Post-campaign | | p-value |
|---|----------|------|---------------|------|-------------|
| | n | % | n | % | |
| Have you seen, heard or read anything about harms of shisha smoking (n=80) | | | | | $p=0.003^*$ |
| Yes | 36 | 45.0 | 54 | 67.5 | |
| No or Don't know | 44 | 55.0 | 26 | 32.5 | |
| Shisha contains cancer-causing substances (n=84) | | | | | $p=0.13$ |
| Strongly agree | 36 | 42.9 | 47 | 56.0 | |
| Somewhat agree | 29 | 34.5 | 20 | 23.8 | |
| Neutral / Don't know | 17 | 20.2 | 15 | 17.9 | |
| Somewhat disagree | 1 | 1.2 | 1 | 1.2 | |
| Strongly disagree | 1 | 1.2 | 1 | 1.2 | |
| What are the health effects of smoking shisha compared to cigarettes? (n=81) | | | | | $p=0.82$ |
| Same or more harmful | 55 | 67.9 | 53 | 65.4 | |
| Less harmful or Don't know | 26 | 32.1 | 28 | 34.6 | |
| Smoking shisha can cause damage to your body (n=85) | | | | | $p=0.31$ |
| Strongly agree | 46 | 54.1 | 52 | 61.2 | |
| Somewhat agree | 28 | 32.9 | 23 | 27.1 | |
| Neutral / Don't know | 9 | 10.6 | 9 | 10.6 | |
| Somewhat disagree | 2 | 2.4 | 1 | 1.2 | |
| Strongly disagree | 0 | 0.0 | 0 | 0.0 | |
| Have you thought about reducing the amount of shisha you smoke? (n=92) | | | | | $p=0.70$ |
| Yes, [Within the next 30 days/ next 6 months/ completely stopping] | 43 | 46.7 | 46 | 50.0 | |
| No / Don't know | 49 | 53.3 | 46 | 50.0 | |
| Have you talked to someone about the harms of smoking shisha? (n=70) | | | | | $p=0.05$ |
| Yes | 44 | 62.9 | 34 | 48.6 | |
| No / Don't know | 26 | 37.1 | 36 | 51.4 | |
| Do you know where to find information or support to help quit smoking shisha? (n=80) | | | | | $p=1.00$ |
| Yes | 18 | 22.5 | 18 | 22.5 | |
| No / Don't know | 62 | 77.5 | 62 | 77.5 | |



quitting waterpipe smoking before or after the campaign, or the proportion of participants who had talked to someone about the harms of waterpipe smoking. Finally, the proportion of participants who were aware of where to obtain information or support to help quit smoking waterpipe was low both at baseline and post campaign (22.5%) (see Table 2).

The questions that were asked between the baseline and post-campaign survey questions provided insight into behaviours related to waterpipe smoking (see Table 3). 46.7% of respondents reported having searched for information about waterpipe on the internet. Of those who had, 37.0% had searched where to buy or smoke waterpipe and 41.3% had searched about the harms of waterpipe smoking. In terms of location, 55.2% of those who smoked waterpipe reported doing so at home, while 32.8% reported they smoked at a restaurant. Panel members were asked an open-ended question about the reasons they smoke waterpipe. The responses generally related to the social aspects, relaxation or de-stress, enjoying the taste or smell of waterpipe, having fun, the cultural or family aspect, or peer pressure.

Finally, panel members were also asked about whether they smoked other tobacco products. There was strong evidence of an association between waterpipe smoking and smoking of other tobacco products, with 37.0% of people who smoked waterpipe also reporting smoking other tobacco products, compared with 7.1% of non-waterpipe smokers smoking other tobacco products ($p=0.006$) (results are not shown).

Discussion

By using an SMS community panel, this evaluation study showed that the *Shisha No Thanks* project was able to increase awareness of messages about the harms of waterpipe smoking among the target audience of young adults of Arabic speaking background. This adds to the limited number of studies of interventions addressing waterpipe smoking, and indicates that a co-designed social marketing approach, using social media and community events constitutes an effective strategy to raise awareness of this issue.

This evaluation also identified there is a baseline level of awareness of the harms of waterpipe smoking among young adults. The openness of the panel participants towards health messages on this topic could partly be due to the way participants were recruited, and the co-design approach taken for the development of this project. Given the strong cultural associations of waterpipe smoking, it is recommended that future interventions also work closely with the target audience for the intervention to be broadly accepted by communities [2].

While our subgroup analyses found that the increases in awareness of messages about the harms of waterpipe smoking were only statistically significant among non-smokers, women and the older age group, there were still increases detected in all subgroups (see Appendix 6), and the lack of statistical significance may be due in part to the small sample sizes in the subgroups. However, it would be beneficial for future research to assess whether

Table 3 Survey responses for questions about waterpipe smoking-related behaviours

| | n | % |
|--|----|------|
| Have you ever searched for information about smoking shisha on the internet (n=107) | | |
| Yes | 50 | 46.7 |
| No | 53 | 49.5 |
| Not sure | 4 | 3.7 |
| If you have ever searched for information about smoking shisha on the internet, what was it about? (n=46) | | |
| How to smoke shisha | 2 | 4.3 |
| Where to buy or smoke shisha | 17 | 37.0 |
| What are the harms of smoking shisha | 19 | 41.3 |
| How to quit smoking shisha | 4 | 8.7 |
| Other | 4 | 8.7 |
| If you smoke shisha, where do you mostly smoke it? (n=67) | | |
| At home | 37 | 55.2 |
| At restaurant | 22 | 32.8 |
| At a park, or other public area | 3 | 4.5 |
| Other | 5 | 7.5 |
| Do you currently smoke cigarettes, pipes or other tobacco products (excluding shisha)? (n=101) | | |
| Yes | 29 | 28.7 |
| No | 69 | 68.3 |
| Don't know | 3 | 3.0 |
| How often do you now smoke cigarettes, pipes or other tobacco products (excluding shisha)? (n=26) | | |
| Daily | 13 | 50.0 |
| At least weekly (not daily) | 4 | 15.4 |
| Less often than weekly | 6 | 23.1 |
| Not at all, but I have smoked in the last 12 months | 3 | 11.5 |

different campaign dissemination channels and campaign messaging are more effective for specific demographics. For example, identifying whether messages should aim to increase knowledge, target people's health worries, address image perceptions or challenge social norms, would help inform future campaigns targeted at specific audiences.

In the context of other waterpipe smoking interventions, our results are similar to those of a community-based education and awareness intervention in Egypt [28] that had no impact on waterpipe smoking behaviours, but did have an effect on the awareness of the harms of waterpipe smoking. This is consistent with the literature that the success of health campaigns is increased when run in conjunction with other interventions, [29] and therefore suggests that future waterpipe campaigns need to be part of a multipronged approach that uses several health promotion interventions to address waterpipe smoking [12]. For example, our evaluation showed consistent low levels of awareness of support services for people who would like to quit smoking waterpipe, demonstrating the need for greater provision and promotion of support services for people

who would like to reduce or quit waterpipe smoking. Policy interventions, similar to those adopted to regulate use and marketing of conventional cigarettes, including smoke-free laws to manage the popular trend of waterpipe smoking bars and lounges, regulations on flavouring additives, and health warning labels on products and related accessories, are other strategies that should be used together with social marketing campaigns. Increased levels of awareness of harms have been found to improve community attitudes towards waterpipe smoking bans, [30] and social marketing campaigns that increase awareness could support the implementation of such policy measures.

Incorporating waterpipe use into broader tobacco control strategies could lead to more sustained progress in reducing this type of tobacco smoking within both the social and cultural groups in which it has been traditionally popular and the growing trend of waterpipe use among the community at large. The culturally appropriate and research-based resources developed for this campaign can be used by other public health organisations, practitioners and cultural groups who can tailor them for use in other geographical areas.

Strengths and limitations

To our knowledge, this is one of a limited number of studies that have evaluated the impact of a waterpipe smoking intervention, particularly one with a health promotion ethos [13]. The longitudinal study design is a key strength of this study, along with the satisfactory response rate for each question, despite the prolonged duration of the survey and the perception that young adults are difficult to keep engaged in this type of research. An additional strength is that the survey and all recruitment material, were provided in both English and Arabic, which ensured that people were not excluded from the study based on their primary language.

One limitation of this study is the moderate sample size, which limits its ability to detect small changes, particularly for the subgroups we analysed. However, given the resources available, and the size and nature of the project's target audience, this was a practical compromise in study design. In addition, only including data that had baseline and post-campaign responses could potentially bias results to people who are more engaged with the topic. As the SMS community panel was recruited through the community partner's communication channels, it is possible that there was an overlap in the people who participated in the co-design workshops with those who were recruited to the panel, which could account for the high proportion of people who responded that they talked to someone about the harms of waterpipe smoking before the campaign. The questionnaire used in this study also did not assess where people encountered the campaign messages (e.g. social media, community events or information sessions). Finally, an additional limitation of this study is that the use of an SMS survey allowed for only short-response format questions.

Conclusions

This is one of the first published evaluations of a health promotion intervention targeting young people to address the growing global trend of waterpipe smoking. It makes a timely and important contribution that demonstrates that co-design social marketing campaigns can raise awareness of messages about the harms of waterpipe smoking among young people of Arabic speaking background. While the project was not successful in changing attitudes and intentions to quit waterpipe smoking, longer term campaigns, incorporating lessons from other areas of tobacco control could be used to address the growing popularity of waterpipe smoking.

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12889-022-12792-y>.

Additional file 1: Appendix 1. Additional examples of project resources.

Additional file 2: Appendix 2. Recruitment material.

Additional file 3: Appendix 3. Recruitment survey questions.

Additional file 4: Appendix 4. Survey questions.

Additional file 5: Appendix 5. Number of responses for before-after questions.

Additional file 6: Appendix 6. Subgroup Analysis.

Acknowledgements

We acknowledge the involvement of the following organisations in the development, implementation and evaluation of the *Shisha No Thanks* project: SESLHD Priority Populations Unit and Health Promotion Service, Lebanese Muslim Association, SESLHD Health Promotion Service, SWSLHD Health Promotion Service, SLHD Health Promotion Service and Multicultural Health Service, NSW Multicultural Health Communication Service, Centre for Primary Health Care and Equity (CPHCE), UNSW.

Authors' contributions

LC designed the study, collected and analysed data and drafted the manuscript. NEH designed the study, collected data, revised the manuscript, and provided technical support. BF and RM conceived and designed the study, interpreted the data and revised the manuscript. LW conceived, designed and obtained funding for the study. BOH and revised the manuscript and provided technical support. BHR conceived, designed and obtained funding for the study, interpreted the data and revised the manuscript. All authors provided input on the final manuscript. All authors read and approved the final manuscript.

Funding

The *Shisha No Thanks* project was funded by the Cancer Institute NSW. The University of New South Wales was contracted to undertake the evaluation component of the project. LC receives support from the Prevention Research Support Program, funded by the New South Wales Ministry of Health.

Availability of data and materials

The dataset used and analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

This study was approved by the University of New South Wales Human Research Ethics Committee HC190149. The study was carried out in accordance with ethical guidelines of the University of New South Wales. Informed consent was obtained from all the participants involved in the study.

Consent for publication

Not applicable.

Competing interests

LW and LC work for South Eastern Sydney Local Health District, one of the implementing partners of the *Shisha No Thanks* project. NEH and RM work for CPHCE, the evaluation partner of the project. BHR worked for CPHCE at the time of this evaluation study. BF and BOH have no competing interests.

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Received: 18 May 2021 Accepted: 14 February 2022

Published online: 24 February 2022

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Relevance of this research to thesis objectives

As noted in the introduction to this section (Introduction to Part B: Campaign Evaluations), the purpose of this evaluation research study was to understand whether the evaluation approach identified through the literature review (Figure B.1) is appropriate and fit for purpose. This campaign was different to those described in Chapter 3 in the nature of the health issue, and being of much smaller scale. The evaluation used the approach outlined in Figure B.1, collecting digital delivery and engagement metrics (Section 4.3) and impact evaluation measures (method described in Section 4.4 and findings reported in Section 4.5). Similar to the study described in Section 3.5, the evaluation showed an incongruence between the reported online engagement metrics (i.e. a notably large number of Facebook comments) and the impact evaluation measures (i.e. modest campaign awareness, and no statistically significant impact on knowledge or attitudes). This reinforces the findings in Section 3.5 and the implication that further research activities are required to understand how to interpret online engagement actions (as per the second research question of this dissertation). These conclusions led to the design and development of the research studies that are subsequently described in Part C (Chapter 5 and Chapter 6).

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PART C:

UNPACKING ENGAGEMENT METRICS

INTRODUCTION TO PART C: UNPACKING ENGAGEMENT METRICS

The evaluation case studies in Part B of my dissertation show that the approach outlined in Figure B.1 to evaluating health campaigns with a digital component does not sufficiently explain how engagement metrics fit in the context of the overall campaign evaluation.

The two evaluation case studies described in this thesis did not find any clear correlation between engagement metrics and impact measures. The results of the *Still Six Lives* campaign evaluation in Section 3.5 highlights the discrepancy between the large numbers of reach and engagement numbers reported by the digital platforms, with the campaign's impact in terms of recognition and even changes in knowledge of the three modifiable behaviours. Similarly, in the *Shisha No Thanks* project, the main project video received a large number of engagements (Section 4.3), and yet the impact evaluation showed only modest campaign effects on awareness, and no significant effects on attitudes (Section 4.5).

In this next part of my dissertation, I use mixed methods to research the meaning of engagement actions and their associated metrics in relation to people's interest or willingness to take up the campaign's intended action. This part of the dissertation aims to address the second research question of how online engagement metrics should be understood in relation to the overall health campaign evaluation.

CHAPTER 5

EXTENDING THE *SHISHA NO THANKS* EVALUATION

5.1 Introduction

As described in Section 4.3, the *Shisha No Thanks* project received considerable engagement response on Western Sydney Local Health District's Facebook page – with approximately 2,600 reactions and 11,000 comments. These are large numbers for an organic (unpaid) Facebook post on a local health district account, and this unanticipated response provided a unique research opportunity to delve deeper into the project's evaluation, and explore what the comments were able to tell us about people's reaction and attitudes towards the project's messages. Importantly, examining the comments would help us further understand how to interpret one of the project's reported engagement metrics – number of comments.

5.2 Attitudes towards the 'Shisha No Thanks' campaign video: Content analysis of Facebook comments (published paper)

To examine the Facebook comments posted to the *Shisha No Thanks* project video, I conceptualised, designed and managed a mixed method study to analyse the comments. I developed a content coding framework that would allow the comments to be categorised based on the commenter's overall attitude towards the video's message, and analysed, interpreted and reported the results.

The findings of this research are published in the following article in *Tobacco Induced Diseases*. The data collection instrument used for this study can be found in Appendix 3.4, and the detailed coding framework can be found in Appendix 3.5.

Chan L, Harris-Roxas B, Freeman B, MacKenzie R, Woodland L, O'Hara BJ. Attitudes towards the 'Shisha No Thanks' campaign video: Content analysis of Facebook comments. *Tobacco Induced Diseases*. 2022;20(October):88. doi:10.18332/tid/153543.

Link: <http://www.tobaccoinduceddiseases.org/Attitudes-towards-the-Shisha-No-Thanks-campaign-video-nContent-analysis-of-Facebook,153543,0,2.html>

Attitudes towards the ‘Shisha No Thanks’ campaign video: Content analysis of Facebook comments

Lilian Chan¹, Ben Harris-Roxas², Becky Freeman¹, Ross MacKenzie³, Lisa Woodland⁴, Blythe J. O’Hara¹

ABSTRACT

INTRODUCTION While social media are commonly used in public health campaigns, there is a gap in our understanding of what happens after the campaign is seen by the target audience. This study aims to understand how the *Shisha No Thanks* campaign video was received by the Facebook audience by analyzing Facebook comments posted to it. Specifically, this study aims to determine whether the Facebook audience accepted or rejected the campaign’s message.

METHODS A sample of the Facebook comments was extracted, and the study team, which included cultural support workers, developed content categories consistent with the research question. Each comment was then coded by three team members, and only assigned a category if there was agreement by at least two members.

RESULTS Of the 4990 comments that were sampled, 9.1% (456) accepted the campaign message, 22.9% (1144) rejected the message, 21.8% (1089) were unclear, and 46.1% (2301) contained only tagged names. Of the sample, 2.8% (138) indicated the commenter took on board the campaign message by expressing an intention to stop smoking shisha, or asking a friend to stop smoking shisha. Of the comments that showed rejection of the campaign, the majority were people dismissing the campaign by laughing at it or expressing pro-shisha sentiments.

CONCLUSIONS This study demonstrates that conducting content analyses of social media comments can provide important insight into how a campaign message is received by a social media audience.

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KEYWORDS

campaign, shisha, waterpipe, content analysis, social media

Tob. Induc. Dis. 2022;20(October):88

<https://doi.org/10.18332/tid/153543>

INTRODUCTION

While social media have become a ubiquitous channel for public health campaigns, many campaigns primarily use them as one-way broadcast media and measure the effectiveness of their efforts through metrics such as reach and engagement¹. More comprehensive campaign evaluations also assess summative (impact and outcome) evaluation measures, such as changes in knowledge or behaviors linked to the health message disseminated through social media²⁻⁴.

Understanding how a public health campaign can change the awareness and attitudes of its intended audience and potentially convince them to reconsider their behaviors, however, requires further analysis⁵. Social media comment analysis has been widely used in health research to understand how the public discusses tobacco and nicotine use⁶⁻⁹ and specifically shisha, a form of tobacco smoking¹⁰⁻¹². Social media comment analysis can provide insight into people’s attitudes in a more informal setting than focus groups or survey responses.

Social media comment analysis has also been used to understand public

responses to health campaigns related to tobacco and nicotine use¹³. Largely, this research has been conducted on Twitter content, rather than Facebook which has more restricted access to exporting comments for analysis. To date, no social media comment analysis has been conducted to understand the response to a health campaign about shisha smoking.

The *Shisha No Thanks* project

Shisha (also known as waterpipe, hookah, narghile or argihle) has been practiced in Arabic-speaking countries for many decades, and the practice is becoming more popular among young people, particularly in Middle Eastern countries¹⁴. It is also a global trend, spreading to other countries, such as the US and Australia¹⁵⁻¹⁷. There are many factors contributing to this trend, including the introduction of flavored shisha tobacco, lax regulation of shisha smoking¹⁸, misconception that shisha smoking is safer than other forms of tobacco smoking¹⁹, that shisha smoking is cool or fashionable¹⁹⁻²¹, and because it is a social activity^{21,22} with cultural elements¹⁹⁻²³.

This growing trend is of great concern, as shisha smoking is associated with a range of health harms, including increased risks of esophageal and lung cancer, emphysema and cardiovascular disease^{24,25}. Concerningly, among young people, shisha smoking is also associated with double the risk of later initiation of cigarette smoking²⁶.

In response to the situation in Australia, the *Shisha No Thanks* project was pioneered to raise awareness of the harms of shisha smoking among young people (aged 18–35 years) from Arabic-speaking backgrounds in Sydney, New South Wales. In the geographical area of the project, 12% of the population identify themselves as Arabic-speaking²⁷, and among Arabic speakers in Sydney, 11.4% reported using shisha¹⁷. The key objective of the project was to increase community awareness of the harms of shisha smoking. The project took a co-design approach and developed a suite of evidence-based, culturally appropriate campaign resources in both English and Arabic that conveyed the harms of shisha smoking, including factsheets and social media content, which were distributed through community events, public relations activities, and social media (Facebook, Instagram and YouTube). One of the key campaign

resources was a 1-min broadcast quality campaign video in English, developed for online viewing, which depicts a scenario of a gathering of family and friends during which shisha is offered to the main character. However, instead of the usual shisha, the head of the shisha was filled with cigarettes and followed by the comment ‘45 minutes of shisha is equivalent to 100 cigarettes’²⁸. The video was published on the campaign’s YouTube, Facebook, Instagram and website, as well as shared on a number of Facebook pages of partner organizations, including local health services and community organizations. Western Sydney Local Health District (WSLHD), which is responsible for the delivery of health services in the western suburbs of the city, was one project partner who organically (unpaid) shared the campaign video on its public Facebook page in October 2019 (Figure 1)²⁹. The campaign video on WSLHD’s Facebook page received over 10000 comments posted to the video within one week of launching the video. This was a large response in comparison to the number of responses on the other Facebook pages which shared the campaign video (where the number of comments ranged 0–284).

This study analyzes the Facebook comments posted to the *Shisha No Thanks* campaign video to examine how it was received by WSLHD’s Facebook audience. Facebook has been chosen as the social media platform of focus for this study as it was one of the main social media channels used by the *Shisha No Thanks* campaign, and the platform on which there was the most engagement with the campaign. This study aims to address the question of whether the Facebook audience that saw the campaign video accepted the campaign message (i.e. perceived the message as relevant or important), or rejected the message (i.e. dismissed it, did not believe it, or ridiculed it). This research study was conducted in parallel with the impact evaluation of the *Shisha No Thanks* campaign which comprised a pre-post survey asking people about their attitudes about the harms of shisha smoking³⁰.

METHODS

A sample of 5000 Facebook comments on the campaign video post were extracted using Facebook’s Graph API (the platform’s interface which allows extraction of text-based data), with the permission and

Figure 1. ‘Shisha No Thanks’ video on Western Sydney Local Health District’s Facebook page



cooperation of WSLHD. The maximum number of comments that can be exported using Facebook’s Graph API is 5000, and Facebook does not provide public information about how the Graph API samples these comments (e.g. whether by recency or whether it is a random sample). Comments were extracted with the accompanying information of the time the comment was posted, and an ID number of the Facebook user who posted it. The names of people who posted the comments were not extracted. Any names ‘tagged’ (mentioned) in the comments were then manually de-identified. As the exported file displayed emojis as unicode strings (e.g. U+1F600), they were then converted into the emoji image along with the official Common Locale Data Repository Short Name (e.g. 😄 <grinning face>)³¹.

The methodology of this study drew upon the process used by Krauss et al.¹². After initial familiarization with the data through review of the first 300 comments, we developed content coding categories consistent with the research questions. The three overarching categories of ‘Accept’ the campaign video message, ‘Reject’ the message, and ‘Unclear’, were developed. Common themes were then

identified for each of the categories, making up the subcategories for each main category (Table 1).

The content coding categories were then tested by cultural support workers, who are bilingual health workers employed to work directly with culturally and linguistically diverse communities³². The four cultural support workers chosen for this study were in the target audience age group (18–35 years), and two were Arabic-speaking. Their involvement ensured that cultural meanings of the comments (both the culture of young people, and of Arabic-speaking communities) were captured in the content coding process. The cultural support workers provided feedback on whether they felt the content coding categories captured the meaning of the comments correctly, and the categories were modified based on their feedback.

The revised content categories were then tested by the coding team, which was made up of two researchers, the *Shisha No Thanks* project officer, one staff member from WSLHD, and four cultural support workers. The coding team was trained in content analysis and familiarization with the content categories. Instead of estimating inter-coder reliability

Table 1. Comment categories and subcategories used for coding the data

| Category | Subcategory | Description |
|----------|---|---|
| Accept | Intention to stop smoking/asks friend to stop smoking | Comment shows concern for a friend/family member, tells them not to smoke shisha; or that the commenter will think twice before smoking shisha again, or a desire to quit/reduce shisha use |
| | Agreement with message | Commenter seems to agree with the campaign message (e.g. repeating info from the message), says how important this information is, or shows shock or surprise at the facts |
| | Other | Other comment that shows acceptance of the campaign video, but does not fit in above categories |
| Reject | Dismiss | Commenter dismisses the message (does not take it seriously) – laughing at it, brushing it off, ridiculing it, or saying that shisha is good/they want to smoke shisha |
| | Skeptical | Does not believe the message or trust the messenger |
| | Other | Other comment that shows rejection of campaign video, but does not fit in above categories |
| Unclear | Comment only contains the phrase 'No thanks' | Comment only contains 'No thanks', with/without tagged name(s), with nothing else to indicate the meaning/tone of these comments |
| | Genuine question | Comment is a genuine question about the facts, suggesting the person wants to know more |
| | Personal or cultural attack | Commenter feels personally attacked, or suggests they think the video is stereotyping/racist towards a certain group; but does not disregard the message |
| | Relevant, but meaning unclear | Comment is clearly relevant to the video, but the meaning of the comment is unclear |
| | Irrelevant or other | Comments that do not make sense, or are irrelevant to the campaign message |

through coding a small sample of comments, to best ensure consistency of coding, each comment was coded by three coders, with the final coding requiring agreement amongst at least two coders. This ensured that a rigorous coding methodology was used. If there was no agreement between at least two coders for the comment's category or subcategory, the comment was reviewed by two researchers who discussed which category and subcategory were most appropriate. Once all comments had been assigned a category and subcategory, the number of comments in each category and subcategory were quantified.

Finally, process evaluation metrics, including reach, video views, likes, shares and comments were obtained from WSLHD's team using Facebook Insights, the platform's native analytics dashboard.

RESULTS

The unpaid campaign video post on Western Sydney Local Health District's Facebook page reached 435811 people, had 316611 3-second video views, and 77351 1-minute video views (24.4% of 3-s video views). As

videos play automatically on Facebook, 3-second video views correspond to people who did not immediately scroll past the video and watched at least 3 seconds of the video. After 3 seconds they may have subsequently continued to scroll past it, clicked the stop button, or continued watching more of the video. Similarly, 1-minute video views correspond to people who stayed and watched at least 1 minute of the video, noting that the entire video is only 1:03 min in length. The post garnered over 23470 engagements, which included 1772 shares, and over 11000 comments.

In total, 4991 comments were extracted from the Facebook post using the Facebook Graph API. Of these comments, one comment posted by WSLHD responding to the comments in general was excluded. Of the remaining 4990 comments, 2301 (46.1%) contained only tagged names of other Facebook users, with no other words, 456 (9.1%) accepted the campaign message, 1144 (22.9%) rejected the campaign message, and 1089 (21.8%) were unclear whether they accepted or rejected the campaign message (Table 2).

Accepting the campaign message

Stop smoking shisha

Of the 456 comments which were categorized as ‘accepting the campaign message’, 138 (2.8% of comments) included a ‘stop smoking’ idea, which could either be the commenter stating they would no longer smoke shisha, for example:

- Omg I am done [name] [name]
 - [name] [name] brb just quitting
- telling their friend to stop smoking shisha, for example:

- [name] lay off the shish bruv
- Enough is enough [name]
- [name] I love you too much to watch you slowly die at the hands of shisha (*sic*). Pls stahp (*sic*) boo! If not for you, for me!

or that the group should stop smoking shisha, for example:

- [name] [name] yeah alright lets give it a miss 😓<downcast face with sweat>
- [name][name] no more Granville for us [*Granville is a suburb in Sydney that has shisha bars/lounges*]

The statements varied in intensity, from begging their friend to stop (e.g. ‘pls, cmon it must stop’),

Table 2. Number of comments assigned to each category and subcategory (N=4990)

| Category | Subcategory | n | %* |
|------------|--|------|------|
| Accept | Intention to stop smoking/ asks friend to stop smoking | 138 | 2.8 |
| | Agreement with message | 278 | 5.6 |
| | Other | 40 | 0.8 |
| | Subtotal | 456 | 9.1 |
| Reject | Dismiss | 1010 | 20.2 |
| | Skeptical | 124 | 2.5 |
| | Other | 10 | 0.2 |
| | Subtotal | 1144 | 22.9 |
| Unclear | Comment only contains phrase ‘No thanks’ | 71 | 1.4 |
| | Genuine question | 17 | 0.3 |
| | Personal or cultural attack | 35 | 0.7 |
| | Relevant, but meaning unclear | 742 | 14.9 |
| | Irrelevant or other | 224 | 4.5 |
| | Subtotal | 1089 | 21.8 |
| Names only | | 2301 | 46.1 |
| Total | | 4990 | 100 |

* Percent of all comments.

to threats (e.g. ‘[name] I’m throwing yours away’), to soft requests (e.g. ‘think again’, ‘be careful’, ‘you need to take it easy’). There were also references to ‘I told you’, suggesting that the commenter had had conversations with their friend previously.

Agreement with campaign message

The majority of ‘accept’ comments were subcategorized as ‘agreeing with campaign message’ (n=278; 5.6% of comments). These generally suggested that the commenter had believed and taken on board the campaign message, but did not necessarily indicate any intended behavior change. Types of comments that fit into this category included those that expressed shock or surprise at the campaign facts, for example:

- [name] holy moly
 - [name] 😱<face screaming in fear>
- repeating key campaign messages or facts, for example:

- [name] [name] 45 mins = 100 ciggies 😱<face screaming in fear>

telling their friend about the campaign message, for example:

- [name] get woke cuz
- [name] [name] wtf do I keep sayingggg (*sic*)
- [name] this is why you should listen to me 😏<unamused face>

or showing support for the campaign message, for example:

- Thank goodness this is getting some publicity
- About time for this info. The number of people that have shisha is a joke and worse think it’s harmless.

Other

There was a small proportion of ‘agree’ comments which were classified as ‘other’ (n=40; 0.8%), and these generally suggested that the commenter believed the campaign message, but did not intend to change behavior, for example:

- [name] [name] still does it anyways 😊<face with tears of joy>
- [name] for all you shisha lovers.

Rejecting the campaign message

Dismissive of campaign message

Of all subcategories, the ‘dismissive’ subcategory had the largest number of comments (n=1010; 20.2%). These mainly consisted of comments of people

laughing at the campaign message/video, for example:

- [name] 😊<face with tears of joy> 😊<face with tears of joy>
 - [name] omggggg HAHAHA
 - [name] I've never laughed so much in my life (*sic*)
- or comments of people expressing pro-shisha attitudes or behaviors, for example:
- [name] Cbf* <3 shisha [*Cbf denotes a slang euphemism for being too lazy*]
 - [name] get me the argilee (*sic*) cuzz

Some comments in this category were also sarcastic in nature, for example:

- lol this really convinced me to stop wow 🙌<clapping hands> 😊<face with tears of joy>
- [name] [name] does it count as a serving of fruit tho? 🤔<thinking face> 😊<face with tears of joy> or ridiculing the health harms, for example:
- Rip lungs 😊<face with tears of joy>.

Skeptical about the campaign

There was also a proportion of comments that suggested skepticism towards the campaign message (n=124; 2.5%). These either said the campaign facts were not true, for example:

- [name] whaaat (*sic*) fake news
- [name] never seen something so inaccurate in my life

or they expressed cynicism about the motivation for the campaign, i.e. that the government makes a lot more money from cigarette tax, so they want people to smoke cigarettes instead of shisha, for example:

- Cigarette tax revenue must be down
- Smoke cigarettes please, we make more tax on those
- Wat a bull...t ad. Only cos there is ZERO tax on shisha they r trying to scare people from it. My rels should of been dead years ago if this was true.

Of note, the cynical comments did not generally tag other people, compared with other categories of comments.

Unclear

There were a significant number of comments which were classified as unclear as to whether they accepted or rejected the campaign message. Of these, there were three specific comment themes that recurred throughout the data. The first involved comments

that simply had 'No thanks' (n=71; 1.4%), which did not indicate whether the commenters were being sarcastic or not, or whether they were saying 'no thanks' to shisha, or 'no thanks' to the campaign video. The second subcategory was comments where people were asking genuine questions (n=17; 0.3%), demonstrating they were interested and engaged with the topic, but that they were undecided whether to accept or reject the campaign message. These could either be questions to a friend asking for their thoughts, for example:

- [name] what do ya think
- [name] true or bs?

or genuine questions to the organization, for example:

- What about the herbal, non-tobacco variety? Surely nothing wrong with that?
- [name] how do they make the comparison?

Another theme that was present in some of the comments was that the commenter felt the campaign was either a personal or cultural attack (n=35; 0.7%). Some people felt that the campaign video, or possibly after being tagged on the video by friends, was personally attacking them, for example:

- [name] [name] I personally feel attacked
- [name] I feel like this ad is a personal attack
- [name] I feel personally attacked by the government.

Others implied that the campaign was an attack on a specific culture, for example:

- How racist is this but [name]
- [name] [name] this is a direct attack on my culture and identity
- [name] the health department is cracking down on culture.

Finally, there was a proportion of comments (n=742; 14.9%) which were clearly relevant to the campaign topic or message, but it was not possible to interpret the meaning of these comments as to whether the commenter accepted or rejected the campaign message.

DISCUSSION

This study's analysis of social media comments is a valuable component to evaluating the *Shisha No Thanks* project, as it provides insight into people's response to the campaign message. Based on the dataset of 4990 comments, 9.1% expressed clear acceptance of the campaign message, with 2.8% of

comments indicating priming steps of behavioral change of the commenter expressing intention to stop smoking shisha, or asking a friend to stop smoking shisha. In contrast, 22.9% of comments rejected the campaign message, with the majority of those being people laughing at the campaign video or expressing pro-shisha sentiments.

This study demonstrates the value of thematically analyzing social media comments. The majority of public health campaign evaluations use only process evaluation measures of social media metrics (such as reach, impressions or likes)¹ or impact evaluation measures of changes in attitudes and behaviours⁵. Both those aspects of evaluation are important, but have their limitations, primarily in not illustrating what happens between the dissemination and reach of the campaign, and the actual intended campaign outcomes. Social media comments can reveal this intermediary step and indicate whether the campaign message has actually 'landed', and how it has been understood and received by the target audience.

This study demonstrates that in the *Shisha No Thanks* campaign, a small but important proportion of people who viewed the video understood, accepted and took up the campaign message, by either saying they themselves would stop smoking shisha, or by asking a friend to stop smoking shisha. Further, the comments provide insight into aspects of the campaign that resonated most, for example, the message that '45 min (of shisha smoking) equals 100 cigarettes'.

Conversely, analyzing the Facebook comments also provides insights into the proportion of people who, despite viewing and engaging with the video, did not seem to take up the campaign message. This demonstrates that process indicators such as video views or engagement metrics alone do not tell the full story. The comments also provided insight into some of the reasons why people did not accept the campaign message³³, which is particularly important given the large proportion of comments in this group. One of the common themes was skepticism toward the motives behind the campaign, with commenters cynically implying that the 'government' did not want people to smoke shisha because they would receive less tax revenue than if shisha smokers switched to cigarettes. This suggests one reason for the low acceptance of the campaign messages is the view of mistrust and wariness towards the 'messenger' (a

government agency) among the audience. Another potential reason for the low acceptance of the campaign message is the strong social and cultural ties that shisha has among groups^{21,22}, and the general social acceptability of shisha smoking¹⁹. In considering comments that rejected the campaign, it is worthwhile to note that research into tobacco control campaigns has found that messages that portray health consequences of smoking and evoke strong negative emotions are actually effective³⁴, and therefore a strong negative reaction may not necessarily be an indication of ineffectiveness of the campaign.

Finally, analyzing Facebook comments helped the project team to understand other potential unintended effects of the campaign, including the perception that the campaign attacks a community's cultural practice. There was substantial concern about this during development of the campaign, but the very small proportion of comments that expressed this sentiment (n=35; 0.70%) suggests that the video and broader campaign were culturally sensitive. This is an important finding that shows that a co-design approach can help manage the cultural sensitivities of campaigns on this issue.

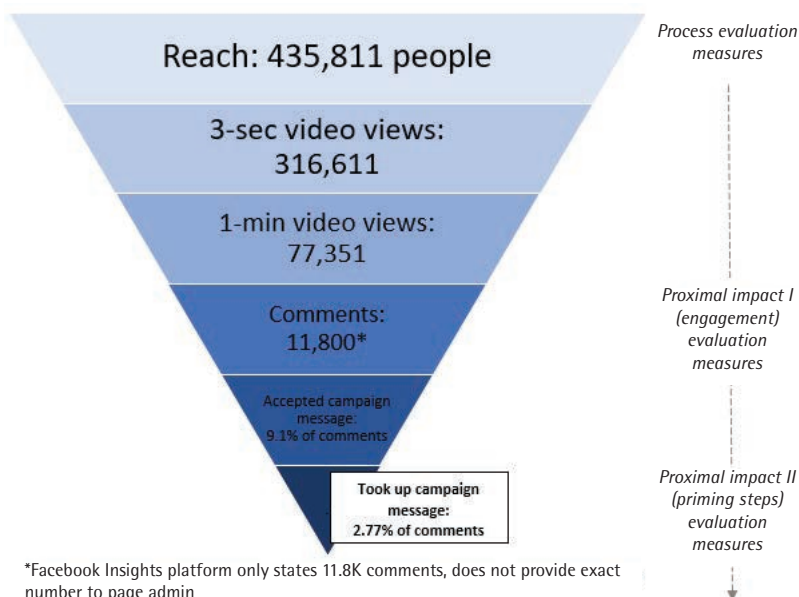
Conceptualizing social media comments in campaign evaluations

Social media comments can be seen as a more nuanced form of engagement, than the more rudimentary metrics of 'likes' and 'reactions', as they provide more insight into the sentiment of the individual towards the campaign, and as demonstrated in this study, can even indicate intentions to change behavior (priming steps). Building on the framework of other campaign evaluation models^{5,35,36}, this evaluation study shows that incorporating social media comments into the evaluation process through content analysis could provide an indicative proximal impact evaluation measure of intention to change behavior (priming steps). Each level of evaluation metric shows diminishing numbers, but increased participation in the campaign, and progress towards the desired campaign outcomes (Figure 2).

Strengths and limitations

A strength of this study is the involvement of cultural support workers in the analysis process of the study. Their involvement ensured appropriate cultural

Figure 2. Levels of engagement with campaign video



and linguistic interpretation of the comments, and is in keeping with the co-design principles of the project, which aimed to involve community members throughout the project, including the evaluation. The involvement of the *Shisha No Thanks* project officer, and a staff member from WSLHD is also seen as a strength of the study, as they were able to provide helpful context to some of the references in the comments, as they had regular interactions and conversations with the video’s audience. An additional strength of this study is the inclusion of emojis in the comment analysis. During the analysis process, the study team recognized that the emoji pictures that were provided, carried a lot of meaning and provided key information in understanding the tone, and therefore category, of the comment. For example, this comment was categorized as accepting the campaign message: ‘[name] for you guys’; whereas this comment was categorized as rejecting the campaign message: ‘[name] for u 😊<face with tears of joy>’, as the emoji changed the tone from serious to joking. In addition, many comments only consisted of emojis and tagged names, with no other text (e.g. ‘[name]<face with tears of joy>😊<face with tears of joy>’; ‘[name] 😊<winking face with tongue>🤪<rolling on the floor laughing>’; ‘[name]😱<face screaming in fear>’). In these instances, the emojis provided the whole meaning of the comment.

A limitation of this study is that we were only able to export part of the total number of comments posted to this Facebook post (slightly less than half of total comments), due to the Facebook Graph API limits. It is not clear from the information provided by Facebook what rules are used in selecting which comments get exported, such as whether they are the most recent comments, the comments with the most engagement, or a random sample of comments. In addition, it is not apparent why 9 comments were missing in the extraction data (as only 4991 comments were returned). While this is not ideal, this represented only a very small proportion (0.2%) of the total number of comments we reviewed. Another limitation of this study is that we did not have information about the demographics of the people who posted comments on this video on WSLHD’s Facebook page, and so there is no way to identify whether the people who commented on the video were from the project’s target audience of young people of Arabic-speaking background. However, Meta (Facebook’s parent company) has reported that in Australia, 43.4% of the combined Facebook, Instagram and Messenger advertising audience is in the 18–35 years age group (the target audience of this project)³⁷. In addition, some of the comments posted to the video included individual Arabic words, which suggests that at least some of the commenters

were of Arabic-speaking background. Furthermore, we acknowledge that people who leave comments on social media posts are more likely to be people who have a strong opinion on the topic, which may limit the generalizability of these findings to the wider video audience.

There were significant challenges in interpreting the Facebook comments, which is reflected in the large proportion categorized as ‘Unclear’ as to whether they accepted the campaign message (n=1089; 21.82%). This is due to the difficulty in interpreting tone in written comments (i.e. whether the commenter is being serious or sarcastic), the lack of context of the comments and having no understanding of the relationship between the commenter and the person they have tagged, and the specific culture that is embedded in social media comments. Specifically, there were examples where the commenter believed the campaign message or saw its personal relevance, but did not take it seriously, for example: ‘😲 <astonished face> + 🤪 <rolling on floor laughing>’, or ‘[name][name] cut that sh.t out yeah 😄 <face with tears of joy>’.

CONCLUSIONS

This study is one of the first to provide insights into how messages that raise awareness of the harms of shisha use are processed by people on social media. Campaigns such as the *Shisha No Thanks* project are important in providing evidence-based messages about shisha smoking, raising awareness of the harms of shisha, and countering the large volume of pro-shisha content on social media^{11,12}.

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ACKNOWLEDGEMENTS

This manuscript is available as a pre-print on JMIR Preprints (<https://doi.org/10.2196/preprints.33902>). We would like to acknowledge the following people for their involvement in this study: Sarah Ip from the Western Sydney Local Health District Health Promotion team for her involvement in analyzing the data; Ayiik Kuot, Elsi Samano, Tungalag Munkhbat and Marella Di Ruocco, from the Sydney Local Health District Cultural Support Program for their involvement in analyzing the data; Jesusa Helaratne from South Eastern Sydney Local Health District for her assistance in organizing access to the data; Harrison Vesey and Sia Anthopoulos from the Western Sydney Local Health District Communications team for their assistance and cooperation in obtaining the data; and Chao Sun from the Sydney Informatics Hub, The University of Sydney, and Benjamin Riordan from the Faculty of Medicine and Health, The University of Sydney, for their technical advice and assistance in accessing the data.

CONFLICTS OF INTEREST

The authors have each completed and submitted an ICMJE form for disclosure of potential conflicts of interest. The authors declare that they have no competing interests, financial or otherwise, related to the current work. L. Chan reports that since the initial planning of the work received a scholarship from Prevention Research Support Program, New South Wales Ministry of Health, provision of study materials and in-kind support of staff time for analysis from the Western Sydney Local Health District, technical advice in accessing data from Sydney Informatics Hub and provision of cultural support workers from South Eastern Sydney Local Health District and Sydney Local Health District Cultural Support Program. B. Freeman reports that in the past 36 months received payment from Cancer Council NSW and payment to her Institution from Cancer Council NSW, Healthway WA, VicHealth, Ian Potter Foundation, and NSW Health. Furthermore, she received consulting fees from the World Health Organization

and Heart Foundation NSW, payment or honoraria for lectures, presentations, speakers bureaus, manuscript writing or educational events from Department of Health The Government of Hong Kong Special Administrative Region, the USA FDA, BMJ Tobacco Control, and support for attending meetings and/or travel from Oceania Tobacco Control Conference, and Australia Public Health Association Conference. Finally she reports that she was an expert advisor (unpaid) at the Cancer Council - Tobacco Issues Committee, an expert member (paid for time) at NHMRC Electronic Cigarettes Working Committee and advisor (unpaid) at Cancer Institute - Vaping Communications Advisory Panel.

FUNDING

The *Shisha No Thanks* project was funded by the Cancer Institute NSW. The University of New South Wales was contracted to undertake the evaluation component of the project. LC receives support from the Prevention Research Support Program, funded by the New South Wales Ministry of Health.

ETHICAL APPROVAL AND INFORMED CONSENT

This study was conducted with approval from the University of Sydney Human Research Ethics Committee (HREC 1) (Approval number: 638; Date: 29 September 2020). A Waiver of Consent was approved by the ethics committee as part of the approval process.

DATA AVAILABILITY

The data supporting this research are available from the authors on reasonable request.

AUTHORS' CONTRIBUTIONS

LC designed the study, collected and analyzed data and drafted and revised the manuscript. BHR and BF contributed to the study design, interpreted the data and revised the manuscript. RMK interpreted the data and revised the manuscript. LW contributed to the study design, provided organizational support for the study and revised the manuscript. BJO analyzed and interpreted the data, provided supervisory support, and revised the manuscript.

PROVENANCE AND PEER REVIEW

Not commissioned; externally peer reviewed.

Relevance of this research to thesis objectives

This research study relates directly to the second research question of this thesis, namely how should digital-specific metrics, particularly 'engagement', be understood in relation to the overall health campaign evaluation? In this study, I examined specifically what the reported engagement metric of Facebook comments represented in relation to how the campaign had been received by its audience. The study findings showed that not all reported online engagement should be assumed or understood to be positive effects of the campaign, and that therefore a more analytical and nuanced approach needs to be taken when including engagement metrics in a campaign evaluation.

CHAPTER 6

UNPACKING ONLINE ENGAGEMENT WITH THE *HEALTHY LUNCH BOX* 'BACK-TO-SCHOOL' CAMPAIGN

6.1 Introduction

As engagement metrics are specific to digital campaigns, and the previous section illustrated that they are not necessarily proxy measures for campaign effects, I identified that further exploratory research using qualitative research methods was needed to understand how online engagement actions fit with people's actual behaviours and attitudes, and also the motivations and reasons people had in undertaking online engagement actions. I approached Cancer Council NSW (CCNSW) to propose a collaborative study examining online engagement with their *Healthy Lunch Box* 'Back-to-School' campaign. This research was conducted as part of addressing the second research question of my dissertation (i.e. how digital engagement metrics should be understood in relation to the overall health campaign evaluation).

As children consume more than one-third of their daily energy intake at school [1], CCNSW developed the *Healthy Lunch Box* program to provide parents with resources on how to prepare healthy foods for their children's school lunch boxes. At the beginning of each school year, CCNSW runs a digital 'Back-to-School' campaign to promote the *Healthy Lunch Box* resources, predominately using social media and email newsletters. The *Healthy Lunch Box* 'Back-to-School' campaign is a suitable case study for the exploratory research of this dissertation as it is run by a not-for-profit organisation with a strong supporter base: using this campaign as the focus for this research allows recruitment of not only people who engaged with the campaign online, but also supporters who are interested in the health topic but did not engage with the campaign on social media. In doing so, the research would be able to explore the motivations *and* barriers to online engagement with a health campaign, and also understand whether online engagement is a necessary intermediary step towards someone taking up the campaign's recommended action and behaviours (i.e. whether people who don't take online engagement actions may be equally as likely to take up the campaign's recommended actions).

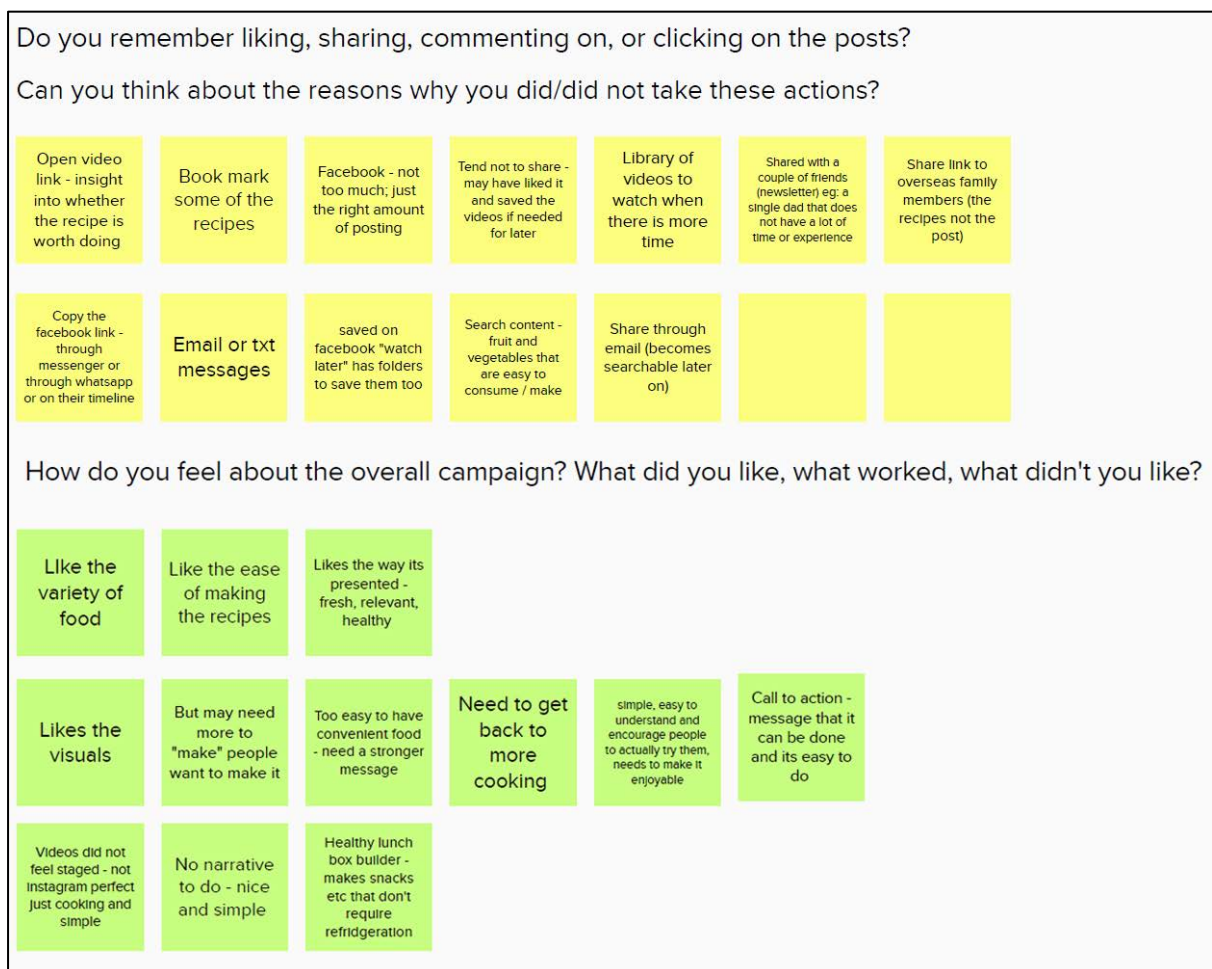
This *Healthy Lunch Box* 'Back-to-School' research used a focus group methodology (online), and enabled exploration of two arms of inquiry – the first being to explore specifically how people's online engagement with the *Healthy Lunch Box* 'Back-to-School' campaign relates to their actual knowledge, attitudes and behaviours on the campaign topic; and the second being to explore more

broadly how people engage with health campaigns online, their motivations for doing so, and whether their online engagement relates to their intention to take up the campaign’s messages.

6.2 Online engagement and perceptions of a nutrition website and campaign aimed at helping families pack a healthy lunch box (submitted paper)

To understand how online engagement actions relate to an individual’s subsequent attitudes and behaviours, I conceptualised and designed a focus group study to explore people’s online engagement as it related to the *Healthy Lunch Box ‘Back-to-School’* campaign. I developed the discussion guide and facilitated the focus group discussions to collect data on people’s online engagement with the campaign, and the impact of that online engagement on their nutrition knowledge and behaviours. These focus groups were conducted online using Zoom videoconferencing, and a virtual whiteboard (Mural.co) as a facilitation tool (see Figure 6.1).

Figure 6.1 – Example of a Mural virtual whiteboard from the focus group sessions



I analysed the findings, and interpreted how these insights can practically help inform an evaluation approach. I designed and drafted the following manuscript reporting these findings, which has been submitted to *Public Health Nutrition*. The data collection tools for this study can be found in Appendix 3.6 (Recruitment survey) and Appendix 3.7 (Focus group discussion guide).

Chan L, Freeman B, Richmond K, Hughes C, Dibbs J, Tan N, O'Hara BJ. Online engagement and perceptions of a nutrition website and campaign aimed at helping families pack a healthy lunch box.

Submitted to Public Health Nutrition – Paper under review

TITLE

Online engagement and perceptions of a nutrition website and campaign aimed at helping families pack a healthy lunch box

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SHORTENED TITLE

Online engagement of a nutrition campaign

ACKNOWLEDGEMENTS

We acknowledge the support of Cancer Council NSW in facilitating this research.

FINANCIAL SUPPORT

This work is supported by the Prevention Research Support Program, funded by the New South Wales Ministry of Health (to L.C.).

CONFLICT OF INTEREST

K.R., C.H., J.D. and N.T. work for Cancer Council NSW who are responsible for the *Healthy Lunch Box* website and Back-to-School campaign. L.C., B.F. and B.J.O declare no conflicts of interest.

AUTHOR CONTRIBUTIONS STATEMENT

L.C. designed the study and data collection tool, conducted data collection, analysis of data, drafted and revised the paper. B.F. contributed to the design of the study, conducted data collection, revised the draft paper and provided supervisory support. K.R. supported participant recruitment, provided input on data collection tool and revised the draft paper. C.H. supported participant recruitment, provided input on data collection tool, revised the draft paper and provided organisational support for the study. J.D. supported participant recruitment, provided input on data collection tool and revised the draft paper. N.T. supported participant recruitment, provided input on data collection tool and revised the draft paper.

B.J.O contributed to the design of the study, development of data collection tool, data collection, analysis of data, revised the draft paper and supervised the study.

ETHICAL STANDARD DISCLOSURE

This study was conducted according to the guidelines laid down in the Declaration of Helsinki and all procedures involving research study participants were approved by the University of Sydney's Human Research Ethics Committee HREC 2 (Project Number 2020/826). Written informed consent was obtained from all participants.

Abstract

Objective

The *Healthy Lunch Box* website and Back-to-School campaign (using social media and e-newsletters) aim to support parents in providing healthy food for their children's school lunch boxes. The purpose of this study is to understand people's online engagement with the website and campaign, and the impact of that online engagement on nutrition awareness and behaviours.

Design

A qualitative study using online focus groups.

Setting

New South Wales, Australia.

Participants

24 people, consisting of parents, grandparents and school teachers, who had engaged with the *Healthy Lunch Box* website or online campaign.

Results

Participants described different types of engagement with the website and online campaign, which can be ordered in an 'engagement pathway' from initial touchpoint (e.g. social media post, online search), to first online engagement action (e.g. link click, 'like' reaction), to short-term action (e.g. exploring the website, or trying a recipe), to campaign impacts. Participants also described that the main factors that promoted online engagement with the website and campaign were qualities of the content, features of the website or campaign, and the reputation of the posting organisation. Conversely factors that were barriers to deeper engagement included that the content did not address the specific challenges parents faced (e.g. being time-poor, having children who were 'fussy' eaters) or that there wasn't enough promotion of the resources.

Conclusions

These findings demonstrate that it is complex process between when people encounter online nutrition resources and campaigns, to whether it has an impact on their nutrition knowledge and behaviours.

Keywords: social media, website, school lunch, packed lunch, engagement

Introduction

A healthy and nutritious diet is fundamental for children's growth and development, and conversely poor nutrition in children is associated with overweight, obesity and metabolic diseases.¹ In New South Wales, Australia only 5.2% of children aged 2-15 years eat the recommended amount of vegetables daily, and 64.2% eat the recommended amount of fruit.² Australian children aged 9-13 years consume up 40% of their daily energy requirements from discretionary foods³ (foods that do not contribute to nutritional requirements, and are often high in saturated fat and/or sugar). Additionally, 22% of children live in a food insecure household, which means they may often not have fresh food or have to go without some meals completely.⁴

Primary school-aged children consume more than one-third of their daily energy during school hours,⁵ with most children in Australia bringing packed lunches from home, rather than purchasing from the school canteen.^{6,7} Most Australian children consume less than 1 serving of vegetables, dairy and lean meats in their school lunch, and 38-44% of their energy intake during school hours comes from discretionary foods.^{5,8} There was minimal improvement in the nutritional quality of children's school lunches in Australia from 1995 to 2011-2012.⁵

Parents want to provide healthy and nutritious food for their children's lunch boxes, but face many challenges, including the ever growing popularity of packaged foods that are marketed as 'lunch box friendly', which target children, are often very convenient, but of overall poor nutritional quality.⁹ In such a context, parents want support in selecting and preparing healthy foods for their children's lunch.¹⁰

The *Healthy Lunch Box* website

Cancer Council New South Wales' (CCNSW) *Healthy Lunch Box* website is primarily targeted at parents of primary school-aged children (aged 5-12 years), and aims to provide useful nutrition information and resources to help prepare healthy school lunches. The core elements of the *Healthy Lunch Box* website (<https://healthylunchbox.com.au/>) include resources such as recipes, an interactive lunch box builder interface, videos and a blog. The website is supported by other online communications and resources, including *Healthy Lunch Box* e-newsletters, posts and paid ads on CCNSW Facebook and Instagram pages, a video playlist on CCNSW's YouTube page, short nutrition articles that schools can include in their newsletters and other school communications.

While the website is a permanent resource, the *Healthy Lunch Box* promotions via e-newsletter and social media are conducted using a campaign-style approach during key times of the year, with one of the main campaigns being the ‘Back-to-School’ campaign at the beginning of the school year in January.

Box 1 – Examples of the Healthy Lunch Box website and social media posts

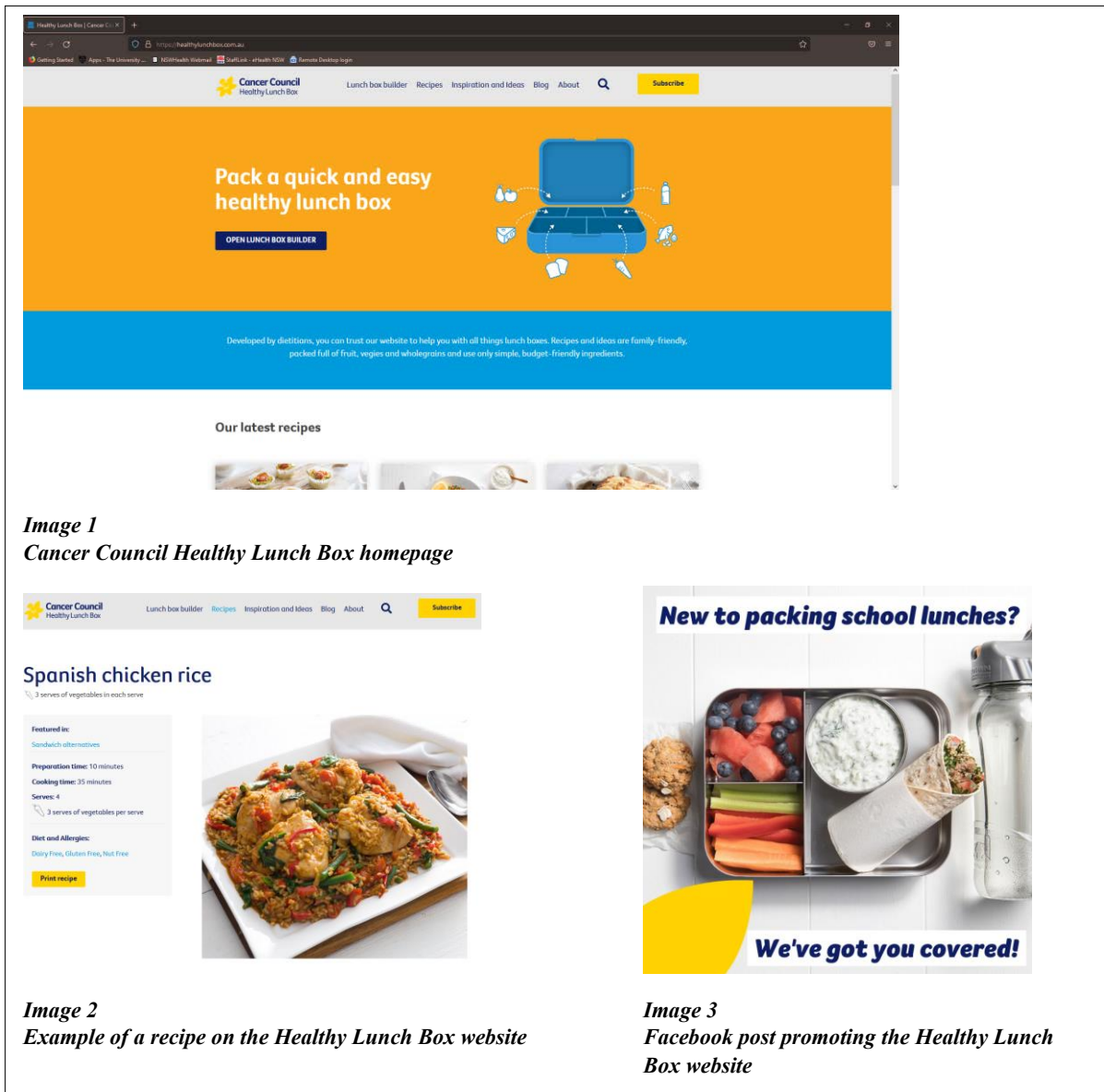


Image 1
Cancer Council Healthy Lunch Box homepage

Image 2
Example of a recipe on the Healthy Lunch Box website

Image 3
Facebook post promoting the Healthy Lunch Box website

Increasingly nutrition programs and interventions are utilising online platforms such as websites, social media and smartphone apps. Based on the limited evidence available, digital nutrition interventions can be effective,¹¹ but there is still a great deal unknown about how to understand online engagement with these digital interventions, and how online engagement with the digital nutrition interventions lead to the desired behaviours.

In this paper, we explore people's experience and engagement with CCNSW's *Healthy Lunch Box* 2021 'Back-to-School' campaign. The aim of this research is to understand in detail people's online experience with the *Healthy Lunch Box* campaign and resources, the impact of that online engagement on their healthy nutrition awareness and behaviours, and how to interpret people's online engagement with the *Healthy Lunch Box* campaign and website.

Methods

Study design and recruitment

This study used online focus groups to collect qualitative data on participants' perception and engagement with the *Healthy Lunch Box* 'Back-to-School' campaign. For study recruitment, a message with a survey link calling for study participants was promoted on the *Healthy Lunch Box* website via a pop-up, the *Healthy Lunch Box* e-newsletter, and the CCNSW Facebook page. People who clicked on the link were asked to complete a short online Recruitment Survey to provide their contact details and indicate how they had engaged with *Healthy Lunch Box* content online. The researchers then allocated each person to an online focus group, based on their indicated availability and the way they had engaged with the *Healthy Lunch Box* website and social media content.

Data collection and analysis

The online focus groups were conducted from March-April 2021 using Zoom videoconferencing application (which has been found to be a satisfactory and increasingly common platform for conducting qualitative research^{12 13}) and each session was recorded with the permission of participants. The focus group discussions were guided by a semi-structured discussion guide to ensure the range of research questions was covered. Some of the key areas covered in the discussion guide included: understanding how and why participants engaged with the *Healthy Lunch Box* campaign online, their experiences of the *Healthy Lunch Box* online resources, and whether the *Healthy Lunch Box* resources changed their knowledge or nutrition behaviours. Each focus group was facilitated by two members of the study team who were not affiliated with the CCNSW. One researcher facilitated the discussion, while the second researcher took notes on a virtual whiteboard (Mural <https://www.mural.co/>) that was visible to the participants via screen-sharing during the focus group session.

Each online focus group was then transcribed using the online application Otter (<https://otter.ai/>) and checked for accuracy against the video recordings by the researchers who facilitated the focus group session. The discussions were then analysed thematically using an inductive approach. One researcher (LC) reviewed the transcripts several times, and identified key categories in the data that were relevant to the research questions.¹⁴ The data was coded using NVivo 12, and analysed through the following key categories: 1. Engagement pathway with *Healthy Lunch Box* resources online, 2. Factors that promoted engagement with *Healthy Lunch Box* campaign, and 3. Barriers and challenges to engaging with *Healthy Lunch Box* resources.

Results

Participant characteristics

There were 67 people who completed the Recruitment Survey and allocated to one of 7 focus group session times. Due to attrition, there were only 24 people who logged into the online focus groups, with 2-5 participants per group. Many of the participants were parents, and some were grandparents, and the majority of participants were women. Some participants were teachers – either primary school teachers or food technology teachers, some of whom were also parents. There were two participants who worked at CCNSW, but not with the nutrition team who ran the *Healthy Lunch Box* website, and two participants who were/are volunteers with the CCNSW. Some people said they had various experiences with CCNSW, such as helping at events, or having engaged with the CCNSW due to their own/family member's experience with cancer.

Engagement pathway with *Healthy Lunch Box*

Participants' descriptions of their engagement with the *Healthy Lunch Box* 'Back-to-School' campaign and website overall can be ordered in the following 'engagement pathway' framework: initial touchpoint, first online engagement, short term action, and impact on knowledge, attitudes and behaviours (see Figure 1).

Initial touchpoint

There were a range of channels through which people first encountered the *Healthy Lunch Box* resources. Many recalled seeing something on social media, mostly as a sponsored (paid advertising) post; but for some people it was because they had engaged with the CCNSW social media accounts for other reasons, or on a social media group where someone else had posted it, or through actively searching for something about healthy eating on social media.

Other people first encountered the *Healthy Lunch Box* resources through online searches, or through visiting the CCNSW website for other reasons. A small group of people described that they first encountered the *Healthy Lunch Box* resources in-person or offline, such as through the school newsletter, or a speaker at school. There were also several people in the focus groups who were engaged with CCNSW in a work or voluntary capacity, with two participants being volunteers who had previously promoted the *Healthy Lunch Box* resources in a kindergarten orientation session. These sessions are no longer part of the *Healthy Lunch Box* initiative.

First online engagement action

One of the commonly reported first actions taken in response to seeing the *Healthy Lunch Box* 'Back-to-School' campaign on social media was to click on the link to find out more information, read the recipes, watch the videos or browse the website. Many people described that they would look at the website for just a few seconds to know whether it was suitable for them.

Another common immediate online action was endorsing the content, such as clicking a 'like' response on the social media post. The reasons for this included simply because they enjoyed the content or to wanting to show support of the content. Participants also described an action that helped them 'save' the content so they could go back to it later. In some cases, this was using the social media platform's save function (e.g. 'Watch later' on Facebook), but in other cases, it included using their web browser's bookmark function, or taking a screenshot of the post. Participants also reported sharing *Healthy Lunch Box* campaign content with others by 'tagging' someone in the comments, or by reposting it on their personal social media account page, or on a group page. People also shared the content using other methods, including private messaging platforms, such as Facebook Messenger, WhatsApp, SMS text or email.

"I do share the Facebook post on my school P&Cs [Parent and Citizens' Association] because I'm the president of a P&C. And so I do share on some of the closed groups. So I share on my P&C page, because I'm the admin of that Facebook page. And also on CWA [Country Women's Association] because I'm associated with CWA."

Some people took the action of 'following' the CCNSW Facebook page after seeing the campaign post. This action suggests that they wanted to be shown more of this type of content in the future.

Short-term action

The focus group discussions then explored what people did as a more substantial action as a result of seeing the *Healthy Lunch Box* campaign content. A commonly reported action was to try a recipe from the website. Other people described visiting the website, and/or using the interactive lunch box builder feature with their children:

“I have used the interactive lunch box builder, and I have actually shown my kids and said, "Look, you know, what do you want? Let me know".

Impact of seeing *Healthy Lunch Box* content

When asked what the impact was of seeing the *Healthy Lunch Box* content on their knowledge, attitudes or behaviours relating to nutrition, some people described specific practical tips or increased awareness about a certain aspect of healthy eating.

“Because I think generally, when I'm thinking about what to pack for a school lunch box, it's usually just like a sandwich. Whereas I guess this has given me different options that it's actually alright, to put other stuff in there. And I think there's even like the little sushi things that you can put in which, you know, I probably would never have really thought about.”

“I guess I'm actively making that choice you know to pack, or even when I'm shopping, to buy nuts instead of buying a muesli bar, like I'm aware of fresh almonds you know as opposed to a bar full of sugar... I just am aware of the choices I'm making”

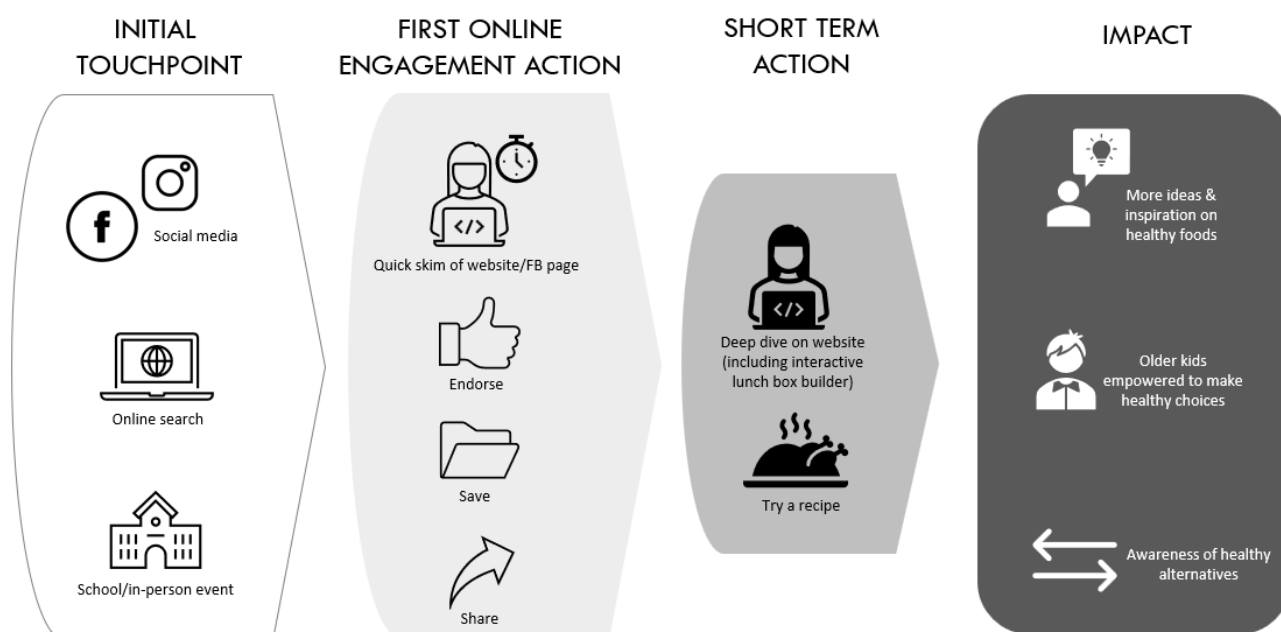
Many participants just reported vague increases in awareness, or general reminders of things they already knew.

“So for me, it's more about just finding inspiration, I didn't really need it to sort of know that they need to eat these different types of food groups, I already sort of have a good understanding of that.”

Positively, some people described making behavioural changes in their regular habits, based on what they had seen from the *Healthy Lunch Box* website. Several people described previously usually eating packaged and processed foods, but now cooking more, eating more healthy alternatives, and providing more healthy foods for their children's lunches.

“I have found it really useful, like my oldest is very proactive in making his own lunch... And it's been really handy to just hand it to him and go, "Oh, here are some recipes." And he particularly likes cooking. So he has probably interacted with it more than myself, in that he'll search recipes and come up with new ideas of ways to balance his lunch box. And I guess it's having a bit of a knock-on effect to the rest of us and that we're watching what he's doing.”

Figure 1 – Healthy Lunch Box Engagement Pathway



Factors that promoted engagement with *Healthy Lunch Box*

The focus group discussion explored factors associated with the campaign and website that prompted people to engage with the resources. These could be divided into three categories – the content itself, the reputation of CCNSW, and the features of the website.

Healthy Lunch Box content

Many people described engaging with the *Healthy Lunch Box* campaign social media posts because of the aesthetic appeal of the images. Participants used descriptive words about the images of food looking healthy, clean, simple, quick and easy. They also described that it wasn't "too fancy" like things they had seen elsewhere, and that the visual style was familiar and similar to other recipe content they used online. Some participants also described that they found the recipes useful for taking to work themselves, not just for children. Several participants made mention of being busy and time poor, and appreciated that the recipes were mostly simple and did not take a large amount of preparation.

“The recipes don't have you know, long list of ingredients. That really, really helps. And yeah, it just makes you feel a bit more empowered to do things that's healthy and fit it in with your own time.”

Some people described that it was specific recipes that caught their attention and led them to engage with the *Healthy Lunch Box* content – either recipes that sounded appetising, used ingredients that they had at home, or recipes that included culturally diverse foods which felt

inclusive – which were potentially points of difference to other recipe content that they had seen online.

“So we had like a couple of Indian dishes. So, you know, that really brought me closer, to be honest, you know, I felt like I was included in their recipes. So that really gave me a sense of belongingness.”

Reputation of CCNSW

A key characteristic of the *Healthy Lunch Box* that was discussed in the focus group sessions is the value of the CCNSW brand in publishing the resources, as people automatically associated this with the information being trustworthy, reputable and of good quality. As a result, people were drawn to it when they saw it, and felt confident to click on the posts and links. Other participants specifically explained that because the website was from CCNSW, they were reassured that the food would be healthy.

“My opinion of the Cancer Council is quite high. I looked at the recipe, and when I looked at the posts, I just assumed this will be a healthy recipe. I just feel that they're quite trustworthy and it's not going to be something that's junky because it's for kids' lunch boxes, it's not going to be high in sugar or high in fat. So I just felt like I can go there and I can get healthy, balanced lunch box options.”

Some participants also described that since the content was from CCNSW, they felt reassured there were no vested commercial interests.

Features of *Healthy Lunch Box* website

Participants also described various features of the *Healthy Lunch Box* website as drawcards for the deeper engagement. Numerous participants were very positive about the video content, describing them to be easy to engage with, and particularly for watching together with their children, as it is a medium that children find engaging.

Participants also described the ‘interactive lunch box builder’ – an interactive webpage that allows the user to select different food groups for their lunch box – as a helpful resource and good way of engaging their children in the lunch planning process.

“Actually, that's really helpful too, when the kids get to that stage of making their own lunch too, because you can go, “Well, you've got a carbohydrate, you've got a fruit, what are you going to take, that's going to be your protein?” or something like that. So getting them thinking about it from that perspective themselves.”

Some participants described that they often would take on board the healthy lunch box advice at the beginning of the year, but then fall back into old habits over time, and so the e-

newsletters from the *Healthy Lunch Box* team were a good reminder to resume these healthy habits, highlighting that these communications kept the issue front of mind.

Barriers and challenges to engaging with *Healthy Lunch Box*

There were several key themes that emerged as reasons why people did not further engage with the *Healthy Lunch Box* campaign or website. These were either that the content did not address their needs, the campaign and website was not promoted (or prominent) enough, or challenges from the wider environment.

Content

One main area that participants discussed as an issue with the *Healthy Lunch Box* campaign was that they felt some of the content did not resonate with them, or did not address the challenges they personally faced in preparing healthy lunches for their children. Some participants felt the recipes were not practical for time-poor parents, or were too difficult to adopt. One of the commonly expressed reasons for not engaging with the *Healthy Lunch Box* website after seeing the posts was that they didn't think their children would like the food in the recipes, often describing their children as 'picky' or 'fussy' eaters.

“I had a look at a few of the ingredients. And I just knew my girls straight away, probably wouldn't be interested in some of the stuff on. I would be; personally I love cooking, I love doing new foods, but they're very picky with what they eat.”

Participants described how this became increasingly challenging as children became older and they made their own decisions about what to have for lunch. Some participants suggested that it would be beneficial to try to develop content specifically tailored to older children and teenagers. Some suggestions included developing online challenges or trends, or publishing more short videos or animations.

“So I feel that maybe we need to add another level to this campaign to engage, you know, young teens or older primary school children with building their lunch box because, you know, learning to cook the simple recipes, or making the lunch boxes is really important. I think it just builds their independence and their parents may not always be available to do that, and may result resort to less healthy options.”

Not seeing enough of the *Healthy Lunch Box* resources

There was also some discussion about how it was difficult for the *Healthy Lunch Box* material to cut through all the food content online. Some people even expressed surprise that they weren't shown more *Healthy Lunch Box* content online after initially engaging with it.

“What I see is there's absolutely a plethora of information all around the internet about healthy eating. And so there's a very high chance of this particular campaign or promotion getting lost between all the different kinds of information available.”

“Yeah, I don't exactly know how all the Facebook algorithms work. But I was surprised that once I liked the page and interacted with the post that I didn't see more.”

One of the most common suggestions or feedback on how the *Healthy Lunch Box* campaign could be improved was about greater promotion of the resources. Many participants described that they had only seen *Healthy Lunch Box* opportunistically, and many suggested other avenues the resources could be promoted, including partnering with other organisations, promotions through school newsletters, shared on Facebook groups, and use of other social media networks.

Challenges of the wider environment

Finally, some participants discussed factors in the wider environment that impacted upon their ability and ease of providing healthy lunches for their children. The issue of peer-pressure among kids was raised by a couple of participants, noting that their children wanted to take the same kind of foods as their peers, which was sometimes unhealthy packaged foods. One participant, who is also a food-technology teacher, commented on the widespread convenience of take-away, impacting people's ability and willingness to cook healthy foods.

Discussion

This study found that people's engagement with the *Healthy Lunch Box* campaign can be broadly categorised into – ‘first online engagement actions’ (e.g. click link for quick skim, endorse content, save, share) and ‘short term actions’ (e.g. explore website, try recipe). These can then be followed by actual changes in nutrition-related awareness, knowledge and behaviour. The study also identified that the key enablers that motivated people to engage with the *Healthy Lunch Box* online resources were qualities of the content itself, the reputation of the source of the website (i.e. CCNSW), or specific features such as videos, interactive elements or emails. Finally, the study identified some of the main barriers and challenges preventing people from engaging with the *Healthy Lunch Box* resources online – being that the content didn't address the challenges they personally experienced (e.g. fussy eating), the challenge of getting cut through amongst the plethora of nutrition information online, and general challenges in the wider food environment (e.g. preferences for

convenience foods). Many participants suggested resources that were developed for older children could be useful in improving healthy eating behaviours among children.

Online consumer pathway

The focus group discussions helped highlight the logic of how people engaged with the *Healthy Lunch Box* online campaign and resources. The discussions suggest that the recipes promoted in the ‘Back-to-School’ campaign were the ‘drawcard’ for the website that attracted people to engage initially. For people who then reported deeper engagement, such as through exploring the website, that became a trigger to think about the healthiness of their children’s lunch box overall, and gain practical advice and information on how to implement changes.

By having a clear consumer pathway in mind (e.g. Figure 1), this helps the *Healthy Lunch Box* team understand what people need to engage with the resources, then progress to the next step in the pathway. The proposed *Healthy Lunch Box* consumer pathway (Figure 1) can also guide how to evaluate the campaign and website, and place social media metrics in context in relation to the overall campaign and website (i.e. where they sit along the spectrum towards the desired campaign and website effects). Evaluation metrics could be captured for the different stages of the consumer pathway (see Table 1); noting that digital and social media metrics are useful for some stages of the consumer pathway, but the latter stages require evaluation methodologies such as surveying people who have engaged with the campaign or website about changes to their awareness, knowledge and behaviours about healthy foods for children’s lunches.

Table 1 - Evaluation measures for each stage of the consumer pathway

| Consumer pathway | Evaluation measures |
|---------------------------------------|--|
| Initial touchpoint | <ul style="list-style-type: none"> • Reach of social media posts or sponsored ads • Number of visits to website from each source: Google search, Facebook, Instagram, typing in direct links |
| First online engagement action | <ul style="list-style-type: none"> • Number of likes and reactions • Number of shares (including post shares, and instances of people tagged in comments) • Number of ‘Save post’ or ‘Watch later’ • Number of link clicks • Number of website visits <x minutes |
| Short term actions | <ul style="list-style-type: none"> • Number of website visits >x minutes • Visits for specific recipes pages |

| | |
|---------------|---|
| | <ul style="list-style-type: none"> • Number of visits of interactive lunch box builder (>x minutes) • Number of repeat website visitors • Survey – Did you try a recipe from the <i>Healthy Lunch Box</i> website? |
| Impact | <ul style="list-style-type: none"> • Survey – Knowledge and awareness of healthy foods for children’s lunch boxes • Survey – Awareness of healthy alternatives • Survey – Did you explore the website with your children? (for older children) |

Strengthening enablers

Based on the discussions from the focus groups, some of the practical strategies that health organisations can use for future healthy school lunch box interventions include developing more video resources, and producing content and resources that are aesthetically pleasing, and in line with the style of popular online content. One of the strongest factors that prompted people to engage with the *Healthy Lunch Box* campaign was the reputation of CCNSW, which demonstrates that organisations, particularly community and not-for-profit organisations, should endeavour to highlight the organisation’s role in the intervention.

Addressing barriers and challenges

Promotional strategies

Participants noted the challenge of being inundated with too much information online, and not being shown more content from *Healthy Lunch Box* even though they had shown their interest by engaging with it. This demonstrates the challenge that health organisations and/or charities face in getting their messages seen by their target audience online: competing for attention against the plethora of information online, and being dependent on social media and search engine algorithms. Additionally, large health organisations and charities may share social media content under one single social media account for the whole organisation to create a single brand, rather than having multiple accounts for different programs or campaigns. This is the case with the CCNSW social media accounts which means that *Healthy Lunch Box* content is scheduled around all CCNSW content such as fundraising campaigns, new research findings, and promotion of information and support for people with cancer.

Health organisations need to identify and use other communication channels for their campaigns that they have more control over, alongside social media – such as the *Healthy Lunch Box* e-newsletters. Participants also identified offline promotional strategies, such as utilising networks of parents, such as Parent & Citizen Associations and school newsletters.

In terms of campaign promotional strategies for websites like *Healthy Lunch Box*, timing appears to be a key consideration – i.e. consideration given to how to reach people at the right time when they're in need of that information or resource. Furthermore, the results highlighted that parents found regular reminders about healthy lunch boxes helpful, not just at the beginning of the school year. One study has identified that school-based mobile communication apps (which many schools in NSW already use) could be used to send regular messages about healthy lunch box foods to parents; an idea which was widely acceptable to school principals.¹⁵

Developing resources for older children

The focus group discussions identified that some parents struggled with getting their older children to eat healthy lunches. This is consistent with the literature, where older children and adolescents are more likely to have more discretionary foods in their lunch boxes;⁸ which could be due to peer pressure and also more input into their food choices. Conversely, some parents noted that their older children were the ones who engaged more with the *Healthy Lunch Box* resources, especially the interactive lunch box feature.

In line with this, there were suggestions among participants that it would be beneficial to develop resources specifically for older children, which would empower them to develop healthy eating habits into adulthood. Older children who have more knowledge about foods, or are more involved in food preparation, are more likely to have healthier diets.^{16 17} A systematic review of social media use for nutrition interventions for adolescents found that they are generally effective, particularly in increasing fruit and vegetable consumption.¹⁸ However there were relatively few interventions identified that used up-to-date social media platforms,¹⁸ suggesting there is much more that could potentially be done in this space.

Other considerations

The discussions in the focus group also highlight the need for initiatives like the *Healthy Lunch Box* website to consider the challenges from the wider food environment that parents face in helping their children to eat healthy lunches. There is sometimes the unintended adverse consequence of information and education initiatives to place the onus on

individuals, which can lead to the stigmatisation or shaming of parents and children if they do not conform with the recommendations.^{19 20} A comprehensive health promotion approach requires creating a supportive environment that enables parents and children to make healthy choices. This could include evidence-based interventions such as government regulation to restrict children's exposure to unhealthy food advertising, better food labelling standards to help people identify healthy options, and settings-based initiatives in schools.²¹

It is also important that healthy eating resources support diversity and do not promote a narrow perspective of a healthy lunch, including not only modelling an 'Anglo-Western' idea of a healthy lunch box.¹⁹ And finally, it is important to consider how to promote equity in healthy eating initiatives, to ensure that it is not just parents who are highly resourced and interested in the issue who benefit from the initiative. This could include developing initiatives such as proactive promotion of healthy lunch box messages to all parents school-wide,²² to addressing food insecurity experienced,²² by some families through establishing in-school lunch programs.²³

Strengths and limitations

The strength of this study lies in the use of a focus group methodology to explore people's engagement with the *Healthy Lunch Box* resources online, which provides more richness of information, and provides insight into why people are engaging with the campaign and online resources. One of the limitations of this study is that self-reporting of online activities can be inaccurate, as some people don't remember all the details of where they encountered content online, and whether they took an engagement action. In addition, there are limitations to the focus group methodology, where discussions may be biased by individuals who are particularly outspoken, such that other people feel pressure to conform to their opinions. Finally, it is important to remember that as part of the focus group methodology, the opinions of the study participants may not be generalisable across the whole target audience, because of the number of participants (n=24), and that people who participate in such studies are likely to be more motivated and passionate about the issue.

Conclusion

There is a positive perception of the *Healthy Lunch Box* campaign and website, with people reporting that they were particularly attracted by the recipes and the affiliation with a trusted organisation like CCNSW. The study demonstrated that it is complex process between when people encounter the campaign, to whether it has an impact on their knowledge and

behaviours around healthy eating. Future online children's nutrition campaigns and resources could be improved by utilising strategies to enhance regular promotion of the online resources, and addressing some of the challenges participants identified in this study, such as parents feeling time-poor, children being fussy eaters, the autonomy of older children in choosing their own foods, and the overall food environment favouring highly processed packaged foods.

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Relevance of this research to thesis objectives

This research study further explored the second research question of this thesis about how digital-specific metrics should be understood in relation to the overall campaign evaluation. The study found that for this campaign, people's online engagement actions represented varying stages of progression towards the campaign objectives. This is relevant to the overarching topic of this thesis, as it demonstrates that online engagement metrics cannot be interpreted as one homogenous group in the overall campaign evaluation approach (as was previously represented in Figure B.1). Instead, the findings of this study suggest that online engagement actions should be understood and interpreted for each individual campaign's context, and reported in the campaign evaluation based on this understanding.

6.3 How and why do people engage with health campaigns on social media? (paper under review)

The focus group study about online engagement with the *Healthy Lunch Box 'Back-to-School'* campaign provided an opening to explore people's reasons for taking engagement actions online more broadly, not just specifically for this campaign. I conceptualised the overall research question for this area of inquiry, and developed questions for the focus group discussion guide to specifically address this research question. Using the data collected from the focus groups, I analysed and interpreted the data collected, and identified the key themes as to why people did or did not engage with health campaigns, with a particular focus on social media. I conceptualised and drafted the following manuscript reporting these findings.

The manuscript is under review with *Health Promotion International*. The supplementary material listed in the manuscript can be found in Appendix 2.17. Other data collection tools for this study can be found in Appendix 3.6 (Recruitment survey) and Appendix 3.7 (Focus group discussion guide).

Chan L, Freeman B, Hughes C, Richmond K, Dibbs J, O'Hara BJ. How and why do people engage with health campaigns on social media?

Paper is under review with Health Promotion International

Original Article submission for Health Promotion International

ARTICLE TITLE:

How and why do people engage with health campaigns on social media?

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KEYWORDS:

WORD COUNT:

FUNDING:

This work is supported by the Prevention Research Support Program, funded by the New South Wales Ministry of Health [to L.C.].

ETHICS APPROVAL:

This study was conducted with approval of the University of Sydney's Human Research Ethics Committee (HREC 2), Project Number 2020/826.

How and why do people engage with health campaigns on social media?

Abstract

While many health organisations seek social media engagement with their campaigns and online activities, there is little known in the health sector of what the engagement means in terms of people's uptake of the health messages. This study aims to investigate why people choose to engage or not engage with health content on social media, through a case study of the Healthy Lunch Box campaign. Through online focus groups, participants were asked about how they engaged with the Healthy Lunch Box content, and health content more generally, on social media. The discussions were then analysed thematically using an inductive approach. The focus groups illustrated that people engaged on social media in a diverse range of ways, beyond the measurable actions of clicking 'like', commenting or clicking a link. Other ways of engaging included sharing via private messaging or taking screenshots. For motivations of why people engaged, or deliberately did not engage with health content on social media, five main categories were identified: content motivated, self-image motivated (i.e. whether it fits with their own identity), other-people motivated (either wanting to influence others or concerned about how others perceive them), organisation motivated, or digital-footprint motivated (i.e. motivated by their willingness to provide data to the social media platform). These results demonstrate that people's decision to engage with health content on social media involves more than consideration about the usefulness of the content, and health campaign planners should also consider drawing upon other factors that motivate people to engage.

Lay summary

Social media engagement refers to the online actions that people take to interact with something they see on social media. The focus of this study is to understand the ways people engage with health content on social media, and explore their motivations for engaging, or deciding not to engage with health content. This was done through conducting online focus group sessions, and asking people about their social media engagement with a particular health campaign (Healthy Lunch Box), and with health content more generally. The study found that there were many reasons people chose to engage or not engage with health content on social media. The five categories of reasons were: 1) the content itself, 2) whether it matched their own personality, 3) what impact it would have on other people, 4) how they felt about the organisation who published it, and 5) whether they wanted to provide data (information) to the social media platform about their interests. These findings will help health organisations understand why people engage with their health messages on social media, and develop strategies to encourage more engagement in the future.

Introduction

Engagement on social media is seen as a marker of success for health campaigns, but there is little fundamental understanding of why organisations should seek engagement on social media, and what engagement means in terms of uptake of health messages. To understand these questions, we need to gain insight into what drives people to undertake these engagement actions. While social media engagement is often considered to be limited to whether someone clicks ‘like’ or some other reaction, in practice social media engagement is much wider, encompassing a range of possible interactions. Social media engagement can be considered as the “quality of user experience with web-based technologies that enable users to interact with, create, and share content with individuals and organisations in their social networks”(McCay-Peet and Quan-Haase 2016).

There are numerous studies investigating the type of content that attracts engagement (Rus and Cameron 2016, Bhattacharya, Srinivasan et al. 2017, Antoniadis, Paltsoglou et al. 2019, Wahid and Gunarto 2021), the type of messaging strategy that attracts engagement (Johnson and Mays 2020, Phan, Villanti et al. 2020), or the platforms that produce more engagement (Cao, Meadows et al. 2021, Reuter, Wilson et al. 2021). However there is less known about why people engage with content on social media, particularly in the health sector. In the field of media and communications, the Uses and Gratification Theory is often used in an attempt to understand why people engage with content on social media platforms (Dolan, Conduit et al. 2019) by considering the gratifications people seek and obtain when they use social media (Quan-Haase and Young 2014). Some of the suggested reasons for why people go to social media include “to keep in touch with friends, for companionship, to share problems, and for social interaction in general. Sharing everyday life experiences on social media enables feelings of belonging and create a sense of online community” (McCay-Peet and Quan-Haase 2016); and that the benefits or gratifications people obtain from using social media are “bonding and bridging social capital”, “information seeking and sharing” and particularly the desire to “staying ‘in the know’”(McCay-Peet and Quan-Haase 2016).

Four broad categories of reasons for why people engage with content on social media are: information, entertainment, remunerative (not just financial, but also the ability to learn something new, get exclusive content or support from others), and relational (i.e. a sense of belonging, connecting with friends and seeking support) (Dolan, Conduit et al. 2016); noting that these categories are not mutually exclusive. Drawing on lessons from the commercial sector, the following two broad categories of motivations for users to engage with health promotion content have been proposed: self-orientated reasons and altruistic reasons (Siuki and Webster 2021). Self-orientated reasons include intrinsic reasons (such as hedonic pleasure, enjoyment and entertainment, and we assume information-seeking), and extrinsic reasons (such as recognition and image, social influence, reciprocity, social bonding, self-presentation and self-enhancement). Altruistic reasons include a concern for others, and genuinely wanting to help others make better choices (Siuki and Webster 2021).

Much of the described literature is conceptual, based on theories or highly-controlled experiments. There is still a gap in our understanding of why people engage with health-related content on social media as part of their routine social media use. The purpose of this study is to gain a greater understanding of people’s engagement with health campaigns on social media, through assessing a practical case study of Cancer Council New South Wales’ (CCNSW) Healthy Lunch Box social media campaign. CCNSW’s Healthy Lunch Box program aims to empower parents with the knowledge of how to provide healthy foods in their children’s school lunch boxes, by providing recipes, videos, blogs, hosting an interactive online lunch box builder tool, and other resources (Cancer Council NSW). At the beginning of each school year, CCNSW runs an online campaign using social media (Facebook and Instagram) and e-newsletters to promote the Healthy Lunch Box program to parents. This study investigates how people engaged with the Healthy Lunch Box

campaign on social media, and why they chose to engage or not engage with the Healthy Lunch Box content, and health content more generally, on social media.

Methods

Study design

Data on participant engagement with the Healthy Lunch Box social media, e-newsletter, and website content was collected through online focus groups.

Participant recruitment

Participants were recruited through three channels – a pop-up window on the Healthy Lunch Box website, a recruitment message in the Healthy Lunch Box e-newsletter, and the Cancer Council Facebook page through boosted posts. The recruitment material included a link to an online Recruitment Survey, which asked demographic information about the participant, and what online actions (if any) they had taken in relation to the Healthy Lunch Box content.

Participants were organised into focus groups based on their responses about how they engaged with the Healthy Lunch Box resources online. Participants who responded in the Recruitment Survey that they had taken actions on social media (e.g. liked a social media post, clicked a link on a social media post, or watched a video on social media) were grouped together, while those who had taken other online actions (e.g. visited the website, subscribed to the email mailing list or read a blog article) were grouped together. In total, there were 4 groups of people who had taken a social media action, and 1 group of people who had not. We also created 2 ‘mixed groups’ which comprised of a mix of people who had or had not taken social media actions. These groupings were developed to best facilitate diversity of motivations and barriers of social media engagement.

One week before the online focus group session, participants were sent an email with a pre-session task, which showed participants a sample of the Healthy Lunch Box social media posts (see Supplementary Material 1), and asked them which ones they had seen. This was followed by a ‘thought-starter’ question, asking participants to consider why they did or did not take an action on the post(s). Participants were not required to answer this in the emailed pre-session task, but rather to consider their response in preparation for the focus group sessions.

Participants were reimbursed for their time in the focus group session with a \$50AU groceries gift card which was sent to them via email.

Data collection

Data for this study was collected via online focus groups. Online focus groups were run using the Zoom videoconferencing platform on an Education license. Using Zoom video conferencing for online qualitative research, such as focus groups and interviews, is becoming increasingly common, and been found to be a satisfactory methodological option for researchers and participants (Archibald, Ambagtsheer et al. 2019, Williams, Armitage et al. 2020). The focus group sessions used a semi-structured discussion guide developed by the study team. The discussion guide had four main sections: how people encountered the Healthy Lunch Box program, how they had engaged with Healthy Lunch Box on social media, feedback on the Healthy Lunch Box program itself, and how people engaged on social media with health content generally. Each focus group session was facilitated by one member of the study team (LC), and co-facilitated by one other member of the study team (BJOH or BF). Each focus group session was video recorded with the permission of the participants, and notes were taken during the session on a virtual whiteboard (Mural) that was visible to all participants during the session through screensharing.

Data analysis

Using the video recordings, each focus group session was transcribed, and the transcriptions were cross referenced with the notes on the virtual whiteboard. The focus group transcriptions were then analysed thematically using an inductive approach (Thomas 2006). One researcher reviewed all the transcripts and identified common themes. Based on the identified themes, a codebook was developed for analysing the data, which was reviewed by two other researchers who were familiar with the data. The themes developed were: 1. Social media platform use, 2. Descriptions of social media behaviours, 3. Motivations for engaging with social media content, and 4. Reasons for not engaging with social media content. One researcher then went through all the transcripts and coded the data semantically based the codebook, using NVivo 12.

Results

In total, 67 people completed the Recruitment Survey, and 7 focus groups were organised. For each focus group 6-11 people were invited to attend, with allocations based on their indicated time availability and their engagement with Healthy Lunch Box on social media. For the actual focus group sessions, 2-5 people attended each session, resulting in a total of 24 focus group participants.

Platforms used

Participants mostly reported using Facebook and Instagram as their primary social media platform. Numerous people also reported using YouTube, LinkedIn, Pinterest, Twitter, TikTok and Snapchat. In some instances, people cited using specific platforms for single-purposes; e.g. Snapchat to talk to their children, TikTok because their granddaughter is on that platform, or Pinterest for crafts. One person also reported using Signal, and another mentioned using Reddit. A small number of people reported either not using social media much in general, and one person reported not using social media anymore due to privacy and security concerns.

How people engaged

Participants reported engaging with the Healthy Lunch Box social media content using the measurable actions of clicking 'like', commenting, clicking on the post/ad, or following CCNSW's social media account.

Participants also reported sharing the content, and there were a range of ways they did this online. Different ways of sharing the content included: sharing it on their own Facebook page to their social network, sharing it to a specific person by tagging them (i.e. writing their name in the comment section), sharing it to closed social media groups, sharing via private messenger apps (such as Facebook Messenger or WhatsApp), or sharing via other electronic communications such as SMS or email.

Another engagement action people took in relation to the Healthy Lunch Box content was 'saving' the content. This too was done in several different ways, including saving it using Facebook's 'Save post', 'Save link', 'Save video' or 'Watch Later' function, clicking on the link and saving the page in the browser's 'bookmark' function, or taking a screenshot of the post.

"I actually have my Facebook categories saved. So I have like recipes, travel, teaching ideas, and stuff like that. So if I see something that I really like, I will save it into a category that is only accessible by myself. And that's how I save recipes, instead of sharing them. My friends aren't interested in cooking."

Motivations for engaging or deliberately not engaging

Five overarching themes emerged of reasons that people provided for either engaging or deliberately not engaging with the Healthy Lunch Box posts, or health content in general on social media.

Content motivated

The most straightforward response people provided for engaging with the Healthy Lunch Box content or other health content on social media was simply because they liked the content itself. Some content characteristics that people described were: useful (e.g. a primary school teacher who thought the content would be useful for teaching students about healthy eating, or parent who had been looking for quick and easy lunch box ideas) or visually appealing (e.g. a recipe looked appetising, or the content was in a design style they'd commonly seen online). None of the participants explicitly expressed not engaging with the content because they didn't like it.

Self-image motivated

Participants described their reason for engaging with content because of how it aligned with their identity (e.g. as a school teacher, a food tech teacher, or someone who likes food or cooking), or their own values (e.g. someone who thinks nutrition is very important).

“I'm also a food tech teacher. So I'm very interested in food photography, and food that looks good, and collecting new recipes; and getting inspiration for students in the classroom, and also family and friends.”

Conversely, some people deliberately did not engage with the Healthy Lunch Box content on social media, despite being interested in it, because it did not fit in with their personal curated social media image. This is in the context that when someone engages with content on social media, their action will be shown on their personal social media feed, which their friends can also see.

“I have quite a curated Instagram and Facebook feed, where I only post certain things that fit within, kind of my brand. So my Instagram brand is very different to my Facebook brand. My Instagram is primarily travel based, and my Facebook is generally just little life updates for my friends that live overseas. So I find that recipes don't actually fit within that timeline, they look quite out of place.”

Other-people motivated

Participants also reported reasons for engaging or not engaging with content based on a consideration of other people. Some people described taking some form of engagement action to actively share the content because they thought it would be useful to others; for example, something they knew their friend would be interested in. People also reported taking engagement actions as a way of influencing others, ranging from sharing the post on Facebook with the hope others would take on board the health content, to more subtle ways of influencing discourse in general. For example one person described the following:

“I know quite a few of my friends of my other friends also like the Cancer Council page. So I guess it's like, maybe subconsciously, somehow it's a way of like, sharing it, but without sharing it. You know because then it'll show "blah, blah, blah has liked this post" or something like that.”

On the other hand, some people described reasons for deliberately not engaging with content because they were concerned how other people would perceive their action. Some people were concerned about being judged on the content itself (e.g. their family would not approve of the food they gave their child), or judged as someone who posted too much irrelevant content.

“I try not to share heaps of stuff on my page because people can unfollow me and block me and stuff like that”

Organisation-motivated

People reported that one of the reasons they engaged with the content was because it was posted by CCNSW, which they viewed as a credible and reputable organisation, and therefore trusted the information. Some noted that they would engage with content from organisations like CCNSW or government agencies, but not from commercial businesses.

Some people specifically described an affinity towards CCNSW, either from having personally engaged with them after a diagnosis of cancer, or having someone close to them who had cancer. These people not only engaged with the content because they viewed it as credible, but because they saw their engagement action as a way of supporting a meaningful cause.

“And of course I'm the one that wants to support an organisation like the Cancer Council, so if there's anything there, that I think I could share with a friend or whatever. I feel very close to the Cancer Council having survived breast cancer twice.”

On the other hand, some people deliberately did not engage with social media content that was posted by businesses and organisations, and would usually only engage with content from family and friends. They described that they perceived content posted by individual people to be more personal and authentic.

“I think it really helps when your friends do share it or like. If I'm seeing that personal post, that's probably a better influencer than seeing like a paid ad, or an organisation that's putting up a post. Because I know that if it was my friend, or somebody that I know it comes from, it's a little bit more meaningful. It's from the heart.”

Digital footprint-motivated

People also described taking engagement actions as a way of actively providing data to the social media platform for a specific purpose. Some people described taking an engagement action such as a ‘like’ as a way of adding the content in their activity feed (a log of actions taken on the social media platform), so they could go back and find it later. Other people described purposefully taking an engagement action to prompt the social media platform algorithm to display more content like this in the future, or indicate to the algorithm that this is good content for other people.

“Yeah, I liked it. Because I know if you like it, you get more ads [that] have a similar content as well coming up.”

“Because then I think it also, I guess knowing how Facebook works and things like that, it also adds momentum to that actual post.”

Vice versa, people described deliberately not taking engagement actions because they didn't want to provide that kind of data. This included people not wanting their activity tracked for privacy reasons, or because they didn't want to be inundated with similar posts and ads.

“Especially with sponsored ads, sometimes you know that if you engage, or even click into a particular post, you're likely to then get spammed afterwards.”

Other reasons

There were some reasons that people provided that didn't fit in with any of the above themes. This included that they generally didn't engage in a visible way with any content on social media; or they only engaged with content in certain ways, for example they would only ‘like’ content, but would never ‘share’ content. Some participants also described that they engaged with content differently depending on the platform; for example, they wouldn't comment on anything on Instagram. These responses often referred to a participant's broad approach to social media rather than decisions about specific content. For these comments, participants did not elaborate on the underlying reasons for that approach, and at times acknowledged they hadn't considered the reasons for it (e.g. saying “I don't know why” after describing their practice).

Finally, some participants noted that their profession as school teachers impacted on their decisions to take social media engagement actions, due to policies, guidelines, or generally being conscious that their actions may be visible to students and the wider school community.

Multiple motivations

The five categories of motivations identified in this study are not mutually exclusive, and in many instances, participants expressed several factors from different categories influencing their decision to engage or not engage with health content on social media. In addition, people perceived the importance of factors differently. For example, some people reported that it was important that it was CCNSW who shared the content, but other people said that it didn't matter who posted it, as long as they were interested in the content.

Online and offline actions

For some people, there were parallels between their online and offline activities, where they would describe tagging a friend in a post's comments in the same way as talking about it to someone in-person, suggesting that they see both actions as the same thing but through different formats. Meanwhile, other people described that they didn't feel comfortable sharing health content online, but would talk about the health content they had found online with someone in person.

Discussion

This study demonstrates that there is a more diverse range of ways people engage with a health campaign on social media than is usually reported, and some engagement was not publicly visible. This included actions such as taking screenshots of posts, sharing on private messaging, saving the post using the platform's native functionality, or using the bookmark function on their web browser. These actions are not readily captured in social media metrics and campaign evaluations.

The focus group discussions demonstrated that the reasons that people decide to engage or not engage with health content on social media are more complex than simply whether they are interested in the content. Decisions to engage or not engage were based on factors of the content itself, alignment with social media self-image, consideration of other people, sentiment towards the organisation posting the content, and willingness to provide data to the social media platform. Each person likely makes decisions about whether to engage with health content on social media based on considerations from many or all the categories of motivations, and gives different weighting to each factor.

Motivations influencing engagement

The findings of this study provide an important contribution to the body of evidence of how to understand people's engagement with health campaigns on social media through a practical case study of a health campaign. The broad categories of motivations influencing people's decision to engage or not engage with health content on social media identified in this study have similarities with some in the published literature (Siuki and Webster 2021), but the considerations of sentiment towards the organisation and of willingness to provide data to the social media platform have not been discussed explicitly elsewhere for health campaigns.

Drawing together the two aspects of this study of how people engage with health content on social media, and why, there were some links between the two. Engagement actions that are 'save' actions are primarily content-motivated, where people are mainly interested in the content; whereas engagement actions that were 'sharing' in nature can be motivated by self-image, consideration of others, or organisation-related.

Understanding people's motivations will be useful for health organisations planning campaigns and content on social media. Health campaigns on social media are often focused on developing interesting and useful content, but the findings of this study demonstrate that it would be beneficial for campaign planners to also consider whether the campaign activates other motivations such as wanting

to share useful information to others, influence others, display a particular self-image, support a cause or organisation, or other motivations identified in our study.

Engagement is more than just metrics

This study has demonstrated that social media engagement metrics (which usually refer to likes, reactions, comments and shares) represent only a subset of the interest and engagement with a health campaign. Social media engagement can be considered in terms of “tangible indicators of engagement” which are social media metrics, and “abstract indicators” which relate to ‘positive user experiences’ (McCay-Peet and Quan-Haase 2016). While social media metrics are the most commonly evaluated form of engagement, there is a need for greater understanding of the ‘abstract indicators’ of engagement. This study takes the first steps in understanding the ‘abstract indicators’ through exploring the audience’s experience and motivations for social media engagement for this campaign from CCNSW. As each health campaign has different target audiences and objectives, health organisations need to build on these findings by conducting similar focus groups and other audience research, to understand their community’s unique motivations and experiences. This will enable campaign planners to develop campaigns that tap into the motivations that are most appropriate for their audience.

Online and offline relationships

The finding that some people see online engagement actions as parallels to offline actions also shows that organisations need to plan health campaigns as a whole, rather than viewing social media as a separate activity. In addition, this study’s finding that some people chose to engage with content because of their positive sentiments towards the organisation, or even deliberately took an engagement action as a way of supporting the organisation, shows that one of the important considerations for health organisations in understanding their social media engagement is in being aware of the public’s perception and attitudes towards their organisation offline. If there is a strong community of supporters for the organisation, health organisations could consider explicitly encouraging sharing by their supporters (e.g. as informal organisation ambassadors), which carries more credibility among others in their network. It is important to note that this is different from employing paid online Influencers, as the value of encouraging sharing by supporters is in the authenticity and credibility of the message coming from supporters, rather than people who are financially incentivised to do so. Overall, these findings demonstrate that organisations need to cultivate their communities through offline activities and strategies to develop strong relationships, that then feedback to promote online engagement.

Diversifying concept of online engagement

A very practical implication of this study is that health organisations need to recognise the diverse ways people may engage with their content, beyond the usual likes, comments and shares. One example of this could be to promote the use of the ‘Save’ function on social media; i.e. instead of including the call-to-action being ‘click on this link to read more’, an additional type of call-to-action could be ‘save this to your Watch Later list for next time you’re looking for a quick and healthy snack’. This also needs to be considered when creating and posting content, as one focus group participant pointed out that while ‘Reels’ and ‘Stories’ are now popular on Facebook and Instagram, it is difficult for people to ‘save’ this content so they can return to it later.

Reflecting on purpose of engagement

Finally, the findings of this study emphasise the pragmatic reasons why health organisations need to continue to try to promote social media engagement with health campaigns. The following reasons were highlighted by participants responses:

- i) Engagement actions send a signal to the social media platform that the individual is interested in the content, so that the platform's algorithm will show more of this type of health content (and from this organisation) in the future.
- ii) Engagement actions send a signal to the social media platform that this content is interesting, promoting the algorithm to display the health message to other people.
- iii) The social media platform will show the person's friends that this person has engaged with the content, which acts as a social proof or word-of-mouth recommendation, which is often a stronger endorsement of the content than if it had just been posted by the organisation.

Therefore, keeping in mind that social media metrics represent only the tangible indicators of engagement, the findings of this study affirm that social media engagement serves a purpose in promoting health content on social media, particularly in contributing to improving the reach of the health messages.

Limitations

One of the main limitations of this study is that the topic of the health campaign being evaluated (healthy eating for children) would be generally considered uncontroversial, and so the findings of this study about why people do or do not engage with the content on social media may not be directly applicable to other health topics that are more sensitive and controversial. A second limitation of this study is the mix of participants recruited for this focus groups, including people who used social media a lot, to people who did not use social media much at all. While the study was designed in this way to capture all people who may be interested in the health topic, it also means that it is not a homogenous group in terms of social media practices and attitudes. In addition, studies have found that different demographic groups have different patterns of social media use, but we were not able to explore these different patterns in this study due to the sample being largely comprised of women aged 30-60 years old. In addition, as this study relied on people's recall of what social media engagement actions they took, there is potential that people didn't remember their exact actions, or their motivations at the time when they encountered the content.

Conclusion

This study demonstrates that there is a wide variety of ways people engage with content from a health campaign on social media, some of which would not be captured by social media engagement metrics. In addition, there are a variety of reasons people choose to engage with health content, and similarly for why people may not engage with the content on social media, apart from not being interested in the content. These are valuable contributions to the very limited understanding into social media engagement of health campaigns and content, despite the fact that social media engagement metrics are increasingly being seen as key evaluation indicators for campaigns. The findings of this study also can help inform social media strategies, to try to reach a wide audience and promote a health message or behaviour.

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Relevance of this research to thesis objectives

This manuscript reports the second component of this research study, which continues to explore the second research question of this thesis about how digital-specific metrics should be understood in relation to the overall campaign evaluation. The study findings demonstrate that not all online engagement actions represent people interested in taking up the campaign's call to action, and therefore it should not be assumed that online engagement measures sit on the progression of campaign effects (as previously represented in Figure B.1). These findings have implications for how online engagement metrics should be included in digital health campaign evaluations, and will be discussed in the following chapter.

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PART D:

EVALUATION AREAS FOR
DIGITAL HEALTH CAMPAIGNS

CHAPTER 7

DISCUSSION

7.1 Overview

The primary aim of my dissertation has been to understand how public health campaigns with a digital component are currently evaluated and explore how they should be evaluated. Although digital media is widely used for health campaigns, and we have a wealth of knowledge of evaluating health campaigns that use 'traditional media' (e.g. television, billboards, radio etc.) [1-3], there is little understanding or consensus on how to evaluate health campaigns that use digital media – including how to interpret the broad group of 'engagement metrics'. There has been a substantial increase in the use of digital platforms by campaigns in recent years, but this has not been mirrored with the same level of reported research and evaluation. While some research has been conducted into the use of social media metrics in health campaigns [4-6], these do not consider how they contribute to the overall campaign evaluation. The paucity of research means there is a gap in our understanding of how to evaluate digital health campaigns, and the contribution of my thesis is in providing evidence for this field of public health research.

To explore this area, I first conducted a review of the literature to understand how campaigns that use digital platforms are currently evaluated and developed a conceptual framework to outline where digital metrics might fit in campaign evaluations. This review then informed my approach for the next phase of this dissertation, where I conducted three evaluation studies on digital health campaigns (Chapter 3 and 4), using an adapted model of a conventional campaign evaluation (Part B, Figure B.1, p.36). I also conducted two other studies using mixed research methods – one which opportunistically arose from one of the campaign evaluations (Chapter 5), and one which was designed to address the research question of how online engagement should be understood (Chapter 6).

This concluding chapter synthesises all the findings, and addresses the final summative research question – how should we evaluate health campaigns with a digital component? Starting with an overview of the findings of each research study (Table 7.1), this chapter then discusses key ideas that emanated from the findings from the evaluations of digital health campaigns. Finally, I will highlight the unique contributions of my thesis to the broader body of literature and propose a reframed approach of conducting digital health campaign evaluations by collecting data for six evaluation areas.

Table 7.1 - Summary of all studies and their implications for digital health campaign evaluations

| Chapter | Study description | Main findings | Implications for digital health campaign evaluations |
|---------|--|--|---|
| 2 | Literature review of evaluations of tobacco control campaign that use digital media. | Diverse range of measures were reported in the evaluations, particularly in process evaluations, making it difficult to compare campaigns. 'Engagement' metrics from social media were commonly reported. | <ul style="list-style-type: none"> Measures should be selected based on the principles of being the most relevant to campaign objectives. A conceptual framework was developed for where digital media metrics are currently perceived to fit with established campaign evaluation frameworks (Part B, Figure B.1, p. 36). |
| 3 | <p>'Movements Matter' campaign evaluation</p> <p>Process and impact evaluation of a state-wide campaign that aimed to raise awareness of decreased fetal movements among pregnant women and clinicians.</p> | The campaign using social media and in-hospital education materials led to some increases in knowledge about fetal movements among pregnant women. | <ul style="list-style-type: none"> Digital reach provides some insight into whether the campaign message reached the target audience. |
| | <p>'Still Six Lives' campaign evaluation</p> <p>Process and impact evaluation of a national campaign that aimed to raise awareness of stillbirth among Australian women, and pregnant women specifically.</p> | The campaign, which used diverse media channels (including social media, influencers, online advertisements and online PR) was somewhat effective in raising awareness of modifiable risk factors of stillbirth. The increase in awareness was not commensurate with the large numbers of digital engagement metrics achieved by the campaign. | <ul style="list-style-type: none"> Large numbers of reach and other online engagement metrics (e.g. clicks, video views) did not translate to equally large improvements in population levels of knowledge of the health issue. Asking about campaign recognition by showing the campaign video only is not an accurate way of measuring recognition. |
| 4 | <p>'Shisha No Thanks' campaign evaluation</p> <p>Impact evaluation of a local campaign that aimed to raise awareness of the harms of waterpipe smoking.</p> | The predominately social media campaign led to some increases in awareness of messages about the harms of waterpipe smoking. There were non-significant improvements in people's attitudes about the harms of waterpipe smoking. | <ul style="list-style-type: none"> The only measure that increased was awareness of messages about the health issue, which may be suggestive of the strength of digital health campaigns. An SMS community panel is an innovative way to conduct campaign impact evaluations. |

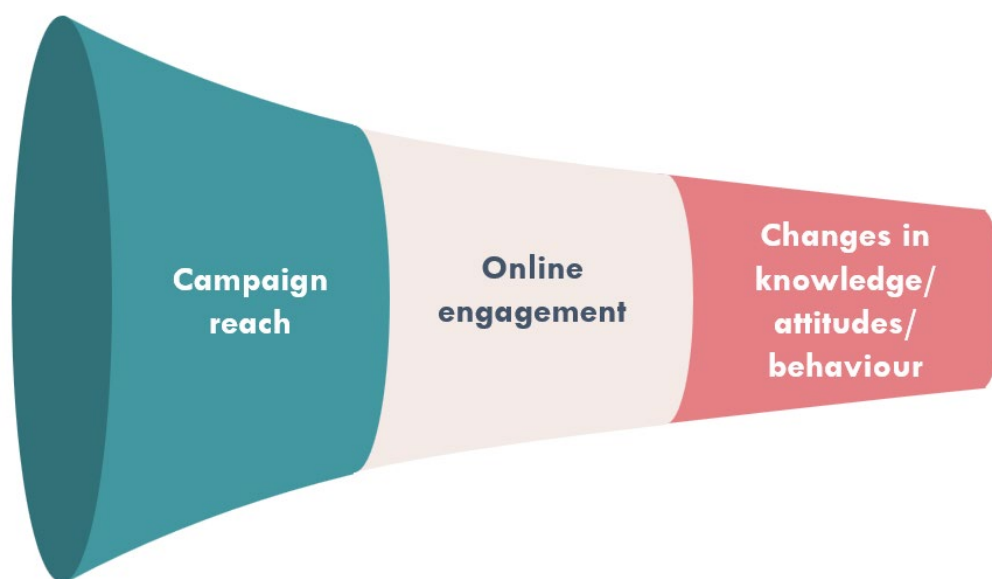
| Chapter | Study description | Main findings | Implications for digital health campaign evaluations |
|---------|---|---|--|
| 5 | A content analysis of comments posted to the <i>Shisha No Thanks</i> campaign video on Facebook. | Not all comments posted to the campaign video represented people who were supportive of the campaign. Only 9% were clearly posted by people who accepted the campaign message, while 23% were people who rejected the campaign message. | <ul style="list-style-type: none"> • Social media engagement metrics cannot be reliably interpreted in isolation, as they may incorrectly give the perception that a campaign has been very successful. • Social media engagement with a campaign does not necessarily represent a precursor to taking on board the campaign message. • Qualitative research such as content analyses provides valuable insight to help inform interpretation of social media engagement metrics. |
| 6 | <i>'Healthy Lunch Box' program campaign evaluation</i> Focus group study exploring how people engaged with the campaign online, and subsequent offline actions. | Online and offline actions related to the campaign can be logically ordered in an 'engagement pathway', and there were a number of factors that promoted or acted as barriers to deeper engagement with the campaign content. | <ul style="list-style-type: none"> • Online engagement with a campaign can be considered in terms of 'first online engagement actions' and 'short term actions', which can form part of the consumers' online pathway. |
| | Focus group study investigating participants' ways and motivations for engaging with <i>Healthy Lunch Box</i> campaign content, and other health content on social media. | Five main categories were identified for why people did, or chose not to, engage with health campaign content on social media: content-related, self-image, considerations of other people, sentiment towards the posting organisation, or willingness to provide data to the social media algorithm. In addition, people 'engaged' with the campaign through ways that are not measured by social media engagement metrics (e.g. screenshots, sending via private messaging, etc). | <ul style="list-style-type: none"> • Not all social media engagement represents people who are going to take up the campaign's call to action. • There are people who are interested in the campaign, but may not necessarily take a social media engagement action. |

7.2 Measuring online engagement

Online engagement and campaign outcomes

As identified in the literature review (Chapter 2), current digital health campaign evaluations assume that online engagement is one step along the process towards people taking up the campaign's call-to-action (see Part B, Figure B.1, p. 36). This logic is often described as the 'campaign funnel' (illustrated below in Figure 7.1), which assumes that more online engagement means there is a larger pool of people who may then progress towards achieving the desired campaign outcomes.

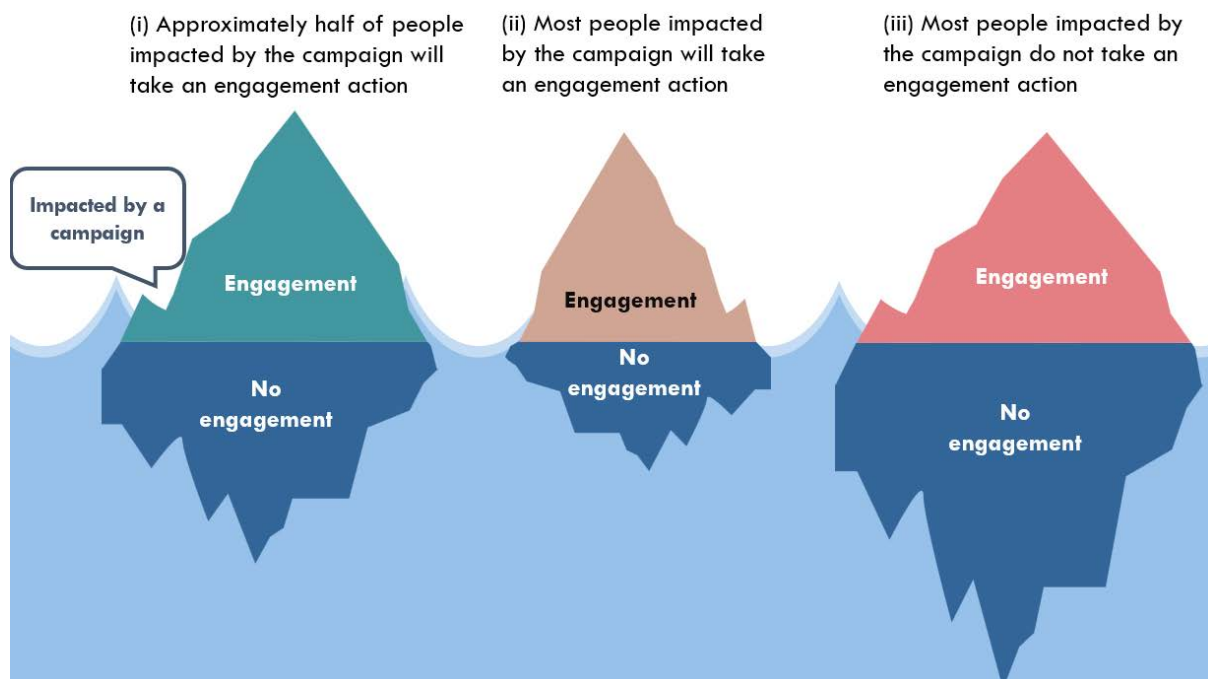
Figure 7.1 – Assumed campaign funnel with online engagement



However, the studies conducted in this dissertation suggest that this assumption may not necessarily be true; or if it is, that extremely large levels of campaign reach and online engagement are required to produce the desired level of changes in knowledge/attitudes/behaviours. The *Still Six Lives* campaign evaluation showed large numbers of digital engagement through paid and unpaid social media activity and online advertising, but had only modest levels of campaign effects (see Section 3.5). Similarly, the *Shisha No Thanks* campaign also garnered large numbers of social media engagement, but again had only modest effects (see Section 4.5). Insight into a possible reason for the lack of impact on attitudes and behaviours was identified by the content analysis of the *Shisha No Thanks* Facebook comments (see Chapter 5), which showed that only 9.1% of the comments were from people agreeing with the campaign; whereas at least 22.9% of the comments were from people rejecting the campaign message [7]. These studies demonstrate that a large amount of online engagement does not necessarily equate to a large number of people moving towards or taking up the desired campaign outcomes.

Conversely, Section 6.3 suggests that there are people who are interested in a health topic or campaign message, but may actively decide not to publicly engage with it on social media for a range of reasons (such as fear of judgement or concern that it does not fit with their desired online self-image), but may still take on board the campaign message. Online engagement is often the only visible indicator of the audience’s interest in the campaign (i.e. metaphorically the visible part of the iceberg in Figure 7.2). However, there is currently no way of knowing the proportion of people impacted by a campaign who take an engagement action, and therefore the quantity of ‘visible’ impact (i.e. engagement) does not reliably reflect the total quantity of people who are impacted by the campaign (see Figure 7.2).

Figure 7.2 – Iceberg analogy depicting the unknown relationship in the quantity of people who are impacted by a campaign and those who engage online



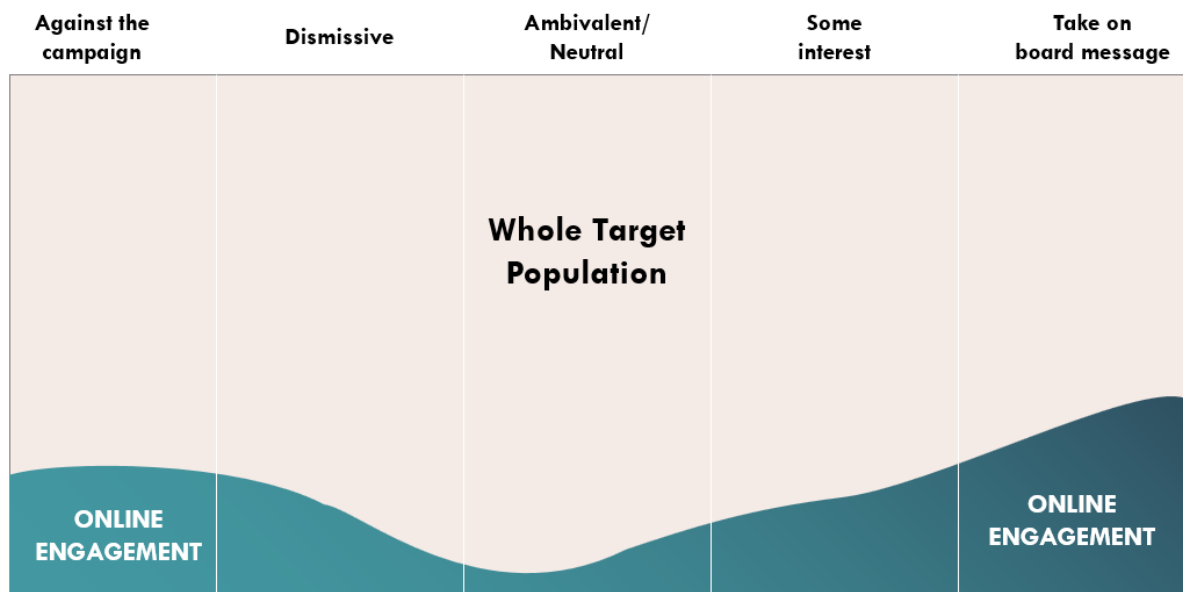
The studies in this dissertation (Chapter 5 and 6) have also shown that people who do engage with a campaign online may do so for a diverse range of reasons, and sit anywhere along the spectrum of campaign responses, as illustrated in Figure 7.3; and we currently have no evidence to estimate the proportion of people in each area of the graph. The categories along the spectrum include:

- **Take on board the message** – people who are interested in the topic, think the campaign message is good and have an intention to change their health behaviours accordingly. Examples of online engagement in this category could include clicking on the call-to-action, sharing the message with others, or leaving a comment (e.g. comments in the *Shisha No*

Thanks project from people showing an intention to stop smoking shisha or asking a friend to stop smoking shisha) [7].

- **Some interest** – people who are interested in the topic, and think the campaign message is good [6], but do not have an immediate intention to change their behaviours. Examples of online engagement could include clicking on a link for more information, ‘liking’ a post to show general support, or leaving a general comment (e.g. comments in the *Shisha No Thanks* project from people who agreed with the campaign message but did not indicate behavioural change) [7].
- **Ambivalent/neutral** – people who don’t have much interest in the campaign message. However, they may still engage with the campaign online for other reasons [8], such as telling someone they know who would be interested in it, or wanting to support the organisation (see Section 6.3). An example of an online engagement action in this category could include tagging a friend in a comment.
- **Dismissive or Against the campaign** – people with negative opinions of the campaign, ranging from not taking it seriously and laughing at it (i.e. dismissive) to explicitly criticising the campaign (i.e. against the campaign). Examples of online engagement actions in these categories could include responding with negative or laughing emoji reactions or leaving derisive or critical comments [9] (e.g. comments in the *Shisha No Thanks* project of people who ‘rejected’ the message) [7].

Figure 7.3 – Uncertainty of the relationship between people’s campaign response with their likelihood of engaging online



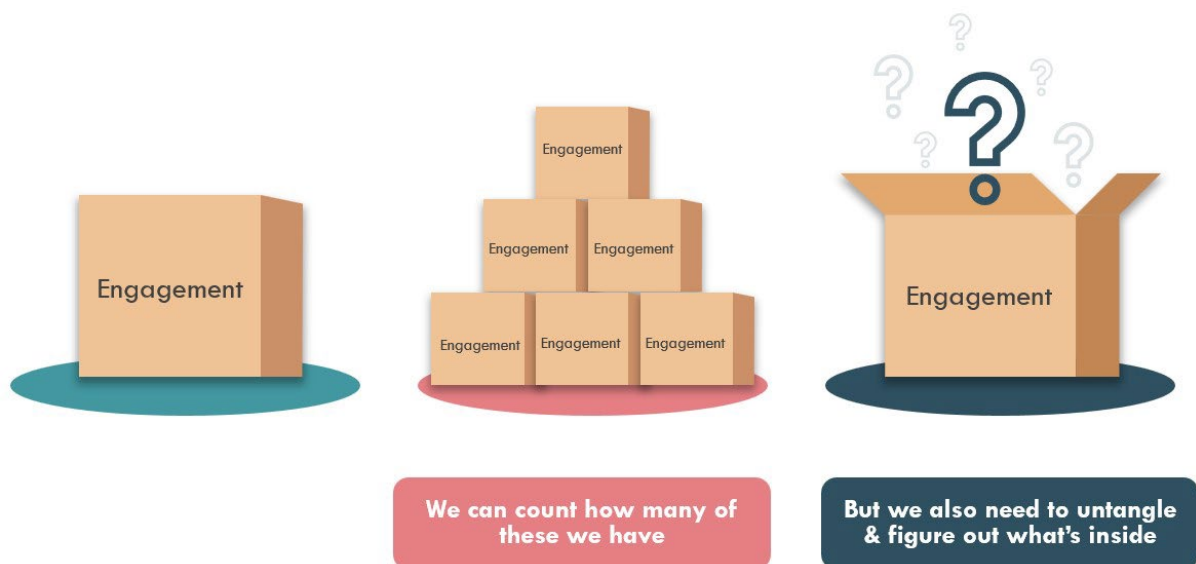
Therefore, online engagement can represent people at any stage of the spectrum of campaign responses, and there is currently no way of knowing the proportions of people in each stage of the spectrum who engage online. The important implication of this finding is that the number of people who have engaged online with a campaign is not a useful indicator of the effectiveness of the campaign. The next section of this discussion will discuss how online engagement should then be assessed and included in campaign evaluations.

Evaluating online engagement

With the wide range of digital metrics available as identified in Chapter 2 and elsewhere in the literature [10], and the complexity of what online engagement represents as discussed above, we need to understand how online engagement should be assessed and included in digital health campaign evaluations.

As discussed in the section above, the findings of this thesis demonstrate that if we are to include engagement metrics in a campaign evaluation, evaluators need to more critically assess what engagement represents (see Figure 7.4), e.g. where along the campaign response spectrum the online engagement sits – from being someone who takes on board the message, to someone who is against the campaign, and how it may relate to the overall campaign objectives.

Figure 7.4 – Unpacking the ‘engagement box’



Section 6.3 drew upon the concept proposed by McCay-Peet and Quan-Haase of tangible and abstract indicators of engagement [13], where the tangible indicators of engagement are

quantifiable, while the abstract indicators of engagement can be considered as “to understand *why* people engage at the level they do” [emphasis added] [13, p.200]. Drawing upon this concept and the studies of this thesis, to assess online engagement and meaningfully include it in campaign evaluations, evaluators and researchers need to:

- 1) Scrutinise the meaning of specific online engagement actions specific to individual campaign. Similar to the types of studies conducted for this thesis (see Chapter 5 and 6), evaluators need to conduct research to understand the meaning behind engagement actions for individual campaigns. The studies of this thesis used qualitative or mixed methods for this research, such as content analyses (e.g. of social media posts) or focus groups. However, there are likely to be other methodologies and research designs that can be used to further understanding in this field, and further research into developing and validating methods to make this kind of evaluation research more accessible would be of great value, such as the useability of automatic content analysis programs. Furthermore, dissemination of research findings into the meanings of engagement actions will help develop a more robust understanding of online engagement with campaigns for the sector.
- 2) Informed by the analysis and greater understanding of the meanings of specific engagement actions for the individual campaign, ensure that engagement metrics (e.g. number of clicks, views and likes) that are included in a campaign evaluation are placed in the context of the campaign’s logic model ¹ and the following categories: reach, measures related to initial engagement (representing attention), and measures related to deeper engagement (see Table 7.2). An example of what these three categories of indicators of engagement could look like for a specific campaign is illustrated for the *Healthy Lunch Box* campaign in Section 6.2. The proposed categories (reach, initial engagement and deeper engagement) are similar to the hierarchical categories of low, medium and high engagement outlined elsewhere [6, 12], but reflect increasing interest towards the campaign’s call-to-action, rather than the degree to which they represent two-way dialogic engagement.

It is worth noting that online engagement metrics blur the delineation between campaign process and impact evaluations and these proposed categories (reach, initial engagement and deeper engagement) do not fit neatly into either process or impact evaluation stages. Engagement metrics are sometimes considered to be measures of a campaign’s impact – i.e. what someone did after seeing a campaign. However, using the definition of process evaluation as being “to understand how

¹ A campaign logic model outlines how different elements of a campaign will interact with each other and how they should logically lead to the desired campaign outcomes.

7.3 Other evaluation considerations

Digital health campaigns evaluations often largely focus on social media engagement metrics [12]. However, the studies in this dissertation demonstrate that we need to recognise other fundamental differences of digital health campaigns (compared to traditional broadcast media) that have implications on how campaign evaluations should be conducted.

The many faces of digital health campaigns

A key learning from the evaluations of this dissertation is in recognising that many digital health campaigns have multiple different executions and creatives. It is no longer sufficient to layer the same creative (e.g. same tagline and image) across different platforms. In the digital landscape, campaign executions need to be tailored to each digital platforms [14], as each have very different requirements. For example, a digital banner advertisement may be a professionally created image, a Tik Tok post may be a person conversationally speaking to camera, an online media article may be a long-form story, and a YouTube pre-roll advertisement would be a 15-30 second professional video. In addition, campaigns now often do not run the same creative material for as long a duration as was previously done, as there is an expectation on digital platforms for new content [15]. So while the overall campaign duration may be the same length as before, the creative is refreshed regularly or developed as series that can be published in a staggered manner over time. An example of this is in the *Still Six Lives* campaign, which ran over 3 phases within 12 months, using different creative approaches and messages for each phase.

These changes have an impact on the way evaluations measure campaign recognition. In the past, evaluation surveys would ask just one question to measure campaign recognition, which often involved showing a single frame of the campaign's TV advertisement or verbally describing one of the advertisements [16, 17]. However, as a result of the changes outlined above, this may no longer accurately assess campaign recognition. Impact evaluation surveys need to ask campaign recognition questions that include examples of all the major campaign portrayals, from different media platforms and from different phases of the campaign (Figure 7.5). This was evidenced in the *Still Six Lives* campaign, where the mid-campaign survey included a question about campaign recognition that asked about one frame from the campaign video only, and results showed low campaign recognition. Subsequently, the post-campaign survey's recognition question included several different campaign images, and the results showed that the most recognised campaign image was one used on digital banner advertisements and social media posts, not the campaign video (Section 3.5). Had the campaign recognition question asked only about the campaign video, there would have been a substantial under-reporting of the proportion of people who had seen the campaign.

Figure 7.5 – Changes in assessing campaign recognition



Changing the way we understand reach

In a traditional mass media campaign evaluation, reach metrics were part of the process evaluation, and described the media spots that campaign planners would buy to obtain a defined amount of reach (e.g. number of TARPs / GRPs for television advertising). In reality, these reported metrics were estimates provided by advertisers about how many people an advertisement could potentially reach. For digital media however, reach metrics are slightly different. Firstly, they describe actual numbers of people who are shown content (not estimates). Secondly, for some digital media activities (particularly organic social media), they are not directly under the control of campaign planners, but rather the reach of campaign content is subject to a digital platform's algorithm ranking, which in turn is influenced by the audience's engagement with the campaign. These differences mean that reach for a digital campaign reflects the delivery *and* an element of engagement (i.e. the audience's response). Reported reach for digital campaigns is therefore more illustrative of how a campaign is implemented and received in real life. Therefore, it is beneficial for evaluators to report digital media spend, activities *and* reach, as they are not necessarily equivalent, and consider reach to be part of the campaign's overall evaluation (not just part of the process evaluation).

Varying roles of digital and social media channels in campaigns

One final consideration is that in some campaigns, digital - and in particular social media - channels have been used as an additional communication tool for health campaigns, rather than just as a

replacement for mass media channels (e.g. TV, print, OOH). As a result, there are now many different ways that digital and social media are used in campaigns, for example:

- Digital-only campaigns – where the campaign is mostly run on social media, with possibly minor support activities from out-of-home or small scale PR (e.g. *Shisha No Thanks* project or the *Movements Matter* campaign)
- Digital-first campaigns – where social media forms the main campaign focus, and other media channels are used as adjuncts (e.g. the *Still Six Lives* campaign, which mostly used digital channels supplemented by some earned media)
- Digital as one of the communication channels – where digital sits alongside many other communication channels, such as TV, print, PR, OOH, with similar level of efforts across all the channels (e.g. the *Tips from Former Smokers* campaign – one of the campaigns identified in the literature review in Chapter 2)
- Digital as a supplementary channel – where a campaign is run on mass media channels, but social media is used for nuanced targeted messages to specific groups (e.g. certain cultural groups, or geographical location).

These are not discrete categories, and campaign strategies sit along the spectrum of these descriptions, but this illustrates another complexity in our discussion of health campaign evaluations – that campaign evaluations often must include assessment of campaign impact across multiple media channels. The intensity of the evaluation of the campaign’s digital components needs to reflect the weight of digital channels in the campaign’s strategy.

These characteristics of digital health campaigns demonstrate that we can no longer continue with evaluating health campaigns in the same ways as previously carried out. The growing use of digital platforms for health campaigns prompts reconsideration of some of the fundamental assumptions of campaign evaluation, understanding of reach and measurement of campaign recognition.

7.4 Lessons from this research to improve practice

This section aims to highlight the unique contributions of the research presented in my thesis and focus on their implications for improving digital health campaign evaluations in practice. The main areas that require careful consideration are listed below.

- **Engagement metrics are not a proxy for campaign effects:** The findings of my thesis provide evidence to demonstrate that digital campaign evaluations should not comprise *only* of engagement metrics, as is currently often done. As demonstrated in Chapters 3, 4 and 5, large numbers for engagement metrics do not necessarily represent large numbers of people taking up the desired campaign message, or signify that the campaign has achieved its objectives. Campaign evaluations should not report engagement metrics alone, and evaluators must continue to conduct impact evaluations assessing campaign outcomes through conventional means, such as surveys about attitudes, knowledge and behaviours related to the health issue.
- **Interpreting engagement metrics with a critical eye:** Engagement metrics do have a role in campaign evaluations, and can be considered in terms of the categories: reach, initial engagement and deeper engagement (Section 6.2 and 7.2). However, as demonstrated in Chapters 5 and 6, engagement actions may have different meanings for each campaign, and therefore evaluators need to undertake further activities to understand the meanings of engagement actions for individual campaigns. This may involve using qualitative or mixed research methods to explore how specific engagement actions relate to the campaign's desired objective.
- **Changes to measuring campaign recognition:** Given the many different creative executions and formats of campaigns across the range of digital platforms, it is no longer sufficient to measure campaign recognition by asking only about one campaign image or message. Evaluators should include several images (or other multimedia assets) used across the different digital platforms in evaluation surveys to be able to accurately measure campaign recognition.
- **Blurring of lines between process and impact evaluations:** The interactive nature of digital media platforms means that reach and engagement metrics do not clearly fit within the categories of either process or impact evaluations, as they represent both the delivery of the campaign in real life, the audience's reaction to the campaign, as well as the actions that people took because of seeing the campaign. These characteristics of digital reach and engagement metrics blur the conventional delineation between process and impact

evaluation stages. As a result, evaluators should conduct and report both process and impact evaluations together for digital campaign evaluations.

As a result of these considerations, it is not appropriate to continue to use the approach outlined in Part B, Figure B.1 (p.36), where digital metrics are simply added to the conventional concept of a progression of campaign effects. Rather, I propose that digital campaign evaluations should be reframed, and give attention to collecting data for each of the key evaluation areas as shown below in Figure 7.6 and described in further detail in Table 7.3.

Conceptualising these as evaluation measure groupings as 'areas' (rather than as a continuum or progression) reflects the current situation of the lack of understanding of if, and how, these digital metrics relate to campaign effects. One of the main reasons for the lack of understanding is the scarcity of thorough digital campaign evaluations, which in turn stems from researchers not having a clear framework for conducting digital campaign evaluations. This is one of the most important contributions of my thesis: by proposing the key evaluation areas for digital health campaigns, I provide a way forward for the field, so that practitioners and evaluators can conduct more thorough digital campaign evaluations. In doing so, we can grow the body of evidence and develop a better understanding of how digital metrics relate to campaign effects.

It is worth noting that the proposed key evaluation areas for digital health campaigns shown in Figure 7.6 do not include campaign evaluation metrics related to priming steps and trialling behaviours (which are present in the conceptual framework in Part B, Figure B.1, p.36). This is because the research scope of this dissertation did not include identifying the relationship between digital campaign metrics and the process of behavioural change.

Figure 7.6 – Overview of proposed evaluation areas for digital health campaigns

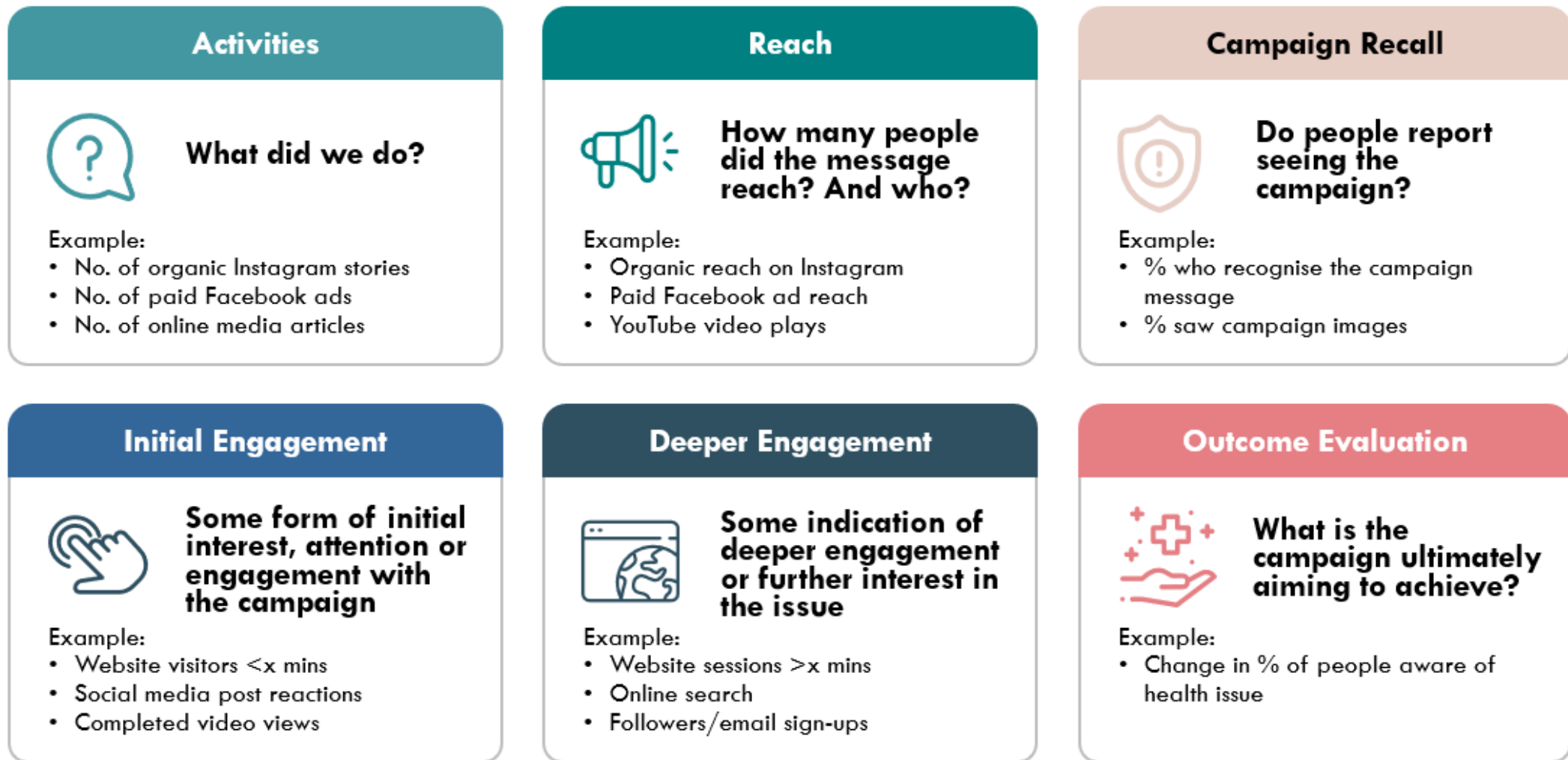








Table 7.3 – Proposed evaluation guide for digital health campaigns

| Evaluation area | Digital considerations | How can we measure it? | Examples of indicators |
|---|---|---|--|
| <p>Activities</p> <p><i>Detailed description of how the campaign message was actively disseminated</i></p>  | <p>With the multitude of digital channels, it is now a substantial undertaking to report all the different ways the campaign has been disseminated on both digital and non-digital channels.</p> <p>It is important to be explicit in describing the types of campaign content and where they were placed; and it is not sufficient to simply group them all together as ‘digital advertising’.</p> | <p>Detailed descriptive statements of the type of campaign content that was placed on each media channel. Where possible, financial spend for each activity should also be reported to provide indication of scale of activities.</p> | <ul style="list-style-type: none"> • No. of 15-sec non-skippable ads on YouTube • No. of organic Instagram stories • No. of sponsored Facebook posts with details of specific targeting (e.g. age group, geographical location, etc) • No. of online media articles • \$ spend on paid advertising for each platform (e.g. Facebook, display advertisements and Google) |
| <p>Reach</p> <p><i>How many people did the campaign message reach? And who?</i></p>  | <p>This is now one of the easiest to measure metrics, and measures actual reach (instead of estimated reach as was traditionally reported with broadcast media).</p> <p>It is important to note that in most instances, it is not possible to know whether it is the same people on the different platforms who have seen the campaign, and therefore reach data from different platforms cannot be summed together; nor can reach data for individual pieces of content.</p> | <p>Digital platforms use several terms to report reach, with common terms including: ‘reach’ (number of people who are shown the content), ‘impressions’ (number of times the content is shown) and ‘1-sec video views’ (as platforms usually auto-play videos).</p> | <p>Reach metrics for the key pieces of campaign content (aligning with creative and media spend/resourcing), e.g.:</p> <ul style="list-style-type: none"> • Total organic reach on Instagram for specified time period • Reach of Facebook paid advertisement • No. of impressions of Facebook paid advertisement • No. of YouTube video plays |
| <p>Campaign recall / recognition / attention</p> <p><i>Do people report seeing the campaign?</i></p>  | <p>With campaigns having different creative executions across the variety of digital media, survey questions asking about campaign recognition need to include the main variations of the campaign (e.g. a screenshot of feature video, popular social media post, key message from podcast or PR coverage, banner advertisement image, etc).</p> | <p>Pre- and post-campaign surveys asking about:</p> <ul style="list-style-type: none"> • Campaign recall (i.e. Have you seen/heard something about the health issue?) • Campaign recognition: <ul style="list-style-type: none"> ○ Have you seen any of these images? ○ Have you seen/heard any of these messages? | <ul style="list-style-type: none"> • % of people reported seeing something about this issue after the campaign, compared with before • % of people reported seeing each of the main campaign images • % of people reported seeing any of the campaign images • % of people reported seeing any of the campaign messages |
| <p>Initial engagement</p>  | <p>This is where many digital social media metrics fit. This is a new and emerging space, as this is something we have only been able to easily measure with digital platforms. However as discussed in this Chapter, it is</p> | <p>Engagement metrics are provided by social media platforms, website analytics and reports from media buyers. However, to</p> | <p>For websites:</p> <ul style="list-style-type: none"> • No. of website visitors • No. of website visits (<x mins) <p>For paid digital advertisements:</p> |

| Evaluation area | Digital considerations | How can we measure it? | Examples of indicators |
|---|--|--|---|
| <p><i>Indications of initial interest, attention or engagement with the campaign</i></p> | <p>important that evaluators further scrutinise engagement actions to understand their meaning and how they relate to individual campaigns.</p> | <p>understand the meaning of each engagement metric, evaluators need to conduct additional evaluation research activities, such as content analyses or focus groups.</p> | <ul style="list-style-type: none"> • No. of clicks <p>For social media posts:</p> <ul style="list-style-type: none"> • No. of clicks, reactions, comments, shares <p>For social media videos:</p> <ul style="list-style-type: none"> • No. of completed video views (on skippable advertisements) |
| <p>Deeper engagement</p>  <p><i>Indication of deeper engagement or further interest in the health issue</i></p> | <p>Similar to short-term outcomes, this is also an area where the digital platforms have allowed for much greater measurement. Some examples of this include: people exploring more about the campaign or health issue online via exploring the campaign website, online searches, following the campaign on social media, or signing up to an email list to receive more information.</p> | <p>This evaluation area can include both digital metrics (e.g. website visits, online searches), and non-digital metrics (e.g. calls to a hotline).</p> | <p>For websites:</p> <ul style="list-style-type: none"> • No. of website sessions >x mins • Average number of pages/session <p>For online search:</p> <ul style="list-style-type: none"> • No. of online searches using relevant keywords for a specified time period <p>For sign-ups:</p> <ul style="list-style-type: none"> • No. of new people subscribing to a mailing list • No. of new followers on Facebook/Instagram/YouTube <p>For downloads:</p> <ul style="list-style-type: none"> • No. of times campaign resources downloaded • No. of app downloads |
| <p>Outcome evaluation</p>  <p><i>What is the campaign ultimately aiming to achieve?</i></p> | <p>Principles of evaluating long-term outcomes remain largely unchanged for digital campaigns. In addition, digital platforms allow for a greater range of options in collecting outcome data – including online focus groups and SMS surveys.</p> | <p>Pre- and post-campaign surveys of target audience asking about awareness, attitudes, knowledge or behaviours about the issue.</p> | <ul style="list-style-type: none"> • Change in % of people who were aware of a health issue after the campaign compared with before • Change in % of people who asked health provider about the health issue after the campaign, compared with before |

** Note that the formative evaluation stage has not been included in this table. Formative evaluation and message testing are important activities in the campaign development stage (Bauman et al, 2006), however it has not been included in this table as it was not covered in the scope of this dissertation.*

7.5 Strengths and limitations

The main strength of this thesis is the comprehensive approach taken for the included campaign evaluations, particularly the inclusion of detailed process evaluation reporting alongside the impact and outcome evaluations. This is commonly not done well in published campaign evaluations [18], and contributes significantly to the lack of understanding of how digital metrics such as engagement and reach relate to campaign outcomes. It is only in doing so that we will be able to understand how digital measures of campaigns relate to impact and outcome evaluation measures. By placing them alongside each other in the campaign evaluations in this thesis, I was able to demonstrate that large numbers of reported reach and engagement do not necessarily lead to large numbers of people changing their attitudes and behaviours.

This thesis included varied health campaigns in terms of scale and public health issue, and this breadth is considered to be a strength of the thesis, as it is reflective of the diversity of public health campaigns implemented by government and non-government organisations. This composition of campaigns, combined with the pragmatic study designs, reflect real-world circumstances and therefore enhance the applicability of the findings of this research.

Another strength of the evaluation studies of this thesis is the close collaborations with health campaign organisers, and creative and communication agencies, which has enabled access to detailed process evaluation measures. These collaborations helped provide detailed information on campaign activity, exact media placements and budgets, changes in strategy during the campaign execution, and digital engagement metrics. Recognising the importance of drawing on expertise from the communications and marketing sector is also reflected in the use of literature from the marketing and advertising sector throughout this thesis, which is especially evident in the literature review (Chapter 2).

Another common theme running throughout this thesis is the use of multiple sources for evaluating a campaign. For example, surveying both clinicians and pregnant women in Section 3.3, conducting both a community survey and an antenatal clinic survey in Section 3.5, and conducting both an SMS community panel and a content analysis of Facebook comments for the evaluation presented in Chapter 4 and 5. Added to the detailed process evaluation reporting described above, this use of multiple sources allowed for triangulation of data, and made the evaluations more comprehensive and relevant.

Another strength of this research is the use of both quantitative and qualitative methods in campaign evaluations. For the *Shisha No Thanks* project evaluation, the use of both quantitative and

qualitative methods to evaluate one study provided a rich picture of the impact of the campaign on the target community. The use of the qualitative method of focus groups in Chapter 6 provided an understanding of how the digital campaign was received that would not otherwise have been possible through quantitative methods. The quantitative approach of the campaign evaluations in Chapter 3 and 4 were able to provide an estimate of magnitude of the impact of the campaign.

A final strength of this research is the focus on how to conduct holistic digital campaign evaluations, rather than focusing solely on how to use social media metrics. There is limited research available to compare the findings of this dissertation about how social media metrics fit with other campaign evaluation measures; which highlights a strength of this research in bringing this holistic and practical perspective, as many campaigns use multiple communication channels (not just social media).

One of the limitations of the campaign evaluations of this thesis was in recruiting only moderate sample sizes for evaluation surveys (Chapters 3 and 4), which is a common issue of campaign evaluations. As they are real-world evaluations, a pragmatic approach is necessary; for example the *Still Six Lives* campaign evaluation needed to adapt to changes in campaign schedule, and participant recruitment was hampered by the COVID-19 pandemic (Section 3.5). Strategies to address this challenge include evaluators working closely with the campaign implementation team to be aware of any changes in campaign timings, and ensuring that sufficient resources are available for the evaluation (e.g. for reimbursement of survey respondents).

Another limitation is that campaign evaluations can only ever measure association, not causation, as there are numerous contemporaneous factors that could influence a person's changes in awareness, attitudes and behaviours. For example, in Section 3.3, a sportsperson's personal experience published in the media could have had an impact on awareness of the health issue; in Section 3.5, concurrent clinical initiatives could have influenced levels of knowledge and awareness; and in Chapter 4, the concurrent community workshops that were conducted as part of the social marketing campaign could have influenced attitudes and awareness. The latter two examples illustrate the complexity of campaign evaluations, as it is best practice for campaigns to run in conjunction with other strategies and initiatives [19].

This thesis examines a variety of health issues, and therefore it is not clear whether the conclusions from each study can be generalised to campaigns on all health issues. For example, the campaign case study in Chapter 6 focuses on an uncontroversial health issue (healthy eating for school children), and therefore the identified motivations and barriers for engagement might not be relevant for a more controversial health issue. On the other hand, the campaign case study in

Section 3.5 focuses on a very emotive topic, and therefore the campaign messages may potentially be more resonant in comparison to other more commonplace health issues.

Finally, it is acknowledged that some data of this research was dependent upon data provided by social media platforms, and as noted in the literature review (in Chapter 2), there have been reports that these platforms have artificially inflated these numbers in the past. Furthermore, we are limited by the data that these platforms provide, as is the case in Chapter 5, where only a subset of the comments on the campaign video could be exported.

7.6 Future research needs

The ever-increasing dominance of digital media use in health campaigns means that this is a growing area of focus. This dissertation has highlighted some of the key areas that require further research going forward. Firstly, there are still significant limitations in our understanding of assessing whether a campaign's digital reach is adequate, i.e., there are no guidelines or benchmarks for campaign evaluators to use to compare whether the reach achieved by a campaign is considered to be reasonable or adequate. Such benchmarks will likely be dependent on a range of factors, including size of target audience, demographics of audience and their use of digital platforms, the topic or health issue, and the campaign spend. Increased reporting and publishing of campaign evaluations with these details will progress understanding on this issue, and in time, a review of published evaluations may allow analysis of how reach should be benchmarked and compared for digital campaigns (e.g. whether it is absolute reach, by proportion of target population, by campaign spend dollars, etc.).

Another important area that requires further research is in the current challenge in understanding how to combine data, such as reach and engagement metrics, from different digital media channels. Due to privacy and commercial factors, digital platforms (e.g. Google, Facebook) do not share sufficient data to allow researchers to easily understand if the same person has been counted in the Facebook reach, online PR reach and catch-up TV reach, or whether those numbers represent three different people. While the commercial sector has made progress in this kind of 'identity-based marketing', it involves substantial complexity and resourcing, and is still an emerging area [20]. The most important research question that needs to be addressed in this area is what proportion of reported reach on each digital platform represents people who have been 'counted' on multiple platforms? In order to explore this research question, exploratory research collaborating with advertising and data agencies may be beneficial in producing case studies of digital health campaigns

which are able to report estimated overall campaign reach across multiple platforms, based on data such as IP addresses, may be helpful.

As highlighted in Section 7.2 of this chapter, there is currently a great gap in our understanding of how online engagement actions should be interpreted in relation to a campaign, as the studies of this thesis have shown that not all engagement represents people who have been positively impacted by the campaign, and in fact some represent people who are against the campaign. More research studies assessing the meaning of online engagement actions for individual campaigns are required to contribute to meagre body of evidence that currently exists about the sentiments and motivations of online engagement with digital health campaigns. Research questions could include: how did people feel about the campaign when they took the engagement action (i.e. sentiment), what motivated people to take the engagement action (i.e. why did they engage?), and what did people do after taking the engagement action (i.e. what did they do as a result of the engagement?). The study design and methodologies of Chapter 5 and 6 in this thesis (i.e. content analysis of social media comments, and online focus groups) were effective to provide insight into these research questions, and could be replicated for other campaign evaluations, but it is also likely there are other study designs and methodologies that could be effective. Furthermore, recognising that these methods are resource-intensive, future research is also needed to develop and trial methods that could make assessing online engagement more practical and accessible for campaign evaluators. It is worth noting that there is an emerging area of using machine-learning to conduct content analyses of online content [21-23]. This method has some potential uses, but is still in its infancy and requires further trialling to understand whether it could be used routinely for digital health campaign evaluations, noting that its use would be primarily for campaigns that generate a high volume of online comments.

In addition, while the studies of this thesis have begun exploring online engagement actions in a deeper way, they have not been able to unpack if and how they relate to the existing advertising concepts of hierarchy of effects. Future research examining the current assumptions in the literature of how online engagement actions fit with the hierarchy of effects model would be beneficial, and would then allow for testing of such assumptions.

Overall, one of the key research questions that need to be addressed in this space is for individual campaigns, whether taking a specific online engagement action (e.g. a comment, video view, link click, etc.) is associated with a positive campaign outcome (e.g. increased knowledge or intention to take up the behaviour change). In theory, this question could be addressed by a study design comparing the likelihood of a positive campaign outcome among people who took an engagement

action with people who did not, but in practice there are challenges of identifying and recruiting people who took an engagement action online (e.g. privacy issues in contacting people via social media without their prior permission, or recall issues of requiring people to retrospectively describe their online engagement actions). Even if such research could be conducted, the results would only indicate if an association was present, and not demonstrate causation; i.e. whether the online engagement action promoted subsequent positive campaign outcome, or whether the online engagement action was a result of being positively impacted by the campaign.

Ultimately, one of the most fundamental gaps in our understanding in this area is whether there is any relationship between people's online engagement actions and the actual process of behaviour change. The evaluation case studies of this thesis found that there is no clear correlation between engagement metrics and impact evaluation results. Whilst this is suggestive there is no relationship between online engagement actions and behaviour change, there remains important research questions such as: for each specific type of online engagement action (e.g. comments, shares, video views, clicks), are people who undertake that actions are then more likely to progress to take up a behaviour change? If so, is this through the path of being more likely to take up priming steps or trialling behaviours first, or are online engagement actions a replacement for traditional priming steps or trialling behaviours? And do online engagement actions fit in existing theories of behaviour change used in health campaigns (e.g. transtheoretical model/stages of change, social cognitive theory, etc), and if so, how? While addressing these research questions would provide vital knowledge in understanding how online engagement actions fit with campaign mechanics and therefore in an evaluation framework, research into this area is beyond the field of public health alone, and requires input and expertise from the field of behavioural psychology.

Finally, I acknowledge that this dissertation does not explore the formative evaluation phase of developing and testing digital health material for use in campaigns. Formative evaluations are critical in campaign development [1, 24], and some digital technologies have the potential to be very useful for formative evaluations (e.g. social media could be a quick and valuable way of testing campaign messages). However, there is currently limited in-depth research that has been published on how digital media technologies could help facilitate formative evaluations of digital health campaigns.

7.7 Conclusion

Digital media platforms have distinctively changed health campaigns; they are here to stay and are likely to continue to evolve rapidly. Health campaigns have long been a valuable strategy in the health promotion playbook, and so it is necessary for the sector to develop our understanding of best-practice digital health campaigns. To do so, we need to know how to appropriately evaluate digital health campaigns. My dissertation has outlined many of the challenges and considerations that have arisen in shifting from our conventional understanding of campaign evaluation, to one that is more appropriate for digital campaigns. The use of digital media platforms in health campaigns has provided us with an increased ability to understand who might be reached by a campaign, who might interact with it, what they may do as a result of seeing the campaign, and ultimately how we can best use digital health campaigns to contribute to improving population health outcomes.

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Appendix 1:
AUTHOR CONTRIBUTIONS

Review of Evaluation Metrics Used in Digital and Traditional Tobacco Control Campaigns

Lilian Chan, Blythe O'Hara, Philayrath Phongsavan, Adrian Bauman, Becky Freeman

Journal of Medical Internet Research 2020, 22(8):e17432; doi: 10.2196/17432

Included in Chapter 2

Lilian Chan's contribution to this paper:

- Conceptualised the study and research questions
- Developed the literature review search strategy
- Conducted the literature searches and reviewed search results to identify papers for inclusion
- Extracted data
- Developed conceptual framework
- Conducted and interpreted all analyses
- Drafted and edited the manuscript, incorporated input from co-authors, and responded to journal reviewers' comments

Co-authors' contributions:

- BOH contributed to study design and the search strategy, reviewed search results to identify papers for inclusion, contributed to interpretation of all analyses, contributed to the review and editing of the paper
- PP contributed to interpretation of analyses, and contributed to the review and editing of the paper
- AB contributed to interpretation of analyses, and contributed to the review and editing of the paper
- BF contributed to study design and the search strategy, reviewed search results to identify papers for inclusion, contributed to interpretation of analyses, contributed to the review and editing of the paper

Evaluation of *Movements Matter*: A social media and hospital-based campaign aimed at raising awareness of decreased fetal movements

Lilian Chan, Adrienne Gordon, Kara Warrilow, Aleena Wojcieszek, Tracy Firth, Felicity Loxton, Adrian Bauman, Vicki Flenady

Australian and New Zealand Journal of Obstetrics and Gynaecology 2021 Dec; 61(6):846-854. doi: 10.1111/ajo.13360

Included in Chapter 3

Lilian Chan's contribution to this paper:

- Contributed to the study design and development of the data collection tools
- Conducted data cleaning, analysis and interpretation
- Conceptualised and designed manuscript development
- Drafted and edited the manuscript, incorporated input from co-authors, and responded to journal reviewers' comments

Co-authors' contributions:

- AG contributed to the conceptualisation of the study, development of data collection tools, interpretation of the findings, and to the review and editing of the paper
- KW managed data collection, contributed to the review and editing of the paper
- AW contributed to the review and editing of the paper
- TF contributed to the review and editing of the paper
- FL contributed to the review and editing of the paper
- AB contributed to the conceptualisation of the study, study design and development of the data collection tools, supervised data analysis, contributed to interpretation of the findings, and contributed to the review and editing of the paper
- VF supervised the study design, contributed to the review and editing of the paper

Evaluating the reach and impact of *Still Six Lives*: A national stillbirth public awareness campaign in Australia

Lilian Chan, Katherine B Owen, Christine J Andrews, Adrian Bauman, Leigh Brezler, Keren Ludski, Jacquelyn Mead, Karin Birkner, Ajay Vatsayan, Vicki J Flenady, Adrienne Gordon

Accepted by ***Women and Birth***

Included in Chapter 3

Lilian Chan's contribution to this paper:

- Contributed to the conceptualisation of the study and study design
- Managed the study and designed the data collection tools
- Conducted data cleaning and interpretation of findings
- Conceptualised and designed manuscript development
- Drafted and edited the manuscript, incorporated input from co-authors, and responded to journal reviewers' comments

Co-authors' contributions:

- KBO conducted the data cleaning and analysis and contributed to the interpretation of findings and the review and editing of the paper
- CJA contributed to the design of the study and the data collection tools, to interpretation of analyses, and to the review and editing of the paper
- AB co-led the conceptualisation of the study and the study design, contributed to the data collection tools, analysis and interpretation of data, and to the design, drafting, review and editing of the manuscript.
- LB contributed to interpretation of analyses, and to the review and editing of the paper
- KL contributed to interpretation of analyses, and to the review and editing of the paper
- JM contributed to interpretation of analyses, and to the review and editing of the paper
- KB collected data and contributed to the review and editing of the paper
- AV contributed to data collection
- VJF acquired funding for the study and contributed to the design of the study, and to review and editing of the manuscript
- AG acquired funding for the study, co-led the conceptualisation of the study and the study design, and contributed to the design of the data collection tools, to interpretation of analyses, and to the review and editing of the paper

A Case Study of an SMS Text Message Community Panel Survey and Its Potential for Use During the COVID-19 Pandemic

Lilian Chan, Nouhad El-Haddad, Becky Freeman, Blythe J O'Hara, Lisa Woodland, Ben Harris-Roxas

JMIR Formative Research 2021;5(11):e28929; doi: 10.2196/28929

Included in Chapter 4

Lilian Chan's contribution to this paper:

- Contributed to conceptualisation of study and study design
- Co-led development of data collection tool
- Conceptualised and designed manuscript development
- Drafted and edited the manuscript, incorporated input from co-authors, and responded to journal reviewers' comments

Co-authors' contributions:

- NE contributed to conceptualisation of study and study design, co-led development of data collection tool, conducted data collection and cleaning
- BF contributed to conceptualisation of study, study design, and to the review and editing of the paper
- BOH contributed to the review and editing of the paper
- LW contributed to conceptualisation of study, study design, and to the review and editing of the paper
- BHR led the conceptualisation of study, contributed to the study design and manuscript development, and to the review and editing of the paper

Evaluation of 'Shisha No Thanks' - a co-design social marketing campaign on the harms of waterpipe smoking

Lilian Chan, Nouhad El-Haddad, Becky Freeman, Ross MacKenzie, Lisa Woodland, Blythe J O'Hara, Ben F Harris-Roxas

BMC Public Health 2022 Feb 24;22(1):386. doi: 10.1186/s12889-022-12792-y

Included in Chapter 4

Lilian Chan's contribution to this paper:

- Contributed to conceptualisation of study and study design
- Co-led development of data collection tool
- Conducted all data analysis
- Led interpretation of analysis
- Conceptualised and designed manuscript development
- Drafted and edited the manuscript, incorporated input from co-authors, and responded to journal reviewers' comments

Co-authors' contributions:

- NE contributed to conceptualisation of study and study design, co-led development of data collection tool, conducted data collection and cleaning
- BF contributed to conceptualisation of study, study design, interpretation of analyses, and to the review and editing of the paper
- RM contributed to conceptualisation of study, study design, interpretation of analyses, and to the review and editing of the paper
- LW acquired funding for the study, contributed to conceptualisation of study, study design, and to the review and editing of the paper
- BOH supervised data analysis, contributed to interpretation of analyses and to the review and editing of the paper
- BHR acquired funding for the study, led the conceptualisation of study, contributed to the study design, interpretation of analyses, and to the review and editing of the paper

Attitudes towards the ‘Shisha No Thanks’ campaign video: Content analysis of Facebook comments

Lilian Chan, Ben Harris-Roxas, Becky Freeman, Ross MacKenzie, Lisa Woodland, Blythe J O’Hara

Tobacco Induced Diseases 2022;20(October):88. doi:10.18332/tid/153543

Included in Chapter 5

Lilian Chan’s contribution to this paper:

- Conceptualised and designed the mixed methods study
- Conducted the data collection, cleaning and coding
- Conducted data analysis, and led interpretation of analysis
- Conceptualised and designed manuscript development
- Drafted and edited the manuscript, incorporated input from co-authors, and responded to journal reviewers’ comments

Co-authors’ contributions:

- BHR contributed to study design, interpretation of analyses and to the review and editing of the paper
- BF contributed to study design, interpretation of analyses and to the review and editing of the paper
- RM contributed to interpretation of analyses and to the review and editing of the paper
- LW contributed to study design, acquisition of data, and to the review and editing of the paper
- BOH conducted data coding, provided oversight to the analyses and interpretation of analyses, contributed to manuscript development, and to the review and editing of the paper

Online engagement and perceptions of a nutrition website and campaign aimed at helping families pack a healthy lunch box

Lilian Chan, Becky Freeman, Korina Richmond, Clare Hughes, Jane Dibbs, Nina Tan, Blythe J O'Hara

*Submitted to **Public Health Nutrition***

Included in Chapter 6

Lilian Chan's contribution to this paper:

- Conceptualised and designed the qualitative study
- Conducted the data collection, coding, analysis and interpretation
- Conceptualised and designed manuscript development
- Drafted and edited the manuscript, incorporated input from co-authors, and responded to journal reviewers' comments

Co-authors' contributions:

- BF contributed to the study design, conducted data collection, and contributed to the interpretation of analyses, conceptualisation of manuscript and to the review and editing of the paper
- KR contributed to study design, interpretation of analyses and to the review and editing of the paper
- CH contributed to study design, interpretation of analyses and to the review and editing of the paper
- JD contributed to study design, interpretation of analyses and to the review and editing of the paper
- NT contributed to study design, interpretation of analyses and to the review and editing of the paper
- BOH contributed to the study design, conducted data collection, supervised data coding and interpretation of analyses, contributed to conceptualisation of manuscript, and to the review and editing of the paper

How and why do people engage with health campaigns on social media?

Lilian Chan, Becky Freeman, Clare Hughes, Korina Richmond, Jane Dibbs, Blythe J O'Hara

*Under Review with **Health Promotion International***

Included in Chapter 6

Lilian Chan's contribution to this paper:

- Conceptualised and designed the qualitative study
- Conducted the data collection, coding, analysis and interpretation
- Conceptualised and designed manuscript development
- Drafted and edited the manuscript, incorporated input from co-authors, and responded to journal reviewers' comments

Co-authors' contributions:

- BF contributed to the study design, conducted data collection, and contributed to the interpretation of analyses, conceptualisation of manuscript and to the review and editing of the paper
- CH contributed to study design and to the review and editing of the paper
- KR contributed to study design and to the review and editing of the paper
- JD contributed to study design and to the review and editing of the paper
- BOH contributed to the study design, conducted data collection, supervised data coding and interpretation of analyses, contributed to conceptualisation of manuscript, and to the review and editing of the paper

Stillbirth in Australia 4: Breaking the Silence: Amplifying Public Awareness of Stillbirth in Australia

Adrienne Gordon, Lilian Chan, Christine Andrews, Keren Ludski, Jacquelyn Mead, Leigh Brezler, Claire Foord, Justin Mansfield, Philippa Middleton, Vicki J. Flenady, Adrian Bauman

Women and Birth 2020 Nov;33(6):526-530. doi: 10.1016/j.wombi.2020.09.010

Included in Appendix 5

Lilian Chan's contribution to this paper:

- Contributed to the review and editing of the paper

Co-authors' contributions:

- AG conceptualised and designed manuscript development, drafted and edited the manuscript, incorporated input from co-authors, and responded to journal reviewers' comments
- CA contributed to the review and editing of the paper
- KL contributed to the review and editing of the paper
- JM contributed to the review and editing of the paper
- LB contributed to the review and editing of the paper
- CF contributed to the review and editing of the paper
- JM contributed to the review and editing of the paper
- PM contributed to the review and editing of the paper
- VJF contributed to the review and editing of the paper
- AB contributed to conceptualisation and manuscript design, and to the drafting, reviewing and editing of the paper

Appendix 2:

SUPPLEMENTARY MATERIAL

This appendix contains all supplementary material from the published and submitted papers included in this dissertation.

Stage 1a: Eligibility criteria for peer-review articles

Inclusion criteria

- Articles that included evaluation of a specific tobacco-related program that had a mass media campaign component. Campaigns were defined as purposive, public sector efforts to inform and influence a population or large segment of the population.

Exclusion criteria

- Did not reference a specific campaign by name.
- Article reported on recruitment of intervention participants using digital platforms.
- Intervention did not have a mass communication component.
- Experimental studies (not in real-world setting).
- Analyses of media or online coverage of tobacco messages.
- Formative research into message testing, or media use patterns to inform campaign design.
- Studies focused on validating scales by using a specific campaign as a case study.
- Studies that compared multiple campaigns, without evaluation of individual campaigns.

Stage 1b: Eligibility criteria for marketing reports

Inclusion criteria

- Reports that described tobacco control campaigns, regardless of whether evaluation results were included in the marketing report.
- Campaigns that included short period burst campaigns, or campaigns that drove audience to cessation services.
- Reports about individual initiatives that were part of a larger campaign.

Exclusion criteria

- Campaigns which were not specifically tobacco-related (e.g. heart health campaigns).
 - Marketing campaigns by tobacco companies.
 - Single public relations (PR) event campaigns and advocacy campaigns (e.g. introducing policy
-

about plain packaging) due to the different nature of intended outcomes.

Stage 2: Eligibility criteria for campaigns***Inclusion criteria****Campaign criteria*

- Sufficient detail about how the campaign was conducted, including the media platforms employed, and how each platform was used.* Information about financial spend on each platform was useful, but not essential.
- Primary purpose of the intervention was campaign-related, with specific activities to promote a campaign message.
- Campaign included at least one digital component, with sufficient details of what the digital component involved.
- Campaign activities could be paid or unpaid.

Evaluation criteria

- Sufficient details on the methodology of how the evaluation was conducted.*

Exclusion criteria

- Insufficient information to assess the campaign activities, i.e. only general descriptions of campaign activities, such as 'digital advertising' or 'social media campaigns' with no further details provided.*
- Campaigns targeting e-cigarettes and waterpipe smoking.

*Information sourced from peer-reviewed journal articles or campaign reports (marketing literature or other grey literature). If available, additional information from websites or social media sites was used to help supplement this process.

Table 4 - Tobacco control campaigns including a digital media component and their evaluation methods

| CAMPAIGN | EVALUATION STUDY/ SOURCE | EVALUATION LEVEL | SUMMARY OF EVALUATION METHODS AND MEASURES |
|---|--|---|---|
| <p>16 Cancers (2015) A state-wide campaign in Australia that ran for four months, raising awareness of the range of cancers associated with smoking by sharing emotional and graphic images and stories. The campaign used TV, digital platforms, radio, and out-of-home ads.</p> | <p>Allom et al., 2018 [37] Pettigrew et.al, 2018 [38]</p> | <p><i>Awareness, Proximal Impact (Engagement) and Distal Impact Measures</i></p> | <p>Cost-effectiveness time-series study assessing number of ‘campaign events’ (website visits, calls to telephone service, registrations to smoking cessation service or requests for QuitKit) for each burst of the campaign which used different media. Also measured campaign awareness for each campaign burst through a telephone survey.</p> |
| <p>Be a Failure (2017) A national campaign in Canada that ran for five months, encouraging smokers to understand that cessation often takes many quit attempts. The campaign used digital video, social media and out-of-home ads.</p> | <p>‘Ministry of Health and Long-Term Care: Be a Failure’ case study, 2018 [36]</p> | <p><i>Process, Awareness, Proximal Impact (Engagement), Proximal Impact (Priming Steps) Measures</i></p> | <p>Pre- and post-campaign market research survey asked smokers about campaign awareness, attitudes around quit attempts, intention to quit and whether they had sought out more information. Also used data from Google Analytics about traffic to campaign website. Campaign KPIs suggest process evaluation measures, but results not reported.</p> |
| <p>Break it Off (2012) A national campaign in Canada that ran for three months, encouraging young adult smokers to quit smoking by likening it with ending an unhealthy relationship. The campaign used a social marketing approach and was promoted using paid online and social media ads.</p> | <p>Baskerville, Azagba, Norman, McKeown & Brown, 2016 [60]</p> | <p><i>Proximal Impact (Engagement), Proximal Impact (Priming Steps), Distal Impact and Outcome Measures</i></p> | <p>Quasi-experimental study with an intervention and a comparison group (participants of a different intervention). Participants’ intention to quit, actions towards quitting, and 7- and 30- day abstinence rates were measured pre- and post- campaign via questionnaires. Study also reported website visits, installations of smartphone app and social media engagement metrics.</p> |

| CAMPAIGN | EVALUATION STUDY/ SOURCE | EVALUATION LEVEL | SUMMARY OF EVALUATION METHODS AND MEASURES |
|--|--|---|--|
| <p>Fingerband campaign (2015) A national campaign in Korea that targeted teenage smokers. The campaign used digital content, including a ‘web-toon’ and ‘web-drama’, as well as distributing physical campaign merchandise (wristbands with the campaign logo).</p> | <p>‘Ministry of Health and Welfare: The Fingerband campaign’ case study, 2016 [25]</p> | <p><i>Process, Awareness, Proximal Impact (Engagement) and Outcome Measures</i></p> | <p>The main evaluation measure of the campaign was teen population smoking rates over time. Also reported number of campaign participants, number of wristbands distributed and digital metrics such as campaign digital content views, comments, and review scores.</p> |
| <p>Keep Trying (2013) A state-wide campaign in Canada that ran for four weeks, targeting women aged 25-40 years who were smokers. The campaign used online, radio and OOH ads.</p> | <p>‘Alberta Health Service: Tobacco Cessation – Keep trying’ case study, 2015 [61]</p> | <p><i>Proximal Impact (Engagement) and Distal Impact Measures</i></p> | <p>Campaign evaluation consisted of measuring campaign website traffic, and registrations for cessation support services on the website.</p> |
| <p>No judgements. Just help (2014) A state-wide campaign in the USA that encouraged smokers to contact the redesigned smoking cessation service. The campaign used TV, radio, print, OOH and digital ads.</p> | <p>Keller et al., 2016 [72]</p> | <p><i>Proximal Impact (Engagement), Distal Impact and Outcome Measures</i></p> | <p>Observational study of smokers who utilised the quit service with data collected at registration and at a seven month follow up survey. Measures included quit attempts, and 30-day abstinence rates. The evaluation also used telephone service provider reports and Google Analytics to measure calls to cessation service, website visits and registrations to quit service.</p> |
| | <p>QUITPLAN Service: No judgements. Just help.’ case study, 2015 [62]</p> | <p><i>Proximal Impact (Engagement) and Distal Impact Measures</i></p> | <p>Evaluation reported number of phone calls, web page views, quitting starter kit requests, with data from service provider and Google Analytics.</p> |

| CAMPAIGN | EVALUATION STUDY/ SOURCE | EVALUATION LEVEL | SUMMARY OF EVALUATION METHODS AND MEASURES |
|--|---|---|---|
| <p>Personal Testimonies (Make Smoking History) (2012)</p> <p>A state-based campaign in Australia that ran for two months, targeting 25-39 year old male smokers by sharing the personal testimonies of two smokers. The campaign used print, radio and online ads.</p> | Clayforth et al., 2014 [59] | <i>Proximal Impact (Engagement) and Distal Impact Measures</i> | Cost-effectiveness time-series study assessing number of campaign responses (calls to telephone service, accessing specific web address provided, web searches to locate the website and registrations to smoking cessation service) for each burst of the campaign which used different media. |
| <p>Quit the Denial (2013)</p> <p>A state-based campaign in Canada targeting young adults, using humour to challenge the social norm of acceptability of ‘social smoking’. The campaign was run predominately online using video and display ads, in addition to out-of-home promotions.</p> | Ontario Ministry of Health and Long-Term Care: Social smoking campaign’ case study, 2014 [26] | <i>Process, Awareness, Proximal Impact (Engagement), and Proximal Impact (Priming Steps) Measures</i> | Evaluation reported process measures of video views, “earned impressions”, and number of “social smokers” reached. Also reported engagement measures of proportion of people talking about ‘social smoking’ online and in social media, proportion who sought further information, and priming step measures of knowledge and attitudes (but unclear how this data was obtained). |
| <p>SmokeFree Teen (2013)</p> <p>A national campaign in the USA that ran for almost three months, aimed at encouraging adolescent smokers to access smoking cessation resources. The campaign used TV, radio, online and social media ads.</p> | Sanders et al., 2018 [8] | <i>Process, Awareness, Proximal Impact (Engagement), and Distal Impact Measures</i> | Evaluation using digital metrics to collect data on exposure to digital ads, clicks on campaign ads, and campaign outcomes (visits to campaign website, sign-ups to SMS program, smartphone app downloads, Facebook fans and Twitter followers). |

| CAMPAIGN | EVALUATION STUDY/ SOURCE | EVALUATION LEVEL | SUMMARY OF EVALUATION METHODS AND MEASURES |
|---|---|--|---|
| <p>Stop before the suffering starts (Breathless & Symptoms) (2013)</p> <p>A national campaign in Australia that ran for three months to encourage quit attempts by highlighting the pain associated with smoking-related illnesses. The campaign used TV, print, out-of-home and online video ads.</p> | Myers & Blackmore, 2013 [14] and von Weiler, Bayard & Sheard, 2014 [39] | <p><i>Process, Awareness, Proximal Impact (Engagement), Proximal Impact (Priming Steps) and Distal Impact Measures</i></p> | Process measures of TARPS reported for television ads. Telephone interviews were conducted to measure campaign awareness, channel attribution, campaign response, beliefs about health harms of smoking, attitudes towards smoking, intention to quit, actions towards a quit attempt and actual quit attempts. |
| <p>Stoptober (2012 – present)</p> <p>A national campaign that has been run annually in the UK every October. The campaign aims to create a social movement to encourage people to quit smoking. It is a social marketing campaign that uses TV, print, radio, online and social media promotions.</p> | Brown et al., 2014 [74] | <i>Distal Impact Measures</i> | Monthly nationally representative household surveys conducted in the years prior to the campaign, and in the first year of the campaign, measuring past-month quit attempt rates. |
| | Arden, Buckley, Hirst, Shardlow & Walmsley, 2016 [67] | <p><i>Proximal Impact (Engagement), Proximal Impact (Priming Steps), Distal Impact and Outcome Measures</i></p> | Using Public Health England’s Tobacco Simulation Model, the evaluation estimated number of quit attempts, successful quit attempts (greater than 4 weeks) in the population, proportion who used the campaign support tools, and proportion who believed lots of people were quitting together. The evaluation also reported cigarette sale volumes, internet search term volumes, and ‘social mentions’. |
| | Public Health England: Stoptober 2016 Facebook Messenger Bot’ case study, 2017 [69] | <i>Proximal Impact (Engagement)</i> | Evaluation reported number of people using the campaign Facebook Messenger Bot, and engagement with the email communications. |
| | Public Health England, 2017 [75] | <p><i>Awareness, Proximal Impact (Engagement), Distal Impact and Outcome Measures</i></p> | Online interviews with current and recent ex-smokers to measure brand awareness, quit attempts and sustained quit attempts. Digital metrics were collected to identify uptake of the Facebook Chatbot |

| CAMPAIGN | EVALUATION STUDY/ SOURCE | EVALUATION LEVEL | SUMMARY OF EVALUATION METHODS AND MEASURES |
|--|--|---|--|
| | Public Health England, 2018 [63] | <i>Awareness, Proximal Impact (Engagement), Distal Impact and Outcome Measures</i> | Using marketing and advertising tracking surveys, the evaluation collected measures of brand awareness, response to campaign message quit attempts and sustained quit attempts It also used digital metrics to measure campaign-related online searches, website visits, downloads of app, sign-ups to eCRM programme and uptake of Facebook Chatbot. |
| Take it right outside (2014) A national campaign in Scotland that ran for four months, aiming to educate smokers who are parents on the dangers of secondhand smoke for their children. The campaign used TV, radio, out-of-home and online ads. | ‘Scottish Government: Second-hand Smoke – Take it right outside’ case study, 2014 [70] | <i>Proximal Impact (Priming Steps)</i> | Survey to measure knowledge of effect of secondhand smoke on children, and attitudes about whether it is acceptable to smoke around children. |
| | Rowa-Dewar & Amos, 2016 [55] | <i>Awareness and Outcome Measures</i> | Pre- and post-campaign semi-structured interviews with parents measuring campaign awareness, message response, and behavioural change. |
| | Progressive, 2014 [40] | <i>Awareness, Proximal Impact (Engagement), Proximal Impact (Priming Steps), Distal Impact Measures</i> | Face-to-face interviews, with optional self-complete questionnaire to measure campaign awareness (for each media channel used), actions taken as a result of the ad, smoking behaviours around children, attitudes about smoking and perceived risk of secondhand smoke to children. |
| The Facts Now (2015) A state-wide campaign in the USA targeting teens and young adults. The campaign was primarily online, using shareable content, but also utilised events, TV and radio promotions. | Tobacco Free Florida: Auctioneer’ case study, 2016 [27] | <i>Proximal Impact (Engagement) and Outcome Measures</i> | The evaluation reported website visits and engagements, Twitter followers and engagements, Facebook fans and engagements and YouTube views. It also cited the population teen smoking rate. |
| The Real Cost (2014 – present) A multi-year national campaign in the USA aimed at preventing youth (12-17 year olds) | Duke et al., 2015 [15] | <i>Awareness Measures</i> | Longitudinal in-person and online survey with target audience measuring campaign awareness, brand awareness and perceived effectiveness of the campaign message. |

| CAMPAIGN | EVALUATION STUDY/ SOURCE | EVALUATION LEVEL | SUMMARY OF EVALUATION METHODS AND MEASURES |
|---|---|---|--|
| from becoming smokers. The campaign used TV, radio, print, out-of-home digital and social media promotions. | Farrelly et al., 2017 [41] | <i>Awareness and Outcome Measures</i> | Cohort study of online or in-person interviews pre- and post-campaign, collecting data on self-reported campaign exposure, frequency of exposure, and smoking initiation. |
| | Huang et al., 2017 [42] | <i>Awareness and Proximal Impact (Priming Steps) Measures</i> | Telephone survey measuring campaign awareness, attitudes about tobacco products, and risk perceptions of smoking. |
| | Kranzler, Gibson & Hornik, 2017 [43] | <i>Awareness and Proximal Impact (Priming Steps) Measures</i> | Observational study using telephone survey to measure recall of campaign ad, anti-smoking beliefs targeted by the campaign and intention to smoke. |
| | Chew, Kim, Chen, Ruddle & Morgan-Lopez, 2018 [77] | <i>Process Measures</i> | Social network analysis of Twitter accounts that helped maximise the reach of the campaign message. |
| | MacMonegle et al., 2018 [78] | <i>Cost-effectiveness evaluation</i> | Cost-effectiveness evaluation of campaign based on cost per quality-life adjusted year saved, and monetary return on investment. |
| | Food and Drug Administration: Little Lungs' case study, 2017 [29] | <i>Process and Proximal Impact (Engagement) Measures</i> | Evaluation of the online stop-animation video series reported number of views on YouTube, Facebook and Instagram, and number and rate of 'social engagements'. |
| | Duke et al., 2018 [16] | <i>Awareness and Proximal Impact (Priming Steps) Measures</i> | Longitudinal study with a baseline survey and two post-campaign follow-up surveys. Measured tobacco-related beliefs (both related to campaign, and not related to campaign). Exposure to campaign measured by self-report and based on market-level TARPs. |

| CAMPAIGN | EVALUATION STUDY/ SOURCE | EVALUATION LEVEL | SUMMARY OF EVALUATION METHODS AND MEASURES |
|---|--|--|---|
| The Smoking Kid (2012) A national campaign in Thailand that used a single video on social media to encourage introspection among smokers to motivate them to quit smoking. | THPF: The Smoking Kid – A personal message to smokers’ case study, 2013 [28]; and ‘Thai Health Promotion Foundation: Smoking kid’ case study, 2015 [73] | <i>Process and Distal Impact Measures</i> | Evaluation reported number of YouTube video views, earned media value and number of calls to smoking cessation service. |
| Tips from Former Smokers (2012 - present) A multiyear national campaign in the USA that shares testimonies from people who live with tobacco-related diseases. The campaign uses TV, radio, out-of-home, digital video, digital display, search and social media ads. | Augustson et al., 2012 [65] | <i>Proximal Impact (Engagement) and Distal Impact Measures</i> | Analysis of smoking cessation phone service call volume and website visits data before, during and immediately after campaign period (using data from service provider and web metrics). |
| | McAfee, Davis, Alexander, Pechacek & Bunnell, 2013 [44] | <i>Awareness, Distal Impact and Outcome Measures</i> | Cohort study of smokers and non-smokers with baseline and follow-up surveys measuring quit attempts, sustained quit attempts, cessation recommendation to friends/family over previous three months and campaign awareness. |
| | Bright et al., 2013 [66] | <i>Proximal Impact (Engagement) and Distal Impact Measures</i> | Analysis of smoking cessation phone service call volume and website visits before, during and after campaign (using data from service provider and web metrics). Evaluation examined the effect of ‘pulsing’ the national television ads whilst local television and online ads ran continuously. |
| | Duke, Hansen, Kim, Curry & Allen, 2014 [79] | <i>Process Measures</i> | Descriptive overview of how state tobacco control programs used and disseminated campaign content on social media (Facebook, Twitter and YouTube). |
| | Emery, Szczypka, Abril, Kim & Vera, 2014 [56] | <i>Awareness Measures</i> | Assessed Twitter content related to campaign for relevance, message content, and ‘fear’ appeal characteristics. |

| CAMPAIGN | EVALUATION STUDY/ SOURCE | EVALUATION LEVEL | SUMMARY OF EVALUATION METHODS AND MEASURES |
|----------|---|---|--|
| | Zhang, Vickerman, Malarcher & Mowery, 2014 [17] | <i>Distal Impact and Outcome Measures</i> | Measured cessation outcomes (24hr quit attempt and 7+ days abstinence) of people who used Quitline phone services, and analysed in relation to campaign exposure (based on GRPs of area code). |
| | Ayers, Althouse & Emery, 2015 [68] | <i>Proximal Impact (Engagement)</i> | Measured Google searches for campaign-related keywords (e.g. amputation, asthma and smoking) and cessation-related searches before and during campaign. |
| | Chung, 2015 [30] | <i>Process, Awareness and Proximal Impact (Engagement) Measures</i> | Quantitative (number of views and comments) and qualitative (sentiment and content analysis) evaluation of campaign's YouTube videos. |
| | Davis et al., 2015 [18] | <i>Distal Impact Measures</i> | Analysed call volume to Quitline relative to the weekly media market level campaign GRPs for television and radio. |
| | Duke et al., 2015 [45] | <i>Awareness and Proximal Impact (Priming Step) Measures</i> | Longitudinal online survey examining relationship between exposure to the campaign and changes in beliefs, tobacco related cognitions and intentions to quit smoking. |
| | Huang et al., 2015 [46] | <i>Awareness, Proximal Impact (Priming Step) and Distal Impact Measures</i> | Pre- and post-campaign cohort study, assessing knowledge of smoking risks, awareness and use of cessation resources and quitting behaviours in relation to exposure to campaign ads. |
| | Komfield, Smith, Szczypka, Vera & Emery, 2015 [5] | <i>Process and Proximal Impact (Engagement) Measures</i> | Sampling of online media sites to identify coverage of campaign. Identified content was coded for content, inclusion of multimedia and measures of audience engagement. |

| CAMPAIGN | EVALUATION STUDY/ SOURCE | EVALUATION LEVEL | SUMMARY OF EVALUATION METHODS AND MEASURES |
|----------|--|--|---|
| | Xu et al., 2015 [80] | <i>Cost-effectiveness evaluation</i> | Cost-effectiveness evaluation based on cost per successful quit, cost per premature death averted, cost per life year saved, and cost per quality-adjusted life year gained. Behavioural outcomes measures based on McAfee et al., 2013 study. |
| | Zhang, Vickerman, Malarcher & Carpenter, 2015 [81] | <i>Process and Awareness Measures</i> | Examined caller characteristics to smoking cessation phone service during campaign period compared with a similar period in the previous year. Also examined how callers had heard about the quit service (e.g. television media, other media, referral) |
| | Chung, 2016 [82] | <i>Process Measures</i> | Identified parties who tweeted about the campaign on Twitter, and who played central roles in disseminating health campaign messages. |
| | Davis et al., 2016 [19] | <i>Process and Awareness Measures</i> | Assessed the effect of variation in dose of digital video and television ads on awareness of campaign through setting up different doses in different media markets. Measured self-reported exposure to campaign, media format they recall seeing campaign and frequency. |
| | Kim et al., 2016 [24] | <i>Process and Proximal Impact (Engagement) Measures</i> | Collected data from a web panel tracking measuring visits to campaign sites and other related smoking cessation websites, and search queries using related keywords. |
| | Neff et al., 2016 [47] | <i>Awareness, Proximal Impact (Priming Step), Distal Impact and Outcome Measures</i> | Evaluated phase 2 of the 2014 campaign using pre- and post-campaign online surveys in a nationally representative longitudinal cohort. Measures included self-reported campaign recall, quit attempts, intention to quit and successful quit attempts. |
| | Shafer et al., 2016 [20] | <i>Process and Proximal Impact (Engagement) Measures</i> | Analysed relationship between geographical and temporal variations in dose of television and digital video campaign ads with visits to campaign website. |
| | Zhang et al., 2016 [83] | <i>Distal Impact Measures</i> | Using call volume data, the study examined the effect of campaign ads on calls to smoking cessation phone services of states with and without alternative phone numbers. |

| CAMPAIGN | EVALUATION STUDY/ SOURCE | EVALUATION LEVEL | SUMMARY OF EVALUATION METHODS AND MEASURES |
|----------|-----------------------------------|--|---|
| | Zhao & Cai 2016a [49] | <i>Awareness Measures</i> | Assessed impact of campaign on adolescents, using National Youth Tobacco Survey (a cross sectional survey of school students). The study measured ad recall (promoted by description) and smoking status. |
| | Zhao & Cai 2016b [48] | <i>Awareness and Proximal Impact (Priming Step) Measures</i> | As above (Zhao, 2016a), but also analysed exposure to campaign with intention to quit and smoking susceptibility. |
| | Abril, Szczypka & Emery 2017 [57] | <i>Awareness/ Proximal Impact (Engagement) Measures</i> | Analysed campaign-related tweets for fear control responses. |
| | Davis et al., 2017 [58] | <i>Awareness and Distal Impact Measures</i> | Examined whether perceived effectiveness of ads was associated with quit attempts using survey data from nationally representative longitudinal cohort study of smokers at baseline and follow up. Measures of perceived effectiveness (PE) were rated after viewing ad. PE measures included whether 'ad worth remembering', 'grabbed my attention', powerful, informative, meaningful, or convincing. |
| | England et al., 2017 [76] | <i>Outcome Measures</i> | Analysed effect of campaign on smoking cessation by pregnant women. Exposure to campaign was measured based on campaign air dates, and smoking status was ascertained from birth certificates. |
| | McAfee et al., 2017 [50] | <i>Awareness, Proximal Impact (Priming Step), Distal Impact and Outcome Measures</i> | Study measured the effect of increasing doses of television campaign ads. Nationally representative survey measured awareness of campaign, knowledge of smoking-related diseases, quit attempts, intention to quit smoking; and for non-smokers: communication with friends or family about smoking dangers. |

| CAMPAIGN | EVALUATION STUDY/ SOURCE | EVALUATION LEVEL | SUMMARY OF EVALUATION METHODS AND MEASURES |
|--|---|--|--|
| | Davis et al., 2018 [21] | <i>Process, Proximal Impact (Priming Step) and Distal Impact Measures</i> | Analysed seven waves of nationally representative surveys (baseline and six follow-ups) from 2012-2015. Measured quit attempts and intention to quit, and compared against television ad GRPs. |
| | Murphy-Hoefer et al., 2018 [84] | <i>Distal Impact and Outcome Measures</i> | Used data from Davis et al. [21] and Neff et al. [47] to estimate population number of campaign-attributable quit attempts and sustained quit attempts from 2012-2015. |
| | Zhang et al., 2018 [22] | <i>Process and Distal Impact Measures</i> | Examined effect of campaign on Spanish smoking cessation phone services use by analysing number of calls to Spanish Quitline and exposure to campaign television ads. |
| Truth FinishIt (2014 - present) A national campaign in the USA targeting youth (15-21 year olds), with the aim of changing the social norm of smoking. The campaign uses TV, digital display ads, online video and social media ads. | Evans et al., 2016 [51] | <i>Awareness and Proximal Impact (Priming Step) Measures</i> | Partly a feasibility study to develop a 'brand equity' scale for this phase of the campaign. An online survey was used to collect data on campaign exposure, and attitudes and beliefs about tobacco use. |
| | Vallone et al., 2016 [52] | <i>Awareness, Proximal Impact (Engagement) and Proximal Impact (Priming Step) Measures</i> | Evaluation used data from a marketing survey on brand awareness and anti-tobacco attitudes; and data from longitudinal cohort interviews measuring campaign awareness and anti-tobacco industry attitudes. Social media engagement data (engagement on Facebook, Twitter, YouTube and Instagram) was also collected using a third party site |
| | 'truth: "Finish It"' case study, 2016 [31] | <i>Outcome Measures</i> | Evaluation reported population smoking rates over time. |
| | 'Truth Initiative: Left Swipe Dat' case study, 2016 [64], and 'truth: "Left swipe dat"' case study, 2016 [71] | <i>Process and Proximal Impact (Engagement) Measures</i> | Evaluation of the 'Left Swipe Dat' video reported earned media impressions, campaign website views and video views. The report also included changes in brand equity ratings and changes in attitudes about people who smoke. |

| CAMPAIGN | EVALUATION STUDY/ SOURCE | EVALUATION LEVEL | SUMMARY OF EVALUATION METHODS AND MEASURES |
|----------|--|--|---|
| | Hair et al., 2017 [35] | <i>Process, Awareness and Proximal Impact (Engagement) Measures</i> | Evaluation used cross-sectional online surveys and digital metrics to measure awareness of campaign ads which aired during popular television events, and level of social media engagement. The evaluation also reported on GRPs and digital impressions. |
| | Vallone et al., 2017 [53] | <i>Awareness, Proximal Impact (Priming Steps) and Outcome Measures</i> | Using the campaign longitudinal cohort study (interviews at baseline, and every six months), evaluation collected data on brand equity, smoking status, intention to quit smoking, anti-tobacco attitudes and ad awareness. |
| | Evans et al., 2018 [54] | <i>Awareness, Proximal Impact (Priming Steps) and Outcome Measures</i> | Using the campaign longitudinal cohort study, evaluation analysed measures of campaign awareness, brand equity, campaign-related attitudes, anti-tobacco sentiment and current smoking status. |
| | Vallone et al., 2018 [23] | <i>Awareness and Proximal Impact (Priming Steps) Measures</i> | Using the campaign longitudinal cohort study, evaluation analysed measures of campaign awareness (including dose), campaign-related attitudes, anti-tobacco sentiment and intention to smoke. |
| | Weir et al., 2018 [85] | <i>Cost-effectiveness evaluation</i> | Cost-effectiveness evaluation of campaign based on expenditure, estimated lifetime treatment costs saved and QALYs saved |
| | 'Truth Initiative: #StopProfiling' case study, 2018 [32] | <i>Process and Proximal Impact (Engagement) Measures</i> | Evaluation of the #StopProfiling campaign push reported number of video views, social engagements, website traffic, sign-ups to campaign and earned media impressions. |

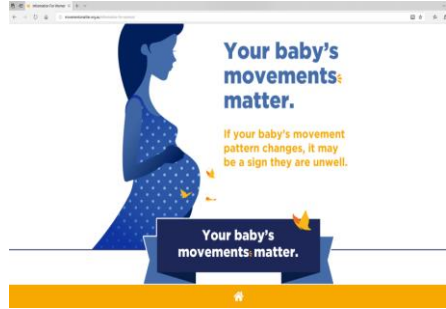
Appendix 2.3: Movements Matter campaign materia

Campaign material

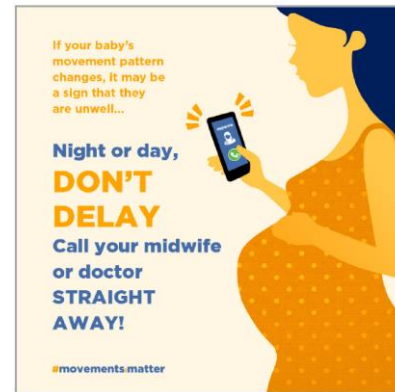
i)



ii)



iii)



i) Campaign poster used in hospital antenatal clinics; ii) Campaign website; and iii) Campaign social media post

Appendix 2.4: Survey for pregnant women (Movements Matter evaluation)



Your baby's movements during pregnancy

If you are 16 years of age or older, currently pregnant at 28 weeks or more gestation, and receiving antenatal care from one of the health services below, we would love to hear from you.

Participating health services:

- Mercy Hospital for Women, Melbourne
- The Royal Women's Hospital, Parkville
- The Northern Hospital, Epping
- La trobe regional hospital, Traralgon
- Ballarat base hospital

You are invited to take part in a survey about babies' movements during pregnancy. We're also interested to know what information you have received about babies' movements during pregnancy and what you think about this information.

This survey takes no longer than 15 minutes to complete. Most of the questions are multiple choice style.

Participation in this survey is entirely voluntary. You do not have to participate and you can change your mind at any time. If you do decide to participate but then change your mind before finishing the survey, simply close your web browser.

Please note that by completing and submitting this survey, you will be indicating your consent to participate.

The information you provide is completely confidential. We do not ask you to provide your name or any other contact details. Access to survey information will be limited to members of the research team.

The survey is being done by the Mater Research Institute - The University of Queensland and The University of Sydney. The study has been approved by the Mater Hospital Human Research Ethics Committee. Study: HREC/14/MHS/141.

If you have any questions about the study, feel free to contact Professor Vicki Flenady by phoning (07) 3163 1592 or emailing vicki.flenady@mater.uq.edu.au or Dr Adrienne Gordon, The University of Sydney, by phoning (02) 8627 0403 or emailing adrienne.gordon@sydney.edu.au.

If you'd like to talk to someone about your pregnancy, talk to your usual doctor or midwife. You can also contact the Pregnancy, Birth and Baby Helpline by calling 1800 882 436 or visiting www.health.gov.au/pregnancyhelpline. We'll show these details on each survey page.

Click next if you want to start now

NEXT

Pregnancy, Birth and Baby Helpline: Call 1800 882 436 or visit www.health.gov.au/pregnancyhelpline

Thanks for your interest in this survey!

Before we start, we need to confirm that you are eligible to take part.

1. **Are you 16 years of age or more?**
 YES NO

2. **Are you currently pregnant at 28 weeks or more gestation?**
 YES NO

3. **Where are you receiving your antenatal care?**
 - Mercy Hospital for Women, Melbourne
 - The Royal Women's Hospital, Parkville
 - The Northern Hospital, Epping
 - La Trobe regional hospital, Traralgon
 - Ballarat Base Hospital, Ballarat Central
 - None of the above

**Survey commences if Q1 & Q2 = Yes
and Q3 ≠ None of the above.**

1. Around how many baby movements should you feel each day after 28 weeks?

- 5
- 10
- 15 or more
- No specific number, but whatever feels normal for my baby
- I don't know

2. Please tick all that apply to you:

“Being aware of my baby’s movements during pregnancy:”

- Helps me to bond with my baby
- Helps me know if my baby is well
- Isn't helpful to me
- Makes me feel too anxious

3. What happens to baby’s movements towards the end of pregnancy?

- Movements stop
- Babies move less because they’re running out of room
- Babies move more
- Babies move about the same
- I don't know

4. What should you do if you feel your baby is moving less than usual?

- Lie on your side for two hours and see if you can count 10 movements
- Contact your doctor or midwife immediately
- Double check if baby is ok with a home doppler
- Wait until the next day to see if things improve
- Have a cold drink or something to eat to try make the baby move
- Not sure

5. What would prevent you from calling your doctor or midwife if you were worried that your baby was moving less? You can tick more than one

- Uncertainty about whether my baby really was moving less
- Worry about wasting my doctor's or midwife's time
- Worry about being a 'nuisance' because I had called or gone in previously and it had been fine
- Someone I trust told me it's normal for babies to move less towards the end of pregnancy
- None of these
- Other: _____

6. You indicated that someone you trust told you it's normal for babies to move less towards the end of pregnancy. Who was this? You can tick more than one

- Mother
- Sister
- Friend
- Partner
- Colleague
- Doctor
- Midwife
- Other: _____

Q6 displays if Q5 "Someone I trust told me it's normal for babies to move less towards the end of pregnancy" selected

7. During your current pregnancy, have you ever called your doctor or midwife or gone to hospital because you were worried about your baby's movements?

- Yes
- No
- I prefer not to answer

8. Thinking about the care you received when you were worried about your baby's movements, please tell us how much you agree with the following statements:

Q8 displays if Q7 = Yes

| | Strongly disagree | Disagree | Neither disagree nor agree | Agree | Strongly agree |
|---|-----------------------|-----------------------|----------------------------|-----------------------|-----------------------|
| I received all the information I needed | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| My care providers spent enough time with me | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I was involved in decision-making about care and procedures/tests | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| My care providers talked to me in a way I could understand | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I felt listened to by my care providers | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| My care providers took my concerns seriously | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I was treated with kindness and respect | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I was satisfied with the care I received | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

9. Has your doctor or midwife given you information about the importance of babies' movements during pregnancy?

- Yes, verbal information
- Yes, written information
- Yes, both verbal and written information
- No
- Can't remember/not sure

10. Has your doctor or midwife explained that decreased fetal movements is linked with stillbirth?

- Yes
- No
- Can't remember/not sure

11. Has your doctor or midwife encouraged you to contact them or come into hospital if you are worried about your baby's movements?

- Yes
- No
- Can't remember/not sure

12. Over the past few weeks, have you seen or heard any advertising about being aware of your baby's movements, and what you should do if the movement patterns change?

- Yes
- No
- Unsure

(If yes) Briefly describe the advertising message:

13. Do you recall the name of the campaign or the words describing the message?

- Yes
- No
- (If yes, please specify)

14. Have you seen any of the following campaign advertising material? (Include images of Movements Matter campaign material – ideally from different channels; ie poster, flyer, social media ad)

- Yes
- No
- Unsure

15. (If yes) How many times have you seen something related to this campaign?

- 1
- 2
- 3+

16. Where did you see material related to this campaign? (Tick all that apply)

- At the doctor's
- At the hospital/ antenatal clinic
- TV
- Radio/ Digital Radio
- Newspaper/ Magazine
- Bus stop ads
- Website
- Facebook
- Instagram
- YouTube
- Twitter

17. Who was the group delivering this campaign? (Tick all that apply)

- Doctors and midwives professional organizations
- Victorian State Government
- Safer Care Victoria
- Stillbirth Centre of Research Excellence

Pregnancy, Birth and Baby Helpline: Call 1800 882 436 or visit www.health.gov.au/pregnancyhelpline

- Australian Federal Government
- Still Aware
- Tommy's
- Other – please specify

18. Did you feel this campaign message was relevant to you?

- Yes
- No

19. How clear do you think the campaign message was?

- Perfectly clear
- Somewhat clear
- Not very clear
- Not clear at all

20. What do you think is the main message of this campaign?

- If you notice that your baby's movements slow down, contact your midwife or doctor immediately.
- Noticing your baby's movements is a good way of bonding with your baby.
- There is no set normal number of movements for your baby. All babies have different patterns and frequencies of movements.
- Counting your baby's movements is important.
- You should start to feel your baby's movements between 16-24 weeks of pregnancy.

21. After seeing the campaign message, did you do any of the following? [tick all that apply]

- Talk to your midwife or doctor about it
- Talk to other people (friends, family, etc) about it
- Go to the website to find more information
- Like, share or comment on the campaign material on social media
- Use the campaign hashtag on social media

22. How confident and likely are you to contact your midwife or doctor if you are concerned about your baby's movements?

- Very confident
- Somewhat confident
- Not sure
- Not confident

You're almost finished! These last few questions are about you and your pregnancy. Please tell us:

1. How many weeks' pregnant are you now?

- 28-30 weeks
- 31-33 weeks
- 34-36 weeks

37-39 weeks

40 weeks or more

2. Is this your first pregnancy?

Yes

No

3. What is your age?

16 -19 years

20 – 24 years

25 – 29 years

30 – 34 years

35 – 39 years

40 – 44 years

45+ years

4. Were you born in Australia?

Yes

No

5. Do you identify as Aboriginal or Torres Strait Islander?

No

Yes, Aboriginal

Yes, Torres Strait Islander

Yes, both

Q5 displays if Q4 = Yes

6. Where were you born?

Q6 displays if Q4 = No

New Zealand

South Asia (India, Pakistan, Sri Lanka, Afghanistan, Bangladesh)

South East and East Asia (Vietnam, Malaysia, Indonesia, China, Japan)

Middle-east (Iraq, Israel, Jordon, Turkey, Yemen, Cyprus)

- Africa
- Europe
- Other: _____

7. Is English your first language?

- No
- Yes
- If so, please state: _____
- If no please state which language _____

8. What is your highest completed education level?

- Did not finish high school
- High school certificate or equivalent
- Certificate, diploma or advanced diploma
- Graduate certificate or diploma
- Bachelor degree
- Postgraduate degree
- Other: _____

9. If you have any comments about babies' movements in pregnancy please add them here

Submit

Thank you for your time!



If you'd like to talk to someone about your pregnancy, talk to your usual doctor or midwife. You can also contact the Pregnancy, Birth and Baby Helpline by calling 1800 882 436 or visiting www.health.gov.au/pregnancyhelpline.

>>Link to Stillbirth CRE website DFM brochure

>>Link to Safer Care Vic resources



Fetal movements during pregnancy

If you are a doctor, midwife, or GP currently providing antenatal care at one of the health services below, we'd love to hear from you.

Participating health services:

- Mercy Hospital for Women, Melbourne
- The Royal Women's Hospital, Parkville
- The Northern Hospital, Epping
- La Trobe regional hospital, Traralgon
- Ballarat Base Hospital, Ballarat Central

You are invited to take part in a brief survey about fetal movements during pregnancy. We're also interested to know what level of knowledge you currently have about fetal movements, and your current practice around decreased fetal movements (DFM).

This survey takes no longer than 15 minutes to complete. Most of the questions are multiple choice style.

Participation in this survey is entirely voluntary. You do not have to participate, and you can change your mind at any time. If you do decide to participate but then change your mind before finishing the survey, simply close your web browser.

Please note that by completing and submitting this survey, you will be indicating your consent to participate.

The information you provide is completely confidential. We do not ask you to provide your name or any other contact details. Access to survey information will be limited to members of the research team.

The survey is being done by the Mater Research Institute - The University of Queensland and The University of Sydney. The study has been approved by the Mater Hospital Human Research Ethics Committee. Study: HREC/14/MHS/141.

If you have any questions about the study, feel free to contact Professor Vicki Flenady by phoning (07) 3163 1592 or emailing vicki.flenady@mater.uq.edu.au or Dr Adrienne Gordon, The University of Sydney, by phoning (02) 8627 0403 or emailing adrienne.gordon@sydney.edu.au.

Click next to start now

NEXT

Thank you for your interest in this survey.

Before we start, we need to confirm that you are eligible to take part.

1. **Are you a doctor, midwife, or GP currently providing care to pregnant women?**
 YES NO

2. **From which health service are you currently practicing or have a woman you are providing care to birthing at? *You may tick more than one***
 - Mercy Hospital for Women, Melbourne
 - The Royal Women's Hospital, Parkville
 - The Northern Hospital, Epping
 - La Trobe regional hospital, Traralgon
 - Ballarat Base Hospital, Ballarat Central
 - None of the above

Survey commences if Q1 = Yes and Q2 ≠ None of the above.

1. What advice about fetal movements during late pregnancy should be given to women?

- It's normal for babies to move less towards the end of pregnancy, as they are running out of room
- Get to know your baby's pattern of movements and contact your care provider if your baby moves less than is usual for them
- Don't worry if your baby isn't moving as much towards the end of pregnancy, they are saving energy for labour
- Use a kick chart to count the number of movements you feel each day

2. How should information about fetal movements be given to pregnant women?

- Written form
- Verbal
- Verbal explanation supported by a leaflet or brochure
- As determined by clinician

3. If a woman calls to report decreased fetal movements, you would...

- Tell her to lie down and rest for an hour, and call back if she is still concerned
- Advise her to come as soon as possible for assessment
- Advise her to have a cold drink or something to eat to try to make the baby move
- Ask if she has been too busy to really know what her baby is doing
- Make an appointment for her to come in tomorrow

4. A 40-year-old woman with a history of a previous small baby presents at 38 weeks' gestation with decreased fetal movements, what immediate action/s would you take?

You may tick more than one

- Take a full history
- Recommend an immediate induction of labour
- Assess fetal growth by symphysial fundal height (SFH) measurement
- Arrange an ultrasound scan
- Perform a CTG
- Ask her to sit in the waiting area and have a cold drink or something to eat
- Test for maternal fetal haemorrhage
- Record a complete set of observations

Transfer her care to a higher-level service

5. Your initial assessment of this woman shows a normal CTG and SFH. Fetal movements resume as normal during your assessment and the woman is no longer concerned. What should you do next?

You may tick more than one

Continue routine antenatal care, advise her to return if DFM recurs

Arrange tertiary USS and refer for obstetric review

Consider induction of labour

Advise her that everything is normal and she doesn't need to worry

Discharge her with no further advice

Other: _____

6. Do you explain to pregnant women that decreased fetal movements is linked with stillbirth?

Always

Most of the time

Sometimes

Rarely

Never

7. Please tell us how much you agree with the following statements:

| | Strongly disagree | Disagree | Neither disagree nor agree | Agree | Strongly agree |
|--|-----------------------|-----------------------|----------------------------|-----------------------|-----------------------|
| Pregnant women need information about the importance of being aware of fetal movements | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Providing women with information about decreased fetal movements should be part of routine antenatal care | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Providing women with information about decreased fetal movements will increase their anxiety during pregnancy | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Providing women with information about decreased fetal movements will increase unnecessary presentations to hospital | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Women often report decreased fetal movements because they want an induction of labour | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

8. Over the past few weeks, have you seen or heard any health education campaigns targeting pregnancy women about being aware of their baby’s movements, and what they should do if the movement patterns change?

- Yes
 No
 Unsure

(If yes) Briefly describe the advertising message:

9. Over the past few weeks, have you received any additional information about patient education or management of decreased fetal movements?

- Yes
 No
 Unsure

(If yes) Briefly describe the advertising message:

10. Do you recall the name of the campaign or the words describing the message?

- Yes
 No
 (If yes, please specify)

11. Have you seen any of the following campaign advertising material? (Include images of Movements Matter campaign material – ideally from different channels; ie poster, flyer, social media ad, clinician campaign material if available)

- Yes
 No
 Unsure

12. (If yes) How many times have you seen something related to this campaign?

- 1
 2
 3+

13. Where did you see material related to this campaign? (Tick all that apply)

- At the doctor’s
 At the hospital or health service
 TV
 Radio/ Digital Radio
 Newspaper/ Magazine
 Bus stop ads
 Website
 Facebook
 Instagram
 YouTube
 Twitter

14. Who was the group delivering this campaign? (Tick all that apply)

- Doctors and midwives professional organizations
 Victorian State Government
 Safer Care Victoria

- Stillbirth Centre of Research Excellence
- Australian Federal Government
- Still Aware
- Tommy's
- Other – please specify

15. What do you think is the main message of this campaign?

- Encouraging pregnant women to contact their midwife or doctor immediately if they notice their baby's movements slow down.
- Encouraging pregnant women to notice their baby's movements as a way of bonding with their baby
- Noticing your baby's movements is a good way of bonding with your baby.
- Telling pregnant women to count their baby's movements.
- Educating pregnant women that there is no set normal number of movements for their baby.
- All babies have different patterns and frequencies of movements.
- Informing pregnant women that they should start to feel their baby's movements between 16-24 weeks of pregnancy.

The survey is almost complete. These last few questions are about you and your workplace/practice. Please tell us:

1. For how long have you been providing care to pregnant women?

- Less than 2 years
- 2-5 years
- 6-9 years
- 10-20 years
- More than 20 years

2. What is your gender?

- Female
- Male
- Other

3. What is your professional discipline?

- Midwifery
- Obstetrics and/or Gynaecology
- Nursing (providing maternity care)

General practice

4. What is the geographic location of your health facility?

Metropolitan

Regional/Rural

Remote

5. If you have any comments about babies' movements in pregnancy please add them here

Thank you for your time

Appendix 2.6: *Movements Matter* social media account engagement

Social media account engagement

| Social media platform | Account URL | Account engagement (8 Oct – 8 Dec 2019) | Organic content posted (8 Oct – 8 Dec 2019) |
|------------------------------|---|--|--|
| Facebook | facebook.com/movementsmatterAU | 1,019 likes | 24 posts |
| Instagram | instagram.com/movementsmatterau | 132 followers | 19 posts |
| Twitter | twitter.com/MovesMatter | 138 followers | 59 tweets |

Appendix 2.7: Responses among women and clinicians who had seen the campaign (prompted recognition in post-campaign survey) (Movements Matter evaluation)

| | Women n=185 | | Clinicians n=114 | |
|--|----------------|-------------|---------------------|-------------|
| | n | % | n | % |
| Number of times saw campaign | | | | |
| 1 | 61 | 33.0 | 23 | 20.2 |
| 2 | 45 | 24.3 | 22 | 19.3 |
| 3+ | 79 | 42.7 | 69 | 60.5 |
| Where campaign was seen | | | | |
| At the hospital/ antenatal clinic | 157 | 84.9 | 99 | 86.8 |
| At the doctor's | 46 | 24.9 | 17 | 14.9 |
| Facebook | 55 | 29.7 | 55 | 48.2 |
| Website | 16 | 8.6 | 16 | 14.0 |
| Instagram | 12 | 6.5 | 13 | 11.4 |
| Youtube | 5 | 2.7 | 1 | 0.9 |
| TV | 19 | 10.3 | 20 | 17.5 |
| Print (magazine/ newspaper) | 3 | 1.6 | 3 | 2.6 |
| Radio/ digital radio | 1 | 0.5 | 5 | 4.4 |
| Bus stop ad | 1 | 0.5 | 0 | 0.0 |
| Who delivered this campaign | | | | |
| Doctors and midwives professional organisations | 108 | 58.4 | 60 | 52.6 |
| Victorian State Government | 37 | 20.0 | 26 | 22.8 |
| SaferCare Victoria | 7 | 3.8 | 51 | 44.7 |
| Stillbirth Centre of Research Excellence | 19 | 10.3 | 26 | 22.8 |
| Australian Federal Government | 1 | 0.5 | 5 | 4.4 |
| Still Aware | 23 | 12.4 | 31 | 27.2 |
| Tommy's | 0 | 0.0 | 9 | 7.9 |
| Message relevance | | | | |
| Yes | 172 | 94.0 | <i>n/a</i> | |
| No | 11 | 6.0 | <i>n/a</i> | |
| Message clarity | | | | |
| Perfectly clear | 121 | 65.8 | <i>n/a</i> | |
| Somewhat clear | 61 | 33.2 | <i>n/a</i> | |
| Not very clear | 2 | 1.1 | <i>n/a</i> | |
| Not clear at all | 0 | 0.0 | <i>n/a</i> | |
| Perceived main message of campaign | | | | |
| If you notice that your baby's movements slow down, contact your midwife or doctor immediately | 172 | 93.0 | 85 | 74.6 |
| Noticing your baby's movements is a good way of bonding with your baby | 16 | 8.6 | 1 | 0.9 |

| | | | | |
|---|-----|-------------|------------|-------------|
| Counting your baby's movements is important | 41 | 22.2 | 0 | 0.0 |
| There is no set normal number of movements for your baby. All babies have different patterns and frequencies of movements | 10 | 5.4 | 28 | 24.6 |
| You should start to feel your baby's movements between 16-24 weeks of pregnancy | 7 | 3.8 | 0 | 0.0 |
| Actions as a result of the campaign | | | | |
| Talk to your midwife or doctor about it | 67 | 36.2 | <i>n/a</i> | |
| Talk to other people (friends, family, etc) about it | 34 | 18.4 | <i>n/a</i> | |
| Go to the website to find more information | 41 | 22.2 | <i>n/a</i> | |
| Like, share or comment on the campaign material on social media | 15 | 8.1 | <i>n/a</i> | |
| Use the campaign hashtag on social media | 0 | 0.0 | <i>n/a</i> | |
| Self-efficacy – How confident & likely are you to contact your midwife/ doctor | | | | |
| Very confident | 110 | 59.5 | <i>n/a</i> | |
| Somewhat confident | 65 | 35.1 | <i>n/a</i> | |
| Not sure | 7 | 3.8 | <i>n/a</i> | |
| Not confident | 3 | 1.6 | <i>n/a</i> | |





Appendix 2.8: Detailed response categories for selected questions in women's survey (*Movements Matter* evaluation)




| | | Pre-campaign n=1142 | | Post-campaign n=473 | |
|--------------------|---|------------------------|-------------|------------------------|-------------|
| | | n | % | n | % |
| Knowledge | Around how many baby movements should you feel each day after 28 weeks? | | | | |
| | No specific number, but whatever feels normal for my baby | 551 | 48.2 | 267 | 56.4 |
| | 5 | 15 | 1.3 | 7 | 1.5 |
| | 10 | 148 | 13.0 | 50 | 10.6 |
| | 15 or more | 342 | 29.9 | 114 | 24.1 |
| | I don't know | 86 | 7.5 | 35 | 7.4 |
| Knowledge | What happens to baby's movements towards the end of pregnancy? | | | | |
| | Babies move the same amount towards the end of pregnancy | 354 | 31.0 | 224 | 47.4 |
| | Movements stop | 5 | 0.4 | 4 | 0.8 |
| | Babies move less because they're running out of room | 445 | 39.0 | 139 | 29.4 |
| | Babies move more | 192 | 16.8 | 64 | 13.5 |
| | I don't know | 146 | 12.8 | 42 | 8.9 |
| Knowledge | What should you do if you feel your baby is moving less than usual? | | | | |
| | Contact your doctor or midwife immediately | 400 | 35.0 | 206 | 43.6 |
| | Lie on your side for two hours and see if you can count 10 movements | 255 | 22.3 | 115 | 24.3 |
| | Double check if baby is ok with a home doppler | 5 | 0.4 | 3 | 0.6 |
| | Wait until the next day to see if things improve | 43 | 3.8 | 9 | 1.9 |
| | Have a cold drink or something to eat to try make the baby move | 398 | 34.9 | 129 | 27.3 |
| | Not sure | 41 | 3.6 | 11 | 2.3 |
| Experiences | Has your doctor or midwife given you information about the importance of babies' movements during pregnancy? | | | | |
| | Yes, both verbal and written information | 323 | 28.3 | 227 | 48.0 |

| | | | | |
|--------------------------|-----|-------------|-----|-------------|
| Yes, verbal information | 534 | 46.8 | 170 | 35.9 |
| Yes, written information | 62 | 5.4 | 22 | 4.7 |
| No | 119 | 10.4 | 29 | 6.1 |
| Can't remember/ not sure | 104 | 9.1 | 25 | 5.3 |




Appendix 2.9: Still Six Lives campaign image recognition in post-campaign survey




Community survey

| Still Six Lives Images | % |
|---|------|
|  | 4.7 |
|  | 10.0 |
|  | 7.5 |
|  | 13.7 |

| Comparison images (non-Still Six Lives Images) | % |
|--|------|
|  | 15.5 |
|  | 13.0 |
|  | 15.7 |

Antenatal clinic survey

| Still Six Lives Images | % |
|---|------|
|  | 5.1 |
|  | 7.9 |
|  | 6.7 |
|  | 17.4 |

| Comparison images (non-Still Six Lives Images) | % |
|--|------|
|  | 22.5 |
|  | 11.8 |
|  | 24.2 |

Appendix 2.10: *Still Six Lives* campaign message recognition in post-campaign survey

Community survey

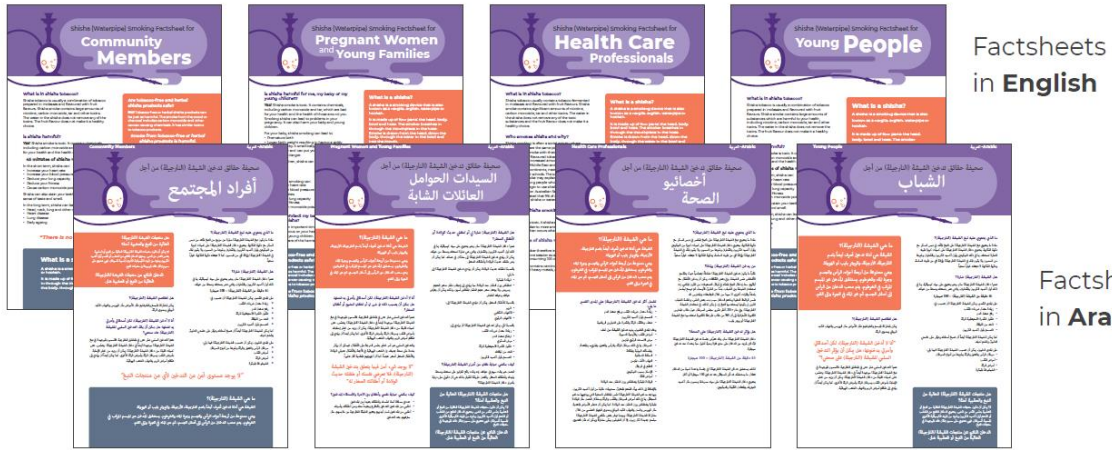
| Message type | Message | % |
|---|---|------|
| Campaign-specific messages | Six babies are stillborn every day | 10.2 |
| | Stillbirth. Together we can reduce the risk | 11.1 |
| | Make the Stillbirth Promise | 2.5 |
| Description of campaign element | A couple sharing their story of having a stillbirth | 24.2 |
| Behavioural messages promoted by the <i>Still Six Lives</i> campaign, and the Safer Baby Bundle clinical initiative | Be aware of your baby's movements | 33.7 |
| | Sleep on your side after 28 weeks | 20.8 |
| | Quit for baby, stop smoking during pregnancy | 41.9 |
| Behavioural message from the Safer Baby Bundle initiative only | Big or small. Your baby's growth matters | 16.8 |
| Comparison message (unrelated to <i>Still Six Lives</i> campaign) | Get to know your baby's normal | 22.8 |

Antenatal clinic survey

| Message type | Message | % |
|---|---|------|
| Campaign-specific messages | Six babies are stillborn every day | 19.1 |
| | Stillbirth. Together we can reduce the risk | 12.4 |
| | Make the Stillbirth Promise | 2.3 |
| Description of campaign element | A couple sharing their story of having a stillbirth | 28.1 |
| Behavioural messages promoted by the <i>Still Six Lives</i> campaign, and the Safer Baby Bundle clinical initiative | Be aware of your baby's movements | 64.0 |
| | Sleep on your side after 28 weeks | 64.0 |
| | Quit for baby, stop smoking during pregnancy | 36.0 |
| Behavioural message from the Safer Baby Bundle initiative only | Big or small. Your baby's growth matters | 15.2 |
| Comparison message (unrelated to <i>Still Six Lives</i> campaign) | Get to know your baby's normal | 13.2 |

SUPPLEMENTAL MATERIAL

Appendix 1 – Additional examples of project resources



Factsheets in English

Factsheets in Arabic



SUPPLEMENTAL MATERIAL

Appendix 2 – Recruitment material



Flyer at local events



Social media post

We're looking for 18-35 year olds to take part in a research study on shisha smoking. All it involves is a couple of SMS questions each month. For your time, you will receive 2x \$50 e-gift cards from an Australian store. Sign up at https://unsw.au1.qualtrics.com/jfe/form/SV_41PYW93Nn9JY6zz.

#shisha #nargile #hookah #recruiting #health #haveyoursay

SUPPLEMENTAL MATERIAL

Appendix 3 - Recruitment survey questions

| Question/ Text | Responses |
|---|---|
| Page 1 | |
| Q1. Would you prefer to complete this survey in English or Arabic? نظففضل إكمال هذا الاستبيان بلغة الإنجليزية أو العربية؟ | <input type="radio"/> English <input type="radio"/> عربى (Arabic) |
| Page 2 | |
| Online Participant Information Statement (Appendix 3) and Consent Form (Appendix 4) | |
| Q2. Do you consent to being contacted with via SMS with 2 survey questions each month over the next 13 months, and for your de-identified information to be used in an evaluation study? | Tick box (compulsory question) |
| Page 3 | |
| Q3. To ensure you are eligible for this study, how old are you? | Free text response. Validate answer – must be between 18 and 35 (compulsory question) |
| Q4. What is your gender? | <input type="radio"/> Male <input type="radio"/> Female <input type="radio"/> Prefer not to say |
| Q5. What is your postcode? | Free text response. Validate answer – must be between 0000 – 9999 (compulsory question) |
| Q6. What language do you speak at home? | <input type="radio"/> English <input type="radio"/> Arabic <input type="radio"/> English and Arabic <input type="radio"/> Other (please specify) |
| Q7. In the past 12 months, have you smoked shisha? (In these questions, by shisha, we also mean argihle, hookah, hubbly bubbly or waterpipe smoking). | <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not sure |
| Q8. If yes, how often do you currently smoke shisha? | <input type="radio"/> Daily <input type="radio"/> At least once per week, but less than daily <input type="radio"/> Less than once per week <input type="radio"/> Not applicable |
| Q9. Please provide your mobile phone number for subsequent SMS questions: | Free text response. Validate answer – must be between 0 – 9999999999 (compulsory question) |
| Page 4 | |
| Thanks for participating in this study and for completing the online survey questions. We will be in touch via SMS soon. If you have any further questions about the study, or would like to opt out at any point, please visit the project website: https://bit.ly/2E9gbFl . | |
| Q10. Would you like to be kept updated about the project's activities via email? If so, please provide your contact email below: (Please note, we will only contact you for the purposes of this project and will not share your phone number or email address with any other parties.) | Free text response. |

SUPPLEMENTAL MATERIAL

Appendix 4 - Survey questions

| Time | Question/ Text |
|--|---|
| Immediately after completing the online recruitment survey | Hi [name], thanks for being part of our research study. We'll be in touch with survey questions soon. For more info visit https://bit.ly/2E9gbFl . |
| Baseline (pre-project) data collection | |
| Week 1 Aug 2019 | Hi, thanks for being part of the waterpipe (shisha) study. To answer the survey questions, just reply with the number that matches your response. Standard messaging rates apply. Text "STOP" to opt out of this survey. T&Cs: https://bit.ly/2E9gbFl Shisha study question 1: Have you recently seen, read or heard anything online, in the media, or your community about the harms of smoking shisha? (E.g. stories, discussions, information or news). It might have been on TV, radio, in magazines or newspapers, on the internet or somewhere else. Reply with a number (1, 2 or 3). 1. Yes 2. No 3. Don't know |
| Week 2 Aug 2019 | If you answered yes to the previous shisha question, can you describe in a few words what you saw, read or heard? |
| Week 3 Aug 2019 | Shisha study: Don't forget to reply to all questions to receive your x3 \$50 vouchers. You will receive the 1st one next week after replying to question 4. Question 3: What do you think of the following statement? Shisha contains cancer-causing substances? Reply with a number (1-6). 1. Strongly agree 2. Somewhat agree 3. Neutral 4. Somewhat disagree 5. Strongly disagree 6. Don't know |
| Week 4 Aug 2019 | Shisha study question 4: How would you rate smoking shisha compared to cigarettes considering its health effects? Reply with a number (1-4). 1. Same 2. Less harmful 3. More harmful 4. Don't know |
| Week 4 Aug 2019 | [For participants who responded to most of the questions so far] You have received a \$50 gift card from UNSW Shisha study. Expires 09 Sep 2020*. Message: Thanks for being part of your research study. Here's a \$50 e-gift. * Gift card expires 3 years from issue date. |
| Week 5 Sep 2019 | Shisha study question 5: What do you think of the following statement? Smoking shisha can cause damage to your body. Reply with a number (1-6). 1. Strongly agree 2. Somewhat agree 3. Neutral 4. Somewhat disagree 5. Strongly disagree 6. Don't know |
| Week 6 Sep 2019 | Shisha study question 6: In the past month, have you thought about reducing the amount of shisha you smoke? Reply with a number (1-5). 1. Yes, within the next 30 days 2. Yes, within the next 6 months |

| | |
|--------------------------------|---|
| | <ol style="list-style-type: none"> 3. Yes, completely stopping shisha smoking 4. No 5. Don't know |
| Week 7 Sep 2019 | <p>Shisha study question 7: Have you recently talked to someone (e.g. family or friend) about the harms of smoking shisha? Reply with a number (1-3).</p> <ol style="list-style-type: none"> 1. Yes 2. No 3. Don't know |
| Week 8 Oct 2019 | <p>Shisha study question 8: Do you know of any websites or phone services that someone could use to get information or support to help quit smoking shisha? Reply with a number (1-3).</p> <ol style="list-style-type: none"> 1. Yes 2. No 3. Don't know |
| Week 8 Oct 2019 | <p>[For participants who have responded to most of the questions so far] You have received a \$50 gift card from UNSW Shisha study. Expires 09 Sep 2020*. Message: Thanks for being part of your research study. Here's a \$50 e-gift. * Gift card expires 3 years from issue date.</p> |
| Campaign launch (15 Oct 2019) | |
| During project data collection | |
| Week 12 Oct 2019 | <p>Shisha study question 9: Have you ever searched for information about smoking shisha on the internet? Reply with a number (1-3).</p> <ol style="list-style-type: none"> 1. Yes 2. No 3. Not sure |
| Week 13 Oct 2019 | <p>Shisha study question 10: If you have ever searched for information about smoking shisha on the internet, what was it about? Reply with a number (1-5).</p> <ol style="list-style-type: none"> 1. How to smoke shisha 2. Where to buy or smoke shisha 3. What are the harms of smoking shisha 4. How to quit smoking shisha 5. Other |
| Week 14 Nov 2019 | <p>Shisha study question 11: If you smoke shisha, where do you mostly smoke it? Reply with a number (1-5).</p> <ol style="list-style-type: none"> 1. At home 2. At restaurant 3. At a park, or other public area 4. Other 5. I don't smoke shisha |
| Week 15 Nov 2019 | <p>Shisha study question 12: What's the main reason(s) you smoke shisha? (in a few words)</p> |
| Week 16 Nov 2019 | <p>Shisha study question 13: Do you currently smoke cigarettes, pipes or other tobacco products (excluding shisha)? Reply with a number (1-3).</p> <ol style="list-style-type: none"> 1. Yes 2. No 3. Don't know |
| Week 17 Nov 2019 | <p>Shisha study question 14: How often do you now smoke cigarettes, pipes or other tobacco products (excluding shisha)? Reply with a number (1-6).</p> <ol style="list-style-type: none"> 1. Daily 2. At least weekly (not daily) 3. Less often than weekly 4. Not at all, but I have smoked in the last 12 months 5. Not at all and I have not smoked in the last 12 months 6. Not applicable, I have never smoked |

| Follow-up data collection | |
|---------------------------|---|
| 13 Jan 2020 | <p>Shisha study question 1: Have you recently seen, read or heard anything online, in the media, or your community about the harms of smoking shisha? (E.g. stories, discussions, information or news). It might have been on TV, radio, in magazines or newspapers, on the internet or somewhere else. Reply with a number (1, 2 or 3).</p> <ol style="list-style-type: none"> 1. Yes 2. No 3. Don't know |
| 20 Jan 2020 | <p>If you answered yes to the previous shisha question, can you describe in a few words what you saw, read or heard?</p> |
| 28 Jan 2020 | <p>Shisha study question 3: What do you think of the following statement? Shisha contains cancer-causing substances. Reply with a number (1-6).</p> <ol style="list-style-type: none"> 1. Strongly agree 2. Somewhat agree 3. Neutral 4. Somewhat disagree 5. Strongly disagree Don't know |
| 3 Feb 2020 | <p>Shisha study question 4: How would you rate smoking shisha compared to cigarettes considering its health effects? Reply with a number (1-4).</p> <ol style="list-style-type: none"> 1. Same 2. Less harmful 3. More harmful 4. Don't know |
| 10 Feb 2020 | <p>Shisha study question 5: What do you think of the following statement? Smoking shisha can cause damage to your body. Reply with a number (1-6).</p> <ol style="list-style-type: none"> 1. Strongly agree 2. Somewhat agree 3. Neutral 4. Somewhat disagree 5. Strongly disagree 6. Don't know |
| 17 Feb 2020 | <p>Shisha study question 6: In the past month, have you thought about reducing the amount of shisha you smoke? Reply with a number (1-5).</p> <ol style="list-style-type: none"> 1. Yes, within the next 30 days 2. Yes, within the next 6 months 3. Yes, completely stopping shisha smoking 4. No 5. Don't know |
| 24 Feb 2020 | <p>Shisha study question 7: Have you recently talked to someone (e.g. family or friend) about the harms of smoking shisha? Reply with a number (1-3).</p> <ol style="list-style-type: none"> 1. Yes 2. No 3. Don't know |
| 2 Mar 2020 | <p>Shisha study question 8: Do you know of any websites or phone services that someone could use to get information or support to help quit smoking shisha? Reply with a number (1-3).</p> <ol style="list-style-type: none"> 1. Yes 2. No 3. Don't know |
| 2 Mar 2020 | <p>[For participants who have responded to most of the questions so far] You have received a \$50 gift card from UNSW Shisha study. Expires 09 Sep 2020*. Message: Thanks for being part of your research study. Here's a \$50 e-gift. * Gift card expires 3 years from issue date.</p> |

2 Mar 2020

There are no more questions for this research study, and we will not be contacting you via SMS again. If you would like to be informed of the results of the study, please visit <http://bit.do/foTef> for contact details. Thanks again for being part of the study.

SUPPLEMENTAL MATERIAL**Appendix 5 - Number of responses for before-after questions**

| | Baseline (n) | Post- campaign (n) | Paired data (Both Baseline and Post- campaign) (n) |
|---|-----------------|--------------------------|---|
| Have you seen, heard or read anything about harms of shisha smoking | 101 | 89 | 80 |
| Shisha contains cancer-causing substances | 105 | 87 | 84 |
| What are the health effects of smoking shisha compared to cigarettes? | 103 | 87 | 81 |
| Smoking shisha can cause damage to your body | 112 | 85 | 85 |
| Have you thought about reducing the amount of shisha you smoke? | 106 | 93 | 92 |
| Have you talked to someone about the harms of smoking shisha? | 76 | 93 | 70 |
| Do you know where to find information or support to help quit smoking shisha? | 105 | 87 | 80 |

Appendix 6 - Subgroup Analysis

Gender

Men

| | Baseline | | Post-campaign | | <i>p-value</i> |
|---|----------|-------------|---------------|-------------|----------------|
| | n | % | n | % | |
| Have you seen, heard or read anything about harms of shisha smoking (n=29) | | | | | <i>p=0.06</i> |
| Yes | 15 | 51.7 | 23 | 79.3 | |
| No or Don't know | 14 | 48.3 | 6 | 20.7 | |
| Shisha contains cancer-causing substances (n=32) | | | | | <i>p=0.64</i> |
| Strongly agree | 17 | 53.1 | 19 | 59.4 | |
| Somewhat agree | 10 | 31.3 | 9 | 28.1 | |
| Neutral / Don't know | 4 | 12.5 | 3 | 9.4 | |
| Somewhat disagree | 1 | 3.1 | 1 | 3.1 | |
| Strongly disagree | 0 | 0.0 | 0 | 0.0 | |
| What are the health effects of smoking shisha compared to cigarettes? (n=29) | | | | | <i>p=0.73</i> |
| Same or more harmful | 14 | 48.3 | 16 | 55.2 | |
| Less harmful or Don't know | 15 | 51.7 | 13 | 44.8 | |
| Smoking shisha can cause damage to your body (n=31) | | | | | <i>p=0.31</i> |
| Strongly agree | 14 | 45.2 | 19 | 61.3 | |
| Somewhat agree | 14 | 45.2 | 8 | 25.8 | |
| Neutral / Don't know | 2 | 6.5 | 4 | 12.9 | |
| Somewhat disagree | 1 | 3.2 | 0 | 0.0 | |
| Strongly disagree | 0 | 0.0 | 0 | 0.0 | |
| Have you thought about reducing the amount of shisha you smoke? (n=35) | | | | | <i>p=0.42</i> |
| Yes, [Within the next 30 days/ next 6 months/ completely stopping] | 19 | 54.3 | 23 | 65.7 | |
| No / Don't know | 16 | 45.7 | 12 | 34.3 | |
| Have you talked to someone about the harms of smoking shisha? (n=25) | | | | | <i>p=0.22</i> |
| Yes | 16 | 64.0 | 12 | 48.0 | |
| No / Don't know | 9 | 36.0 | 13 | 52.0 | |
| Do you know where to find information or support to help quit smoking shisha? (n=29) | | | | | <i>p=1.00</i> |
| Yes | 7 | 24.1 | 7 | 24.1 | |
| No / Don't know | 22 | 75.9 | 22 | 75.9 | |

Women

| | Baseline | | Post-campaign | | <i>p</i> -value |
|---|----------|-------------|---------------|-------------|-----------------|
| | n | % | n | % | |
| Have you seen, heard or read anything about harms of shisha smoking (n=51) | | | | | <i>p</i> =0.03* |
| Yes | 21 | 41.2 | 31 | 60.8 | |
| No or Don't know | 30 | 58.8 | 20 | 39.2 | |
| Shisha contains cancer-causing substances (n=52) | | | | | <i>p</i> =0.13 |
| Strongly agree | 19 | 36.5 | 28 | 53.8 | |
| Somewhat agree | 19 | 36.5 | 11 | 21.2 | |
| Neutral / Don't know | 13 | 25.0 | 12 | 23.1 | |
| Somewhat disagree | 0 | 0.0 | 0 | 0.0 | |
| Strongly disagree | 1 | 1.9 | 1 | 1.9 | |
| What are the health effects of smoking shisha compared to cigarettes? (n=52) | | | | | <i>p</i> =0.34 |
| Same or more harmful | 41 | 78.8 | 37 | 71.2 | |
| Less harmful or Don't know | 11 | 21.2 | 15 | 28.8 | |
| Smoking shisha can cause damage to your body (n=54) | | | | | <i>p</i> =0.60 |
| Strongly agree | 32 | 59.3 | 33 | 61.1 | |
| Somewhat agree | 14 | 25.9 | 15 | 27.8 | |
| Neutral / Don't know | 7 | 13.0 | 5 | 9.3 | |
| Somewhat disagree | 1 | 1.9 | 1 | 1.9 | |
| Strongly disagree | 0 | 0.0 | 0 | 0.0 | |
| Have you thought about reducing the amount of shisha you smoke? (n=57) | | | | | <i>p</i> =1.00 |
| Yes, [Within the next 30 days/ next 6 months/ completely stopping] | 24 | 42.1 | 23 | 40.4 | |
| No / Don't know | 33 | 57.9 | 34 | 59.6 | |
| Have you talked to someone about the harms of smoking shisha? (n=45) | | | | | <i>p</i> =0.21 |
| Yes | 28 | 62.2 | 22 | 48.9 | |
| No / Don't know | 17 | 37.8 | 23 | 51.1 | |
| Do you know where to find information or support to help quit smoking shisha? (n=51) | | | | | <i>p</i> =1.00 |
| Yes | 11 | 21.6 | 11 | 21.6 | |
| No / Don't know | 40 | 78.4 | 40 | 78.4 | |

Age

Younger age group (18-26 years old)

| | Baseline | | Post-campaign | | <i>p-value</i> |
|---|----------|-------------|---------------|-------------|----------------|
| | n | % | n | % | |
| Have you seen, heard or read anything about harms of shisha smoking (n=47) | | | | | <i>p=0.21</i> |
| Yes | 25 | 53.2 | 31 | 66.0 | |
| No or Don't know | 22 | 46.8 | 16 | 34.0 | |
| Shisha contains cancer-causing substances (n=47) | | | | | <i>p=0.18</i> |
| Strongly agree | 19 | 40.4 | 27 | 57.4 | |
| Somewhat agree | 16 | 34.0 | 9 | 19.1 | |
| Neutral / Don't know | 11 | 23.4 | 9 | 19.1 | |
| Somewhat disagree | 0 | 0.0 | 1 | 2.1 | |
| Strongly disagree | 1 | 2.1 | 1 | 2.1 | |
| What are the health effects of smoking shisha compared to cigarettes? (n=46) | | | | | <i>p=0.34</i> |
| Same or more harmful | 30 | 65.2 | 26 | 56.5 | |
| Less harmful or Don't know | 16 | 34.8 | 20 | 43.5 | |
| Smoking shisha can cause damage to your body (n=50) | | | | | <i>p=0.36</i> |
| Strongly agree | 28 | 56.0 | 32 | 64.0 | |
| Somewhat agree | 14 | 28.0 | 11 | 22.0 | |
| Neutral / Don't know | 7 | 14.0 | 6 | 12.0 | |
| Somewhat disagree | 1 | 2.0 | 1 | 2.0 | |
| Strongly disagree | 0 | 0.0 | 0 | 0.0 | |
| Have you thought about reducing the amount of shisha you smoke? (n=54) | | | | | <i>p=0.63</i> |
| Yes, [Within the next 30 days/ next 6 months/ completely stopping] | 25 | 46.3 | 28 | 51.9 | |
| No / Don't know | 29 | 53.7 | 26 | 48.1 | |
| Have you talked to someone about the harms of smoking shisha? (n=42) | | | | | <i>p=0.06</i> |
| Yes | 26 | 61.9 | 18 | 42.9 | |
| No / Don't know | 16 | 38.1 | 24 | 57.1 | |
| Do you know where to find information or support to help quit smoking shisha? (n=52) | | | | | <i>p=1.00</i> |
| Yes | 14 | 26.9 | 13 | 25.0 | |
| No / Don't know | 38 | 73.1 | 39 | 75.0 | |

Older age group (27-35 years old)

| | Baseline | | Post-campaign | | <i>p-value</i> |
|---|----------|-------------|---------------|-------------|-----------------|
| | n | % | n | % | |
| Have you seen, heard or read anything about harms of shisha smoking (n=33) | | | | | <i>p=0.004*</i> |
| Yes | 11 | 33.3 | 23 | 69.7 | |
| No or Don't know | 22 | 66.7 | 10 | 30.3 | |
| Shisha contains cancer-causing substances (n=37) | | | | | <i>p=0.45</i> |
| Strongly agree | 17 | 45.9 | 20 | 54.1 | |
| Somewhat agree | 13 | 35.1 | 11 | 29.7 | |
| Neutral / Don't know | 6 | 16.2 | 6 | 16.2 | |
| Somewhat disagree | 1 | 2.7 | 0 | 0.0 | |
| Strongly disagree | 0 | 0.0 | 0 | 0.0 | |
| What are the health effects of smoking shisha compared to cigarettes? (n=35) | | | | | <i>p=0.73</i> |
| Same or more harmful | 25 | 71.4 | 27 | 77.1 | |
| Less harmful or Don't know | 10 | 28.6 | 8 | 22.9 | |
| Smoking shisha can cause damage to your body (n=35) | | | | | <i>p=0.61</i> |
| Strongly agree | 18 | 51.4 | 20 | 57.1 | |
| Somewhat agree | 14 | 40.0 | 12 | 34.3 | |
| Neutral / Don't know | 2 | 5.7 | 3 | 8.6 | |
| Somewhat disagree | 1 | 2.9 | 0 | 0.0 | |
| Strongly disagree | 0 | 0.0 | 0 | 0.0 | |
| Have you thought about reducing the amount of shisha you smoke? (n=38) | | | | | <i>p=1.00</i> |
| Yes, [Within the next 30 days/ next 6 months/ completely stopping] | 18 | 47.4 | 18 | 47.4 | |
| No / Don't know | 20 | 52.6 | 20 | 52.6 | |
| Have you talked to someone about the harms of smoking shisha? (n=28) | | | | | <i>p=0.73</i> |
| Yes | 18 | 64.3 | 16 | 57.1 | |
| No / Don't know | 10 | 35.7 | 12 | 42.9 | |
| Do you know where to find information or support to help quit smoking shisha? (n=28) | | | | | <i>p=1.00</i> |
| Yes | 4 | 14.3 | 5 | 17.9 | |
| No / Don't know | 24 | 85.7 | 23 | 82.1 | |

Shisha smoking status

People who smoke shisha

| | Baseline | | Post-campaign | | <i>p-value</i> |
|---|----------|-------------|---------------|-------------|----------------|
| | n | % | n | % | |
| Have you seen, heard or read anything about harms of shisha smoking (n=56) | | | | | <i>p=0.05</i> |
| Yes | 26 | 46.4 | 36 | 64.3 | |
| No or Don't know | 30 | 53.6 | 20 | 35.7 | |
| Shisha contains cancer-causing substances (n=57) | | | | | <i>p=0.22</i> |
| Strongly agree | 17 | 29.8 | 27 | 47.4 | |
| Somewhat agree | 23 | 40.4 | 13 | 22.8 | |
| Neutral / Don't know | 16 | 28.1 | 15 | 26.3 | |
| Somewhat disagree | 0 | 0.0 | 1 | 1.8 | |
| Strongly disagree | 1 | 1.8 | 1 | 1.8 | |
| What are the health effects of smoking shisha compared to cigarettes? (n=55) | | | | | <i>p=1.00</i> |
| Same or more harmful | 34 | 61.8 | 34 | 61.8 | |
| Less harmful or Don't know | 21 | 38.2 | 21 | 38.2 | |
| Smoking shisha can cause damage to your body (n=59) | | | | | <i>p=0.19</i> |
| Strongly agree | 25 | 42.4 | 31 | 52.5 | |
| Somewhat agree | 23 | 39.0 | 19 | 32.2 | |
| Neutral / Don't know | 9 | 15.3 | 8 | 13.6 | |
| Somewhat disagree | 2 | 3.4 | 1 | 1.7 | |
| Strongly disagree | 0 | 0.0 | 0 | 0.0 | |
| Have you thought about reducing the amount of shisha you smoke? (n=65) | | | | | <i>p=0.52</i> |
| Yes, [Within the next 30 days/ next 6 months/ completely stopping] | 36 | 55.4 | 40 | 61.5 | |
| No / Don't know | 29 | 44.6 | 25 | 38.5 | |
| Have you talked to someone about the harms of smoking shisha? (n=48) | | | | | <i>p=0.12</i> |
| Yes | 26 | 54.2 | 19 | 39.6 | |
| No / Don't know | 22 | 45.8 | 29 | 60.4 | |
| Do you know where to find information or support to help quit smoking shisha? (n=58) | | | | | <i>p=1.00</i> |
| Yes | 12 | 20.7 | 12 | 20.7 | |
| No / Don't know | 46 | 79.3 | 46 | 79.3 | |

People who don't smoke shisha

| | Baseline | | Post-campaign | | <i>p</i> -value |
|---|----------|-------------|---------------|-------------|-----------------|
| | n | % | n | % | |
| Have you seen, heard or read anything about harms of shisha smoking (n=23) | | | | | <i>p</i> =0.04 |
| Yes | 10 | 43.5 | 17 | 73.9 | |
| No or Don't know | 13 | 56.5 | 6 | 26.1 | |
| Shisha contains cancer-causing substances (n=26) | | | | | <i>p</i> =0.41 |
| Strongly agree | 18 | 69.2 | 19 | 73.1 | |
| Somewhat agree | 6 | 23.1 | 7 | 26.9 | |
| Neutral / Don't know | 1 | 3.8 | 0 | 0.0 | |
| Somewhat disagree | 1 | 3.8 | 0 | 0.0 | |
| Strongly disagree | 0 | 0.0 | 0 | 0.0 | |
| What are the health effects of smoking shisha compared to cigarettes? (n=26) | | | | | <i>p</i> =0.73 |
| Same or more harmful | 21 | 80.8 | 19 | 73.1 | |
| Less harmful or Don't know | 5 | 19.2 | 7 | 26.9 | |
| Smoking shisha can cause damage to your body (n=26) | | | | | <i>p</i> =0.74 |
| Strongly agree | 21 | 80.8 | 21 | 80.8 | |
| Somewhat agree | 5 | 19.2 | 4 | 15.4 | |
| Neutral / Don't know | 0 | 0.0 | 1 | 3.8 | |
| Somewhat disagree | 0 | 0.0 | 0 | 0.0 | |
| Strongly disagree | 0 | 0.0 | 0 | 0.0 | |
| Have you thought about reducing the amount of shisha you smoke? (n=26) | | | | | <i>p</i> =1.00 |
| Yes, [Within the next 30 days/ next 6 months/ completely stopping] | 6 | 23.1 | 5 | 19.2 | |
| No / Don't know | 20 | 76.9 | 21 | 80.8 | |
| Have you talked to someone about the harms of smoking shisha? (n=21) | | | | | <i>p</i> =0.45 |
| Yes | 17 | 81.0 | 14 | 66.7 | |
| No / Don't know | 4 | 19.0 | 7 | 33.3 | |
| Do you know where to find information or support to help quit smoking shisha? (n=21) | | | | | <i>p</i> =1.00 |
| Yes | 6 | 28.6 | 5 | 23.8 | |
| No / Don't know | 15 | 71.4 | 16 | 76.2 | |

Confidential

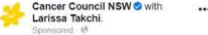



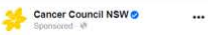

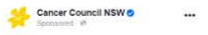







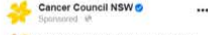





HLB Pre-session task

Record ID _____

This brief task invites you to reflect on whether you have seen any social media posts related to Healthy Lunch Box over the past few months.

This task should take less than 5 minutes.

Healthy Lunch Box social media posts

- 1.  Sponsored
It's back to school time! 🎒 Looking for lunch ideas? 🍴 Try this simple recipe from @Masterchef 2019 winner Larissa Takchi

HEALTHYLUNCHBOX.COM.AU
FREE Healthy Recipes
An easy recipe from Larissa Takchi [LEARN MORE](#)
- 2.  Sponsored
Try our Lunch Box Builder for delicious healthy ideas for the new school year! 🍌

HEALTHYLUNCHBOX.COM.AU
Complete our lunch box builder [LEARN MORE](#)
- 3.  Sponsored
Looking for healthy snacks for your kid's lunch box? 🍌 🥕 🥒? Take a look at our healthy snack alternatives 🍌 🥕 🥒

HEALTHYLUNCHBOX.COM.AU
Healthy lunches made easy! [LEARN MORE](#)
- 4.  Sponsored
It's almost back to school time, so that means time to start planning the lunch box. 🍌 Check out our range of delicious recipes today!
and yogurt

HEALTHYLUNCHBOX.COM.AU
Banana Pikelets Recipe
Healthy lunches made easy! [LEARN MORE](#)
- 5.  Sponsored
Do your kids love their smoothies? 🍌 Here's a delicious, healthy recipe for a Berrylicious Smoothie!

HEALTHYLUNCHBOX.COM.AU
Berrylicious Smoothie Recipe [DOWNLOAD](#)
- 6.  Sponsored
What's in your lunchbox this season? 🍌 Summer is the perfect time to eat more fruit, vegies and salads

HEALTHYLUNCHBOX.COM.AU
Summer fruits make the best snacks [LEARN MORE](#)
- 7.  Sponsored
Who doesn't love spag bo? Here's a recipe for sauce that you can serve with pasta or use as a sandwich filling.

HEALTHYLUNCHBOX.COM.AU
FREE Healthy Recipes
Cancer Council NSW [DOWNLOAD](#)
- 8.  Sponsored
Do your kids love chicken drumsticks? This braised chicken and vegetables recipe makes a great family meal and...

HEALTHYLUNCHBOX.COM.AU
Braised chicken and vegies
Healthy lunches made easy! [DOWNLOAD](#)
- 9.  Sponsored
Our zucchini and cheese arancini balls are bite-sized morsels perfect for the lunch box or as a healthy snack to fill hungry tummies.

HEALTHYLUNCHBOX.COM.AU
Mini arancini balls
Hungry tummy recipes [LEARN MORE](#)
- 10.  Sponsored
Enjoy #PancakeDay the lighter way with our egg and healthy banana pancakes. If you're lucky enough to have any leftovers, they will make a great addition to the lunch box tomorrow.
Grab the recipe and more at <https://healthylunchbox.com.au/pancakes-please/>


Q1. Which of the above Healthy Lunch Box posts have you seen? (check all that apply)

1 2 3 4 5 6 7 8 9 10 Other

Q2. Did you take any action on the post? (Like, react, comment, share, click, watch, etc). Before the focus group session, we'd like you to reflect and consider why you did, or did not, take an action on the post.

Some possible thought-starters could be:

Reasons for taking an action:

- It was informative
- There was something visually eye-catching about the post
- Something that touched you emotionally
- Feeling that it fit with your values
- Wanting to share the info with others
- Wanting to share the 'experience' with a friend/wanting to discuss it with a friend
- Wanting to support the organisation that posted the content (the Cancer Council)

Reasons for not taking an action:

- It didn't really catch my attention
- I've seen lots of similar content online before
- Not wanting to let your network know you're interested in this kind of content
- Feeling there's no point in taking an action
- Not interested in the content

We don't need you to provide an answer right now, but this question will be part of our discussion during the focus group, so please remember your response for the focus group discussion.

That completes the pre-session task.

We look forward to our discussions during the Focus Group session. If you have any questions or concerns in the meantime, please feel free to contact Lilian Chan (lilian.chan@sydney.edu.au).

Appendix 3:

DATA COLLECTION INSTRUMENTS

This appendix contains the data collection instruments used in this dissertation that have not already been included as supplementary material in the manuscripts (Appendix 2).

SB CAMPAIGN EVALUATION
WAVE 1

[single]

Q1. Do you know someone who has lost a baby in late pregnancy or during birth?
This could include family, friends, close acquaintances, or yourself.

1. Yes
2. No
98. Don't know
99. Prefer not to say

[single]

Q2. Which response is the most appropriate for the following statement: "Stillbirth is preventable"

1. Always
2. Mostly
3. Sometimes
4. Rarely
5. Never
98. Don't know

[single] [Randomise statements 1 - 5]

Q3. If someone in your family or someone whom you know well was pregnant and was concerned about her baby moving less, would you: [randomly rotate order or responses]

1. Tell her that's normal
2. Tell her to keep observing carefully for the next 24hrs and contact a doctor/midwife if it persists
3. Tell her to count the number of movements and record in a diary
4. Encourage her to call the doctor/midwife/hospital straight away
5. Advise her to have a cold or fizzy drink to wake up the baby
98. Don't know

[Multi] [Randomise Statements 1-6]

Q4. Which of the following advice would you give to someone in your family or someone whom you know well who is pregnant *specifically* to reduce the risk of stillbirth?

Please select all that apply.

1. Quit smoking and avoid secondhand smoke
2. Get familiar with your baby's movements patterns and if you notice a change let your doctor/midwife know straight away
3. Sleep on your side in late pregnancy
4. Take folate supplements
5. Avoid pre-packaged salads
6. Keep physically active by walking 30 minutes each day
98. Don't know

[Single]

Q5. Have you seen or heard any messages in the media or online about stillbirth in the past 6 months?

1. Yes
2. No
98. Don't know

If Q5 = 1 (Yes), then ask Q5a.

[Open]

Q5a. What did you see, hear or read?

[Open text box]

ASK ALL [Multi] [Rotate images 1 – 4]

Q6. Which of the following messages have you seen or heard about stillbirth?

Select all that apply

[Still six lives image]

None of the above

98. Don't know
99. None of the above

IF Q6 = 1, 2, 3, or 4, then ask Q7.

Q7. Where did you hear/see that message?

1. Social media (e.g. Facebook or Instagram)
2. YouTube
3. A story in the media (e.g. newspaper, magazine, TV, radio or website)
4. Online advertisement
5. Podcast
6. In a medical setting, GP, or clinic
7. Other (please specify):
98. Don't know
99. Prefer not to say

DEMOGRAPHICS [SAME QUESTIONS ASKED FOR ALL WAVES]

And finally, a few questions about you.

[Single] [Timestamp SDEDU] SDEDU. STANDARD DEMOGRAPHIC QUESTION

What is the highest level of education you've reached?

1. Some Primary School
2. Finished Primary School
3. Some Secondary School
4. Some Technical Or Commercial/ TAFE
5. Passed School Certificate / Passed 4th Form / Passed Intermediate / Year 10 / Junior or Achievement certificate
6. Passed 5th Form / Year 11 / Passed Leaving or Sub-senior certificate
7. Finished Technical School / Commercial College / TAFE (including trade certificate) / other certificate or apprenticeship
8. Finished or now studying for Matriculation, Higher School Certificate (H.S.C.), V.C.E., Year 12, or Senior Certificate
9. Some University or some college of Advanced Education training
10. Diploma from College of Advanced Education or TAFE (Not Degree), Tertiary or Management Training (including Diploma other than University Degree)
11. Now at University or College of Advanced Education
12. Degree from University or College of Advanced Education
13. Higher Degree or Higher Diploma (e.g. Ph.D, Masters)
99. Prefer not to say

[Single] [Timestamp SDMAR] SDMAR. STANDARD DEMOGRAPHIC QUESTION

What is your marital status?

1. Married
2. De Facto
3. Separated
4. Divorced
5. Widowed
6. Engaged
7. Planning To Marry
8. Single
99. Prefer not to say

[Single] [Timestamp SDWSR] SDWSR. STANDARD DEMOGRAPHIC QUESTION

What best describes your current employment situation?

1. Employed Full-time (35 hours or more per week)
2. Employed Part-time (Less than 35 hours per week)
3. Looking for full-time work (35 hours or more per week)
4. Looking for part-time work (Less than 35 hours per week)
5. Retired
6. Student
7. Non-Worker

- 9. Home Duties
- 99. Prefer not to say

[Single] [Timestamp SDINR]

SDINR. STANDARD DEMOGRAPHIC QUESTION

Please indicate your current approximate annual income from all sources before tax.

If you are not certain, please give your best estimate.

- 1. Less than \$6000
- 2. \$6,000 - \$9,999
- 3. \$10,000 - \$14,999
- 4. \$15,000 - \$19,999
- 5. \$20,000 - \$24,999
- 6. \$25,000 - \$29,999
- 7. \$30,000 - \$34,999
- 8. \$35,000 - \$39,999
- 9. \$40,000 - \$44,999
- 10. \$45,000 - \$49,999
- 11. \$50,000 - \$59,999
- 12. \$60,000 - \$69,999
- 13. \$70,000 - \$79,999
- 14. \$80,000 - \$89,999
- 15. \$90,000 - \$99,999
- 16. \$100,000 - \$109,999
- 17. \$110,000 - \$119,999
- 18. \$120,000 - \$129,999
- 19. \$130,000 - \$149,999
- 20. \$150,000 - \$199,999
- 21. \$200,000 - \$249,999
- 22. \$250,000 - \$299,999
- 23. \$300,000 Or More
- 98. Can't Say
- 99. Prefer not to answer

IF SDINR=98-99, ASK SDINRR

[Single] [Timestamp SDINRR]

SDINRR. STANDARD DEMOGRAPHIC QUESTION

Could you please tell me whether your income would be over \$50,000 or under \$50,000 per annum?

- 1. Under \$50,000
- 2. \$50,000 Or More
- 98. Can't Say
- 99. Prefer not to answer

SB CAMPAIGN EVALUATION
WAVE 2

[single]

Q1. Do you know someone who has lost a baby in late pregnancy or during birth?
This could include family, friends, close acquaintances, or yourself.

1. Yes
2. No
98. Don't know
99. Prefer not to say

Q1b. You've responded that you know someone who has lost a baby in late pregnancy or during birth. Was that person:

1. A close friend or family or yourself
2. A distant acquaintance (eg. Distant friends, someone you follow on social media, or a public figure)
98. Don't know
99. Prefer not to say

[single]

Q2. Which response is the most appropriate for the following statement: "Stillbirth is preventable"

1. Always
2. Mostly
3. Sometimes
4. Rarely
5. Never
98. Don't know

[single] [Randomise statements 1 - 5]

Q3. If someone in your family or someone whom you know well was pregnant and was concerned about her baby moving less, would you: [randomly rotate order or responses]

1. Tell her that's normal
2. Tell her to keep observing carefully for the next 24hrs and contact a doctor/midwife if it persists
3. Tell her to count the number of movements and record in a diary
4. Encourage her to call the doctor/midwife/hospital straight away
5. Advise her to have a cold or fizzy drink to wake up the baby
98. Don't know

[Multi] [Randomise Statements 1-6]

Q4. Which of the following advice would you give to someone in your family or someone whom you know well who is pregnant *specifically* to reduce the risk of stillbirth?

Please select all that apply.

1. Quit smoking and avoid secondhand smoke
2. Get familiar with your baby's movements patterns and if you notice a change let your doctor/midwife know straight away
3. Sleep on your side in late pregnancy
4. Take folate supplements

5. Avoid pre-packaged salads
6. Keep physically active by walking 30 minutes each day
7. None of the above
8. Other (please specify):
9. Would not give advice
98. Don't know

[Single]

Q5. Have you seen or heard any messages in the media or online about stillbirth in the past 6 months?

1. Yes
2. No
98. Don't know

If Q5 = 1 (Yes), then ask Q5a.

[Open]

Q5a. What did you see, hear or read?

[Open text box]

ASK ALL [Multi] [Rotate images 1 – 4]

Q6. Which of the following messages have you seen or heard about stillbirth?

Select all that apply

1. Image 1 (Movements Matter)



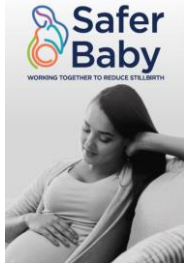
2. Image 2 (Still Six Lives – new SSL Logo)



3. Image 3 (Still Aware)



4. Image 4 (Safer Baby - SBB Brochure)



- 98. Don't know
- 99. None of the above

IF Q6 = 1, 2, 3, or 4, then ask Q7. For each image selected at Q6, then ask Q7, programmed in a loop. Also display the image selected at Q6 when asking Q7.

Q7. Where did you hear/see that message?

- 1. Social media (e.g. Facebook or Instagram)
- 2. YouTube
- 3. A story in the media (e.g. newspaper, magazine, TV, radio or website)
- 4. Online advertisement
- 5. TV advertisement
- 6. Podcast
- 9. Radio advertisement
- 7. In a medical setting, GP, or clinic
- 8. Other (please specify):
- 98. Don't know
- 99. Prefer not to say

IF Q6 = 2, THEN ASK Q8.

[MULTI]

Q8. If you saw the Still Six Lives video, did you find it:
Select all that apply

- 1. Informative and interesting
- 2. Made me think about stillbirth more
- 3. Emotionally disturbing/ distressing
- 4. Not relevant to me
- 5. None of the above
- 6. I have not seen the Still Six Lives video
- 98. Don't know

SB CAMPAIGN EVALUATION
WAVE 3

Q1. Do you know someone who has lost a baby in late pregnancy or during birth?
This could include family, friends, close acquaintances, or yourself.

1. Yes
2. No
98. Don't know
99. Prefer not to say

Q2. Which response is the most appropriate for the following statement: "Stillbirth is preventable"

1. Always
2. Mostly
3. Sometimes
4. Rarely
5. Never
98. Don't know

Q3. If someone in your family or someone whom you know well was pregnant and was concerned about her baby moving less, would you: [randomly rotate order or responses]

1. Tell her that's normal
2. Tell her to keep observing carefully for the next 24hrs and contact a doctor/midwife if it persists
3. Tell her to count the number of movements and record in a diary
4. Encourage her to call the doctor/midwife/hospital straight away
5. Advise her to have a cold or fizzy drink to wake up the baby
98. Don't know

Q4. Which of the following advice would you give to someone in your family or someone whom you know well who is pregnant *specifically* to reduce the risk of stillbirth?

Please select all that apply.

1. Quit smoking and avoid secondhand smoke
2. Get familiar with your baby's movements patterns and if you notice a change let your doctor/midwife know straight away
3. Sleep on your side in late pregnancy
4. Take folate supplements
5. Avoid pre-packaged salads
6. Keep physically active by walking 30 minutes each day
7. None of the above
8. Other (please specify):
9. Would not give advice
98. Don't know

Q5. Have you seen or heard any messages in the media or online about stillbirth in the past 6 months?

1. Yes
2. No
98. Don't know

If Q5 = 1 (Yes), then ask Q5a.

Q5a. What did you see, hear or read?
[Open text box]

If Q5 = 1 (Yes), then ask Q5b.

Q5b. Where did you hear/see that message?

1. Social media (e.g. Facebook or Instagram)
2. YouTube
3. A story in the media (e.g. newspaper, magazine, TV, radio or website)
4. Online advertisement
5. TV advertisement
6. Podcast
9. Radio advertisement
7. In a medical setting, GP, or clinic
8. Other (please specify):
98. Don't know
99. Prefer not to say

Q6. Which of the following messages have you seen or heard about stillbirth?

Please select all that apply [randomly rotate order or responses]

1. Six babies are stillborn every day.
2. Stillbirth. Together we can reduce the risk.
3. Make the Stillbirth Promise.
4. A couple sharing their story of having a stillborn baby.
5. Be aware of your baby's movements
6. Sleep on your side after 28 weeks.
7. Quit for baby, stop smoking during pregnancy
8. Big or small. Your baby's growth matters.
9. Get to know your baby's normal.
98. Don't know
99. None of the above

Q7. Which of the following images have you seen or heard about stillbirth?

Please select all that apply [randomly rotate order of showing them]

5. Image 1 (Movements Matter)



6. Image 2 (Still Six Lives)



7. Image 3 (Still Six Lives)



8. Image 4 (Still Six Lives)



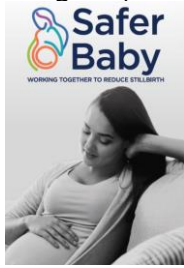
9. Image 5 (Still Six Lives)



10. Image 6 (Still Aware)



11. Image 7 (Safer Baby - SBB Brochure)



- 98. Don't know
- 99. None of the above

Q8. [If selected option 1-7 in Q6, or option 2-5 in Q7] Did you think the campaign messages/images were relevant to you or your friends and family?

- 1. Yes
- 2. No
- 98. Don't know
- 99. Prefer not to say

Q9. [If selected 'Yes' to Q5] If you saw the Stillbirth Promise series of videos (example below), did you find it:

Please select all that apply



The Stillbirth Promise

[Learn more.](#)

- 7. Informative and interesting
- 8. Heartbreaking and poignant
- 9. Made me more aware of stillbirth
- 10. Motivated me to make the Stillbirth Promise
- 11. Emotionally disturbing/ distressing
- 12. None of the above
- 13. I have not seen the Stillbirth Promise series of videos
- 98. Don't know

Confidential

Page 1

Evaluating the impact of a national stillbirth campaign on awareness and knowledge among pregnant women

If you are 18 years of age or older and currently pregnant, we would love to hear from you.

You are invited to take part in a survey about awareness of stillbirth and actions that can reduce the risk of stillbirth.

This survey takes approximately 10 minutes to complete. Most of the questions are multiple choice style.

Participation in this survey is entirely voluntary. If you do decide to participate but then change your mind before finishing the survey, simply close your web browser.

The information you provide is completely confidential and anonymous.

If you wish to receive a summary of the study outcomes, you have the option of providing your email address at the end. Your email address will be collected in a separate form, and will not be linked to your survey responses.

Access to survey information will be limited to members of the research team. This study has been approved by the Ethics Review Committee (RPAH Zone) of the Sydney Local Health District (Study number X20-0340).

If you have any questions about the study, feel free to contact Professor Adrienne Gordon, The University of Sydney, by phoning (02) 8627 0403 or emailing adrienne.gordon@sydney.edu.au.

If you'd like to talk to someone about your pregnancy, please talk to your usual doctor or midwife. You can also contact your hospital antenatal clinic, Birth Unit, or Sands (a Miscarriage, stillbirth and newborn death support service) or PANDA (Perinatal Anxiety and Depression Australia). The contact details of these are provided on the Information for Participants sheet.

Participant Consent

I have read and understood the Information for Participants sheet for this study, and agree to participate in this research study.

- Yes, I agree
 No

Thank you for your interest in this survey.**Before we start, we need to confirm that you are eligible to take part.**

Are you 18 years of age or more?

- Yes
 No

Are you currently pregnant?

- Yes
 No

At which hospital are you currently receiving care?

- Gold Coast University Hospital, Southport
 Hornsby Ku-ring-gai Hospital, Hornsby
 Mater Mothers' Hospital, South Brisbane
 Royal Prince Alfred Hospital, Camperdown
 Royal Hospital for Women, Randwick
 Royal North Shore Hospital, St Leonards
 Townsville University Hospital, Douglas
 None of the above

What is your age?

- 18-24 years
 25-34 years
 35-44 years
 45-54 years
 55 or more years
 Prefer not to say

How many weeks pregnant are you?

Which of the following actions can reduce the risk of stillbirth in late pregnancy? Select all that apply.

- Quit smoking and avoid secondhand smoke
 Take folate supplements
 Avoid pre-packaged salads
 Get familiar with your baby's movement patterns and if you notice a change let your doctor/midwife know straight away
 Sleep on your side in late pregnancy
 Keep physically active by walking 30 minutes each day
 Don't know / Not sure

What position did you usually go to sleep in over the last week?

- Left side
 Right side
 Both left and right sides
 Back
 Tummy
 Sitting or propped up
 No particular position
 Can't remember / Prefer not to say

Do you try to avoid going to sleep in any particular position? Select all that apply.

- Yes, I avoid sleeping on my back
- Yes, I avoid sleeping on my tummy
- Yes, I avoid sleeping on my left side
- Yes, I avoid sleeping on my right side
- Yes, I avoid sleeping sitting or propped up
- No
- Don't know / Prefer not to say

What is a safe going-to-sleep position in late pregnancy (after 28 weeks)? Select all that apply.

- Back
- Tummy
- Left side
- Right side
- Either side
- Don't know

Have you seen information about safe going-to-sleep positions in late pregnancy?

- Yes
- No
- Can't remember / Prefer not to say

What happens to baby's movements towards the end of pregnancy?

- Movements stop
- Babies move less because they're running out of room
- Babies move more
- Babies move about the same
- I don't know

What should you do if you feel your baby is moving less than usual?

- Lie on your side for two hours and see if you can count 10 movements
- Contact your doctor or midwife immediately
- Double check if your baby is ok with a home doppler
- Wait until the next day to see if things improve
- Have a cold drink or something to eat to try make the baby move
- Not sure

Have you seen information about the importance of babies' movements during pregnancy?

- Yes
- No
- Can't remember / Prefer not to say

Have you seen information about the link between decreased fetal movements and stillbirth?

- Yes
- No
- Can't remember / Prefer not to say

Have you received written or verbal advice encouraging you to contact your doctor or midwife if you are worried about your baby's movements?

- Yes
 No
 Can't remember / Prefer not to say
-

Did you smoke 12 months ago?

- Yes
 No
 Prefer not to say
-

Do you still smoke (even if only occasionally) whilst you are pregnant?

- Yes
 No
 Prefer not to say
-

How often does anyone smoke inside your home?

- Daily
 Weekly
 Monthly
 Less than monthly
 Never
 Don't know / Prefer not to say
-

Have you seen information about the risks associated with smoking during pregnancy?

- Yes
 No
 Can't remember / Prefer not to say
-

At your antenatal appointments, has the midwife/ doctor talked with you about the risks of having a stillborn baby?

- Yes
 No
 Can't remember / Prefer not to say
-

Before becoming pregnant for the first time, had you been part of conversations, or seen social media posts by family and friends about the topic of stillbirth?

- Yes
 No
 Can't remember / Prefer not to say
-

During this pregnancy, have you been part of conversations, or seen social media posts by family and friends about the topic of stillbirth?

- Yes
 No
 Can't remember / Prefer not to say

Do you know someone who has had a stillborn baby in the second half of pregnancy or during birth? This could include yourself, family, friends or close acquaintances.

- Yes
 No
 Unsure / Prefer not to say

Have you seen or heard any messages in the media or online about stillbirth in the past 6 months?

- Yes
 No
 Not sure

Have you seen any of the following messages?

1



2



3



4



Select all that apply.

- 1
 2
 3
 4
 None of the above

Where did you see or hear that message?

- Social media (eg Facebook or Instagram)
 YouTube
 A story in the media (eg newspaper, magazine, TV, radio or website)
 Online advertisement
 TV advertisement
 Podcast
 In medical setting (eg GP or clinic)
 Other

Please describe where you saw or heard the message:

You're almost finished! These last few questions are about you and your pregnancy.

What is your ethnicity?

- Maori or Pacific Islander
- Caucasian
- South Asian (including Indian, Pakistani, Bangladeshi, Sri Lankan)
- Mainland Southeast Asian (including Cambodian, Lao, Viet, Thai, Malay, Filipino, Indonesian)
- East Asian (including Japanese, Chinese, Korean)
- Middle Eastern or North African
- Sub-Saharan African
- Central or South American
- Other

Please describe your ethnicity:

Do you identify as Aboriginal or Torres Strait Islander?

- Yes, Aboriginal
- Yes, Torres Strait Islander
- Yes, both Aboriginal and Torres Strait islander
- No, neither

Is English your first language?

- Yes
- No
- Prefer not to say

Which state or territory do you live in?

- NSW
- Queensland
- ACT
- Victoria
- NT
- South Australia
- Tasmania
- Western Australia

Which of the following best describes the area you live in?

- Metropolitan
- Regional/Rural
- Remote

Prior to this current pregnancy, have you been pregnant before?

- Yes
- No
- Prefer not to say

What is your main model of antenatal care for this current pregnancy?

- Public hospital care
- Private obstetrician
- Private midwifery
- General Practitioner shared care
- Midwifery group/team practice
- Midwifery caseload
- Other

That is the final question of this survey.

Thank you for your time.

Stillbirth Campaign Survey Oct/Nov 2021

If you are 18 years of age or older and currently pregnant, we would love to hear from you.

You are invited to take part in a survey about awareness of stillbirth and actions that can reduce the risk of stillbirth.

This survey takes approximately 10 minutes to complete. Most of the questions are multiple choice style.

Participation in this survey is entirely voluntary. If you do decide to participate but then change your mind before finishing the survey, simply close your web browser.

The information you provide is completely confidential and anonymous.

If you wish to receive a summary of the study outcomes, you have the option of providing your email address at the end. Your email address will be collected in a separate form, and will not be linked to your survey responses.

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If you'd like to talk to someone about your pregnancy, please talk to your usual doctor or midwife. You can also contact your hospital antenatal clinic, Birth Unit, or Sands (a Miscarriage, stillbirth and newborn death support service) or PANDA (Perinatal Anxiety and Depression Australia). The contact details of these are provided on the Information for Participants sheet.

Participant Consent

I have read and understood the Information for Participants sheet for this study, and agree to participate in this research study.

- Yes, I agree
 No

Thank you for your interest in this survey.**Before we start, we need to confirm that you are eligible to take part.**

Are you 18 years of age or more?

- Yes
 No

Are you currently pregnant?

- Yes
 No

At which hospital are you currently receiving care?

- Gold Coast University Hospital, Southport
 Hornsby Ku-ring-gai Hospital, Hornsby
 Mater Mothers' Hospital, South Brisbane
 Royal Prince Alfred Hospital, Camperdown
 Royal Hospital for Women, Randwick
 Royal North Shore Hospital, St Leonards
 Townsville University Hospital, Douglas
 None of the above

What is your age?

- 18-24 years
 25-34 years
 35-44 years
 45-54 years
 55 or more years
 Prefer not to say

How many weeks pregnant are you?

Which of the following actions can reduce the risk of stillbirth in late pregnancy? Select all that apply.

- Quit smoking and avoid secondhand smoke
 Take folate supplements
 Avoid pre-packaged salads
 Get familiar with your baby's movement patterns and if you notice a change let your doctor/midwife know straight away
 Sleep on your side in late pregnancy
 Keep physically active by walking 30 minutes each day
 Don't know / Not sure

What position did you usually go to sleep in over the last week?

- Left side
 Right side
 Both left and right sides
 Back
 Tummy
 Sitting or propped up
 No particular position
 Can't remember / Prefer not to say

Do you try to avoid going to sleep in any particular position? Select all that apply.

- Yes, I avoid sleeping on my back
- Yes, I avoid sleeping on my tummy
- Yes, I avoid sleeping on my left side
- Yes, I avoid sleeping on my right side
- Yes, I avoid sleeping sitting or propped up
- No
- Don't know / Prefer not to say

What is a safe going-to-sleep position in late pregnancy (after 28 weeks)? Select all that apply.

- Back
- Tummy
- Left side
- Right side
- Either side
- Don't know

Have you seen information about safe going-to-sleep positions in late pregnancy?

- Yes
- No
- Can't remember / Prefer not to say

What happens to baby's movements towards the end of pregnancy?

- Movements stop
- Babies move less because they're running out of room
- Babies move more
- Babies move about the same
- I don't know

What should you do if you feel your baby is moving less than usual?

- Lie on your side for two hours and see if you can count 10 movements
- Contact your doctor or midwife immediately
- Double check if your baby is ok with a home doppler
- Wait until the next day to see if things improve
- Have a cold drink or something to eat to try make the baby move
- Not sure

Have you seen information about the importance of babies' movements during pregnancy?

- Yes
- No
- Can't remember / Prefer not to say

Have you seen information about the link between decreased fetal movements and stillbirth?

- Yes
- No
- Can't remember / Prefer not to say

Have you received written or verbal advice encouraging you to contact your doctor or midwife if you are worried about your baby's movements?

- Yes
 No
 Can't remember / Prefer not to say
-

Did you smoke 12 months ago?

- Yes
 No
 Prefer not to say
-

Do you still smoke (even if only occasionally) whilst you are pregnant?

- Yes
 No
 Prefer not to say
-

How often does anyone smoke inside your home?

- Daily
 Weekly
 Monthly
 Less than monthly
 Never
 Don't know / Prefer not to say
-

Have you seen information about the risks associated with smoking during pregnancy?

- Yes
 No
 Can't remember / Prefer not to say
-

At your antenatal appointments, has the midwife/ doctor talked with you about the risks of having a stillborn baby?

- Yes
 No
 Can't remember / Prefer not to say
-

Before becoming pregnant for the first time, had you been part of conversations, or seen social media posts by family and friends about the topic of stillbirth?

- Yes
 No
 Can't remember / Prefer not to say
-

During this pregnancy, have you been part of conversations, or seen social media posts by family and friends about the topic of stillbirth?

- Yes
 No
 Can't remember / Prefer not to say

Do you know someone who has had a stillborn baby in the second half of pregnancy or during birth? This could include yourself, family, friends or close acquaintances.

- Yes
- No
- Unsure / Prefer not to say

Have you seen or heard any messages in the media or online about stillbirth in the past 6 months?

- Yes
- No
- Not sure

Where did you see or hear that message?

- Social media (eg Facebook or Instagram)
- YouTube
- A story in the media (eg newspaper, magazine, TV, radio or website)
- Online advertisement
- TV advertisement
- Podcast
- In medical setting (eg GP or clinic)
- Other

Which of the following messages have you seen or heard about stillbirth? Please select all that apply.

- Six babies are born stillborn every day
- Stillbirth. Together we can reduce the risk
- Make the Stillbirth Promise
- A couple sharing their story of having a stillborn baby
- Be aware of your baby's movements
- Sleep on your side after 28 weeks
- Quit for baby, stop smoking during pregnancy
- Big or small. Your baby's growth matters
- Get to know your baby's normal
- Don't know / None of the above

Have you seen any of the following messages?

1



2



3



4



5



6



7

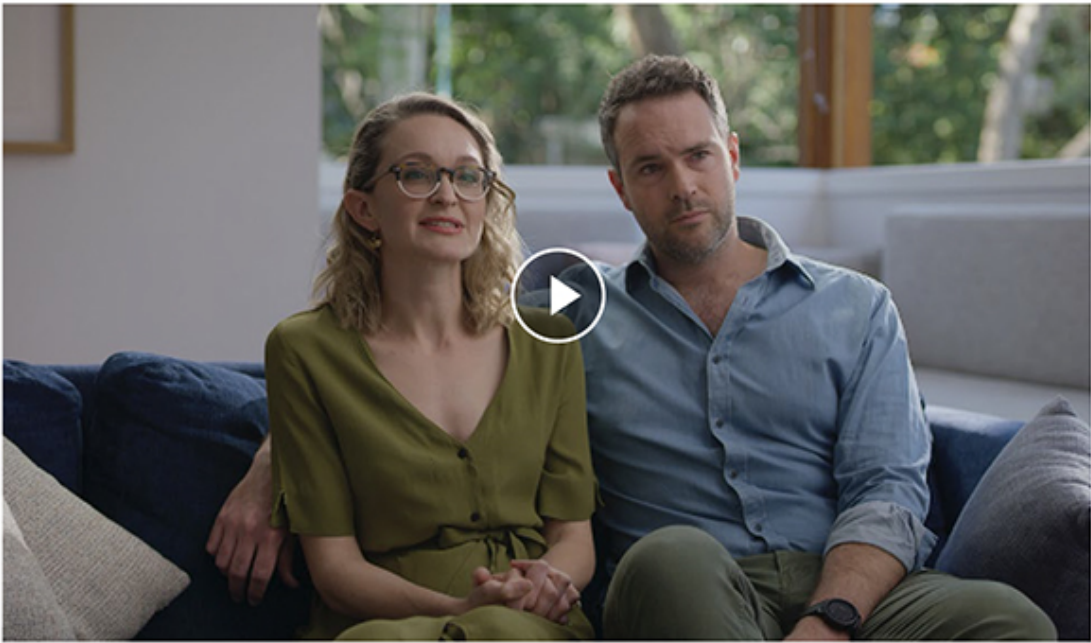


Select all that apply.

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- None of the above

Did you think the campaign messages/images were relevant to you or your friends and family?

- Yes
- No
- Don't know/ Not sure



The Stillbirth Promise

[Learn more.](#)

If you saw the Stillbirth Promise series of videos (example above), did you find it: (Please select all that apply)

- Informative and interesting
- Heartbreaking and poignant
- Made me more aware of stillbirth
- Motivated me to make the Stillbirth Promise
- Emotionally disturbing/ distressing
- None of the above
- I have not seen the Stillbirth Promise series of videos / Don't know

You're almost finished! These last few questions are about you and your pregnancy.

What is your ethnicity?

- Maori or Pacific Islander
- Caucasian
- South Asian (including Indian, Pakistani, Bangladeshi, Sri Lankan)
- Mainland Southeast Asian (including Cambodian, Lao, Viet, Thai, Malay, Filipino, Indonesian)
- East Asian (including Japanese, Chinese, Korean)
- Middle Eastern or North African
- Sub-Saharan African
- Central or South American
- Other

Please describe your ethnicity:

Do you identify as Aboriginal or Torres Strait Islander?

- Yes, Aboriginal
- Yes, Torres Strait Islander
- Yes, both Aboriginal and Torres Strait islander
- No, neither

Is English your first language?

- Yes
- No
- Prefer not to say

Which state or territory do you live in?

- NSW
- Queensland
- ACT
- Victoria
- NT
- South Australia
- Tasmania
- Western Australia

Which of the following best describes the area you live in?

- Metropolitan
- Regional/Rural
- Remote

Prior to this current pregnancy, have you been pregnant before?

- Yes
- No
- Prefer not to say

What is your main model of antenatal care for this current pregnancy?

- Public hospital care
- Private obstetrician
- Private midwifery
- General Practitioner shared care
- Midwifery group/team practice
- Midwifery caseload
- Other

That is the final question of this survey.

Thank you for your time.

Exporting comments from a Facebook post

To export comments from a Facebook post, you need to be the owner of the page to generate a page access token in Facebook's Graph API Explorer.

The process requires:

- The page ID
- The post ID (of the relevant post)
- Access token

Typing the following URL into your browser:

`https://graph.facebook.com/[pageID]_[postID]/comments?access_token=[access token]` will export comments from the relevant Facebook post, with a limit of $n=5,000$. The comments will be displayed in the browser in a structured JSON (JavaScript Object Notation) format, which can be saved as a .json file. The JSON file can be converted into a CSV file for data analysis using R programming package.

‘Shisha No Thanks’ project

Content coding framework for Facebook video comments

Version 6 – 12 February 2021

Research questions and response categories

Q1. Did the target audience accept or reject the campaign message?

- Accept – did they believe it, trust it, understand it?
- Reject – did they dismiss it, discredit it, find it irrelevant?

Q2. Did the campaign video generate conversation about the harms of waterpipe smoking?

Coding Protocol

There are 3 items to complete for each comment.

1. Message Acceptance (Column C)

Did the commenter accept or reject the campaign video message? (Take into account the overall meaning of the comment)

Response: Accept / Reject / Unclear (select from Dropdown list)

2. Subcategory (Column D)

Within the response category, identify the most relevant subcategory.

Response: Select from Dropdown list. See Table 1 for descriptions of subcategories

3. Number tagged (Column E)

How many people were tagged in the comment? (How many times does [name] appear in the comment.)

Response: number 0-10

Notes:

Emojis

- Some comments include emojis – please take into account the meaning of the emoji when classifying each comment. Emojis have been depicted, with <the name of the emoji> to make it clear which emoji it is (as Excel displays them a bit differently sometimes)
- Occasionally there is a string of characters inside angle brackets (eg <U+0635><U+0644><U+0627><U+062D> <U+062E><U+0632><U+0627><U+0645>). These represent an emoji, but we can’t figure out which emoji it is, so just ignore it

Names

- Many comments had people mentioned in them (tagged). Due to confidentiality considerations all names have been replaced with [name].
- le Original comment: John Smith think again bro
Deidentified comment: [name] think again bro

Table 1: Coding Categories

| Message Acceptance Category | Subcategory | Description | Includes: | Examples: |
|-----------------------------|-------------------------------|---|---|---|
| Accept | General stop smoking | Comment shows concern for a friend/family member, tells them not to smoke shisha, OR that the commenter will think twice before smoking shisha again, or a desire to quit/reduce shisha | <ul style="list-style-type: none"> Telling someone not to smoke Concern for a friend/family Personally stop smoking | <ul style="list-style-type: none"> [name] think again hun [name] cut down on the shisha bruhs no more |
| | Agreement with message | Commenter seems to agree with the campaign message (eg repeating info from the message), says how important this info is, OR shows shock or surprise at the facts <i>[Note - see subcategory 'Unclear > No thanks' below]</i> | <ul style="list-style-type: none"> Repeating facts/info from video Agreement with importance of health message Shock or surprise | <ul style="list-style-type: none"> [name] I told ya most the shisha here has tobacco [name] And they say it's harmless. 45mins=100 cigarets When the hospitals are full from people who have lung disease and cancer due to smoking, then you need to know what your doing because it ultimately affects everyone [name] holy demon! Thays deadly |
| | Other | Other comment that shows acceptance of the campaign video, but doesn't fit in above categories | <ul style="list-style-type: none"> Tags friends to tell share the message, but doesn't necessarily change own/other's behaviours | <ul style="list-style-type: none"> [name] [name] still does it anyways <face with tears of joy> |

| Message Acceptance Category | Subcategory | Description | Includes: | Examples: |
|-----------------------------|-------------------|--|---|---|
| Reject | Dismissive | Commenter dismisses the message (doesn't take it seriously) - laughing at it, brushing it off, ridiculing it, or saying that shisha is good/ they want to smoke shisha | <ul style="list-style-type: none"> • Pro-shisha • Laughs it off • Dismiss or ridicules the message | <ul style="list-style-type: none"> • [name] lets smoking 100 ciggies woth next time • [name] get me the argilee cuzz • [name] why do I find this so funny • [name] lol • <laughing emoji> • [name] o well |
| | Scepticism | Doesn't believe the message, or doesn't trust the messenger | <ul style="list-style-type: none"> • Discredits message (says not true) • Cynical about government | <ul style="list-style-type: none"> • Cigarette tax revenue must be down • I would love to see the actual study and research behind these statements of apparent fact • LOLLL what a load of rubbish. Read the comments it's funnier |
| | Other | Other comment that shows rejection of campaign video, but doesn't fit in above categories | | |

| Message Acceptance Category | Subcategory | Description | Includes: | Examples: |
|-----------------------------|-------------------------------------|---|--|---|
| Unclear | No thanks | Comment only contains "[name(s)] no thanks", with nothing else to indicate the meaning/tone of these comments. Meaning is unclear (eg could be no thanks to shisha, no thanks to the campaign, general sarcasm) | | <ul style="list-style-type: none"> [name] no thanks |
| | Genuine question | Comment is a genuine question about the facts, suggesting the person wants to know more | | <ul style="list-style-type: none"> [name] how do they make the comparison? |
| | Personal or cultural attack | Commenter feels personally attacked, or suggests they think the video is stereotyping/racist towards a certain group | <ul style="list-style-type: none"> Feels personally attacked Thinks ad is racist Thinks ad is stereotyping people | <ul style="list-style-type: none"> [name] I feel attacked [name] wow leave western Sydney alone!! [name] ... Racist! How racist is this but [name] |
| | Relevant but meaning unclear | Comment is clearly relevant to the video, but the meaning of the comment is unclear | <ul style="list-style-type: none"> Telling someone to look, but unclear on meaning Relevant responses, but unclear if accept/reject Mixed msg (both accept and reject) in comment | <ul style="list-style-type: none"> [name] <shrugging emoji> [name] this one's for you [name] uh oh [name] I didn't know they came to our place [name] and we did like 5 hrs <shocked face emoji> + <laughing emoji> [name] LMAOOO no more garage shisha [name] hilarious - but - also wow |
| | Irrelevant or other | Comments that don't make sense, or are irrelevant to the campaign message | | |

Confidential

Page 1

Recruitment Survey

Thank you for your interest in taking part in this study. Please read the Participant Information Statement below and indicate whether you consent to take part in this study.

How and why people engage with the Healthy Lunch Box campaign on social media

PARTICIPANT INFORMATION STATEMENT

(1) What is this study about?

You are invited to take part in a research study about how people engage with public health campaigns which use social media, particularly the Cancer Council NSW's Healthy Lunch Box campaign.

You have been invited to participate in this study because you have shown interest in the Healthy Lunch Box campaign through either social media, e-newsletters, or visiting the website. This Participant Information Statement tells you about the research study. Knowing what is involved will help you decide if you want to take part in the research. Please read this sheet carefully and ask questions about anything that you don't understand or want to know more about.

Participation in this research study is voluntary.

By giving your consent to take part in this study you are telling us that you:

Understand what you have read. Agree to take part in the research study as outlined below. Agree to the use of your personal information as described. You will be given a copy of this Participant Information Statement to keep.

(2) Who is running the study?

The study is being carried out by the following researchers:

Dr Blythe O'Hara (Senior Research Fellow, School of Public Health, University of Sydney) Dr Becky Freeman (Senior Lecturer, School of Public Health, University of Sydney) Ms Lilian Chan (PhD Candidate, School of Public Health, University of Sydney) Ms Clare Hughes (Cancer Council NSW) Ms Korina Richmond (Cancer Council NSW) Ms Jane Dibbs (Cancer Council NSW) Ms Rhiannon Edge (Cancer Council NSW) Lilian Chan is conducting this study as the basis for the degree of a Doctor of Philosophy at The University of Sydney. This will take place under the supervision of Dr Blythe O'Hara.

This study is conducted in collaboration with Cancer Council NSW, who run the Healthy Lunch Box campaign.

(3) What will the study involve for me?

If you decide to take part in the research study, we will ask you to complete the following:

An online recruitment survey

The questionnaire will ask you questions about your general background, and about what actions you have done in relation to the Healthy Lunch Box resources. Your responses to these questions will determine whether you meet the criteria to participate in the subsequent online focus groups. If so, you will be sent an email invitation with the details for the online focus group.

Participation in an online focus group

In the email invitation for the online focus group, you will also be asked to complete a simple and brief task of reflecting on whether you have seen any social media posts related to the Healthy Lunch Box campaign, and whether you took any action on the social media post. You will be asked to complete this brief task in your own time prior to the focus groups activity. It is estimated that this will take approximately 5 mins.

For the online focus group, you will be asked to click on a link to attend a Zoom video-conferencing session with 2 to 3 other participants, and 2 researchers. During the focus group, you will be asked questions about how you used the Healthy Lunch Box resources online, whether you recall seeing the resources on social media, your opinion of the resources, and general information about how you use social media. The online focus groups will be 1 hour in duration.

For the focus group, you will be required to turn on your microphone and webcam, and the focus group will be recorded. The recording of the focus group will only be used for research purposes, and will only be viewed by members of the research team.

(4) How much of my time will the study take?

The online recruitment survey will take approximately 5 minutes, the task prior to the focus group will take approximately 5 minutes, and the online focus group will be 1 hour long.

(5) Who can take part in the study?

The study is looking to recruit adults who have seen, used or engaged with the Healthy Lunch Box resources online. People who have not seen, used or engaged with the resources will not be eligible for the study. In addition, participants of the study will need to have an internet connection that is sufficient for video conferencing, and be able to speak a conversational level of English.

(6) Do I have to be in the study? Can I withdraw from the study once I've started?

Being in this study is completely voluntary and you do not have to take part. Your decision whether to participate will not affect your current or future relationship with the researchers or anyone else at the University of Sydney or Cancer Council NSW.

If you decide to take part in the study and then change your mind later, you are free to withdraw at any time. You can do this by contacting Lillian Chan lilian.chan@sydney.edu.au. If you decide to withdraw from the study, we will not collect any more information from you.

Submitting your completed questionnaire is an indication of your consent to participate in the study. You can withdraw your responses if you change your mind about having them included in the study, up to the point that we have analysed and published the results.

If you take part in a focus group, you are free to stop participating at any stage or to refuse to answer any of the questions. However, it will not be possible to withdraw your individual comments from our records once the group has started, as it is a group discussion. Any information that we have already collected will be kept in our study records and may be included in the study results in de-identified form.

(7) Are there any risks or costs associated with being in the study?

Aside from giving up your time, we do not expect that there will be any risks or costs associated with taking part in this study.

Should you have concerns or experience distress resulting from the questionnaire or focus groups, please tell a member of the research team and they will provide you with contact details of relevant support services.

(8) Are there any benefits associated with being in the study?

We hope to use information we get from this research to benefit public health campaigns that use digital media in the future.

You will also be reimbursed for your time in participating in the focus group in the form of a \$50 e-gift card for a grocery store. You will be emailed the gift card after participating in the focus group.

(9) What will happen to information about me that is collected during the study?

By providing your consent, you are agreeing to us collecting personal information about you for the purposes of this research study. This will include audio and video recordings of the focus group sessions, which will be used for research analysis purposes only. Your information will only be used for the purposes outlined in this Participant Information Statement, unless you consent otherwise. Your data will be kept for a period of 5 years after the publication of the research results.

Your information will be stored securely and your identity/information will be kept strictly confidential, except as required by law. Study findings may be published in a student thesis, journal publications, conference presentations and confidential reports, but you will not be individually identifiable in these publications.

(10) Can I tell other people about the study?

Yes, you are welcome to tell other people about the study.

(11) What if I would like further information about the study?

If you would like to know more at any stage during the study, please feel free to contact the Chief Investigator, Dr Blythe O'Hara on blythe.ohara@sydney.edu.au or 0422 600 013, or Co-Investigator Lilian Chan on lilian.chan@sydney.edu.au.

(12) Will I be told the results of the study?

You have a right to receive feedback about the overall results of this study. You can tell us that you wish to receive feedback by ticking the relevant box in the online recruitment survey. This feedback will be in the form of summary report, which you will receive this feedback after the study is finished.

(13) What if I have a complaint or any concerns about the study?

Research involving humans in Australia is reviewed by an independent group of people called a Human Research Ethics Committee (HREC). The ethical aspects of this study have been approved by the HREC of the University of Sydney [INSERT protocol number once approval is obtained]. As part of this process, we have agreed to carry out the study according to the National Statement on Ethical Conduct in Human Research (2007). This statement has been developed to protect people who agree to take part in research studies.

If you are concerned about the way this study is being conducted or you wish to make a complaint to someone independent from the study, please contact the university using the details outlined below. Please quote the study title and protocol number.

The Manager, Ethics Administration, University of Sydney:

Telephone: +61 2 8627 8176 Email: human.ethics@sydney.edu.au Fax: +61 2 8627 8177 (Facsimile)

Consent form

How and why people engage with the Healthy Lunch Box campaign on social media

PARTICIPANT CONSENT FORM

In giving my consent I state that:

I understand the purpose of the study, what I will be asked to do, and any risks/benefits involved. I have read the Participant Information Statement and have been able to discuss my involvement in the study with the researchers if I wished to do so. The researchers have answered any questions that I had about the study and I am happy with the answers. I understand that being in this study is completely voluntary and I do not have to take part. My decision whether to be in the study will not affect my relationship with the researchers or anyone else at the University of Sydney or Cancer Council NSW now or in the future. I understand that I can withdraw from the study at any time. I understand that I may leave the focus group at any time if I do not wish to continue. I also understand that it will not be possible to withdraw my comments once the group has started as it is a group discussion. I understand that personal information about me that is collected over the course of this project will be stored securely and will only be used for purposes that I have agreed to. I understand that information about me will only be told to others with my permission, except as required by law. I understand that the results of this study may be published, and that publications will not contain my name or any identifiable information about me. I understand that the focus group sessions will be audio and video recorded for research analysis. I understand that I can download a copy of the Participant Information Statement and Consent form at [insert link for downloading PDF of this document]

- Yes, I give my consent and agree to take part in this research study
 No, I do not agree to take part in this research study

Recruitment Survey Questions

Name

Email

Phone number

What is your age?

- 18-24 years old
 25-34 years old
 35-44 years old
 45-54 years old
 55 or more years old
 Prefer not to say

What is your gender?

- Female
 Male
 Other/ Non-binary

What is your postcode?

Which of the following apply to you? (Select all that apply)

- I am the parent/primary care giver of a young child(/ren) aged 0-10
 I am the parent/primary care giver of an older child(/ren) aged 10-16
 Neither of the above

Do you have responsibility for packing the lunchbox for: (Select all that apply)

- A young child(/ren) aged 0-10
 An older child(/ren) aged 10-16
 Yourself
 Other adult(s) in your household
 None of the above

Which of the following actions have you done in relation to Cancer Council's Healthy Lunch Box resources? (Select all that apply)

- Visited the website
 Used the Interactive Lunch Box Builder on the website
 Subscribed to the Healthy Lunch Box email mailing list
 Liked, commented or shared a social media post about the Healthy Lunch Box(s)
 Clicked on a link in a Healthy Lunch Box social media post(s)
 Followed Cancer Council on Facebook or Instagram to view more about the Healthy Lunch Box
 Watched a Healthy Lunch Box video on social media (Facebook, YouTube)
 Read a blog article

Which of the following times would generally work for you to participate in a 30-45 min online focus group? (Select all that apply)

- Weekend during the day
- Weekday mornings (between 9am-12pm)
- Weekday lunchtime (12-1pm)
- Weekday evenings (7-9pm)

Please indicate if you have any other specific preferences or availabilities for participating in an online focus groups (eg not available on Fridays, only available in evenings, etc)

Do you wish to receive a summary of the study results once the study is completed? This will be sent via the email address you provide in this form.

- Yes
- No

Discussion Guide

Note:

Prior to the Focus Group, participants will be sent an email with details about the Focus Group (date and time, URL to log in, brief summary of focus group process). In the email, participants will also be given a simple and brief task prior to the focus group.

For the participants who have taken an engagement action on social media:

The short task will ask participants to reflect before the focus group about whether they have seen any social media posts related to the Healthy Lunch Box campaign, and how and why they engaged with it.

For the participants who have not taken an engagement action on social media:

The short task will ask participants to reflect before the focus group about whether they have seen any social media posts related to the Healthy Lunch Box campaign, and whether they have seen any other health-related social media content recently.

Focus group A – People who have taken an engagement action on social media

Introductions

Introduce self and explain purpose of project

The Prevention Research Collaboration at The University of Sydney, in collaboration with Cancer Council NSW, is undertaking a research project looking at how and why people have engaged with the Cancer Council NSW's Healthy Lunch Box Back to School 2021 Campaign.

Make mention of survey, consent, and payment for attending session

Inform the need to audio record the session and mention anyone observing the session; reassure the recording will be used for internal purposes only, and nobody will be individually identified

Explain the importance of everyone contributing to the discussion, particularly if they feel differently to the person next to them and go over the following group rules:

- The most important rule is that only one person speaks at a time. There may be a temptation to jump in when someone is talking but please wait until they have finished.
- There are no right or wrong answers, you can be as frank and open as you like. You do not have to speak in any particular order.
- When you do have something to say, please do so. There are many of you in the group and it is important that I obtain the views of each of you.
- You do not have to agree with the views of other people in the group.
- Does anyone have any questions?
- Please turn off mobiles if possible.

Have participants introduce themselves

Setting the context

Setting the context, and getting participants in the frame of mind of their experience encountering the Healthy Lunch Box campaign on social media – general questions on where they saw information, how did they come across the information

You told us that you clicked like, commented or shared one of the Healthy Lunch Box campaign's social media posts by the Cancer Council. We would like to ask you some questions about your thoughts and feelings about the post.

1. Thinking about the Healthy Lunch Box post/s you have seen, do you remember how the post came to your attention? Was it on your general social media feed? Specifically selecting to look at Cancer Council info? Sent to you/ shared to you by a friend?
2. Can you remember where you were when you saw the post, eg at home, on a bus/train. Would you have been using your phone or at a computer?

Understanding the engagement action

We're interested to find out why people engage with health content on social media.

Remind participants of the content by showing the content that they engaged with

Here's a sample of some of the social media posts from the Healthy Lunch Box campaign.

1. Do you recall seeing any of these posts?
2. Do you recall how many times you saw these posts?
Prompt with general terms (once, a couple of times, many times)
3. Do you remember liking, sharing, commenting on, or clicking on one, or a few, or these posts?
4. Can you think of the reason/s you liked, commented, shared, clicked on, or tagged someone?

Prompt with some suggestions – type these into the chat box so people can see them

For example, was it because of the:

- Information it provided
- Something appealing about the post (eg visually)
- Something that touched you emotionally
- Feeling that it fit with your values
- Wanting to share the info with others
- Wanting to share the 'experience' with a friend/wanting to discuss it with a friend
- Wanting to support the organisation that posted the content (the Cancer Council)
- Other reasons

Further explore the responses provided by the participants.

5. What did you find most interesting or engaging about the post?

6. Did the source of the post – the Cancer Council, or someone you know who shared it – influence your decision to engage with the post? Do you think you would have engaged if it were posted by another organisation?
7. Did seeing the post motivate you to do something related to the Healthy Lunch Box message or activities, such as go to the website, try a recipe, try the lunch box builder, show it to your child?

| |
|--|
| Experiences of Cancer Council’s Healthy Lunch Box website |
|--|

We’re interested to understand more about people’s general experience and comments about Cancer Council’s Healthy Lunch Box website.

Website engagement:

1. Did you look at the Healthy Lunch Box website?
 - a. Did you use or share the recipes that were included on the website? (prompt for which recipes had more appeal etc)
 - b. Did you know about the interactive lunch box builder? Did you use it? How did you use it?
 - c. What prompted you to visit the website? Was it as a result of seeing the social media Back to School campaign posts? Or something else?
2. Did you sign up to the Healthy Lunch Box newsletters?
3. Did you take any other action related to the website?

General perception of the Social Media campaign:

We would like to get some overall comments on the Healthy Lunch Box Back to School Campaign.

1. How did you feel about the campaign overall?
2. What did you like about the campaign? What worked for you?
3. Were there parts of the campaign you didn’t like?
4. Do you trust the information provided by the campaign?

Knowledge and attitudes about healthy eating

1. After visiting the website, do you feel like you know more about how to plan and pack a healthy lunch box? For example, what food groups to consider, how much fruit and vegetable intake is recommended, knowledge of healthier alternatives to unhealthy foods
2. After visiting the website, do you feel more confident in preparing a healthy lunch box for your children or yourself?

Behaviours

1. Has the Healthy Lunch Box website influenced you to take healthy lunches to school or work?
2. Has the Healthy Lunch Box website influenced any other changes in your life in terms of healthy eating? (Eg: eating healthier breakfast and dinners, looking for more healthy recipes online, etc).

Explore these questions in detail

General social media behaviour

Get a sense of whether people use social media much, and about social media interests related to the campaign.

We'd now like to get a sense of people's social media use, as part of this research is interested in the uses of social media for the Healthy Lunch Box campaign.

1. What kinds of social media do you use, and how often do you use them?
Prompt with examples: Facebook, Instagram, Twitter, YouTube, TikTok, Pinterest, LinkedIn, Snap
2. In general, what kind of social media content do you engage with?
Prompt with categories: friends' posts and photos, news and current affairs, lifestyle, health-related, other interests. Or types of content: photos, videos, links
3. Can you recall any other health or wellbeing-related information you may have seen on social media in the past few months? Eg exercise posts. (Not covid posts).
4. Did you engage with these posts? If so, why? If not, why not?
5. Have you seen any social media posts that you think are effective in helping influence healthy behaviours? If not, do you have any thoughts on how social media posts could do this?

Conclusion

Any final comments

Thank for time and contribution

Ensure completion of survey – demographic information

Focus group B – People who have engaged with campaign in some other way

Introductions

Introduce self and explain purpose of project

The Prevention Research Collaboration at The University of Sydney, in collaboration with Cancer Council NSW is undertaking a research project looking at how and why people have engaged with the Cancer Council NSW's Healthy Lunch Box Back to School 2021 Campaign.

Make mention of survey, consent, and payment for attending session

Inform the need to audio record the session and mention anyone observing the session; reassure the recording will be used for internal purposes only, and nobody will be individually identified

Explain the importance of everyone contributing to the discussion, particularly if they feel differently to the person next to them and go over the following group rules:

- The most important rule is that only one person speaks at a time. There may be a temptation to jump in when someone is talking but please wait until they have finished.
- There are no right or wrong answers, you can be as frank and open as you like. You do not have to speak in any particular order.
- When you do have something to say, please do so. There are many of you in the group and it is important that I obtain the views of each of you.
- You do not have to agree with the views of other people in the group.
- Does anyone have any questions?
- Please turn off mobiles if possible.

Have participants introduce themselves

Engagement with campaign

Find out more details about how people engaged with the Healthy Lunch Box campaign (eg website and newsletter).

We're interested to understand more about people's experience with Cancer Council's Healthy Lunch Box Back to School 2021 Campaign.

General

1. How did you first become familiar with the Cancer Council's Healthy Lunch Box resources? (eg through a different newsletter, online search for healthy recipes, word of mouth, etc)

Website

1. Did you look at the Healthy Lunch Box website?
 - a. Did you use or share the recipes that were included on the website? (prompt for which recipes had more appeal etc)
 - b. Did you know about the interactive lunch box builder? Did you use it? How did you use it?
2. How did you find the Healthy Lunch Box website?
3. Did you find what you were looking for when you went to the website? What were the reasons you went to the website?

Newsletter

1. Did you sign up to the Healthy Lunch Box newsletters? Why? (prompt for motivations)
2. What do you find most useful about the newsletters? (eg which articles, info, general reminders)

Other

1. Did you take any other action related to the Healthy Lunch Box campaign? (eg read a blog article, watch a video)

Social media experience

1. Do you remember seeing something about the Healthy Lunch Box Back to School campaign on social media (eg a post, image or video)?
Prompt for descriptions
2. Here's a sample of some of the Healthy Lunch Box posts on social media, have you seen any of these?
Campaign recognition – show examples of Healthy Lunch Box social media content.

We're interested in why some people do, and some people don't click on social media posts.

3. Since you do have some interest in the Healthy Lunch Box website, can you think of reasons why you did or didn't click on these posts when you saw them on social media? Do you generally click on posts about healthy lifestyle topics?

Experiences of Cancer Council's Healthy Lunch Box campaign

General perception of the campaign:

We would like to get some overall comments on the Healthy Lunch Box Campaign.

1. How did you feel about the campaign overall?
2. What did you like about the campaign? What worked for you?
3. Were there parts of the campaign you didn't like?

Knowledge and attitudes about healthy eating

1. After visiting the website, do you feel like you know more about how to plan and pack a healthy lunch box? For example, what food groups to consider, how much fruit and vegetable intake is recommended, knowledge of healthier alternatives to unhealthy foods
2. After visiting the website, do you feel more confident in preparing a healthy lunch box for your children or yourself?

Behaviours

1. Has the Healthy Lunch Box website influenced you to take healthy lunches to school or work?
2. Has the Healthy Lunch Box website influenced any other changes in your life in terms of healthy eating? (Eg: eating healthier breakfast and dinners, looking for more healthy recipes online, etc).

Explore these questions in detail

General social media behaviour

Get a sense of whether people use social media much, and about social media interests related to the campaign.

We'd now like to get a sense of people's social media use, as part of this research is interested in the uses of social media for the Healthy Lunch Box campaign.

1. What kinds of social media do you use, and how often do you use them?
Prompt with examples: Facebook, Instagram, Twitter, YouTube, TikTok, Pinterest, LinkedIn, Snap
2. In general, what kind of social media content do you recall engaging with?
Prompt with categories: friends' posts and photos, news and current affairs, lifestyle, health-related, other interests. Or types of content: photos, videos, links
3. Can you recall any other health or wellbeing-related information you may have seen on social media in the past few months? Eg exercise posts. (Not covid posts).

4. Did you engage with these posts? If so, why? If not, why not?
5. Have you seen any social media posts that you think are effective in helping influence healthy behaviours? If not, do you have any thoughts on how social media posts could do this?

| |
|-------------------|
| Conclusion |
|-------------------|

Any final comments

Thank for time and contribution

Ensure completion of survey – demographic information

Appendix 4:

STUDY ETHICS APPROVALS

This appendix contains the study ethics approvals that I organised for the research studies in this dissertation:

- **Still Six Lives campaign evaluation among pregnant women (Section 3.5)**
Appendix 4.1: Ethics approval for “Evaluating the impact of a national stillbirth campaign on awareness and knowledge among pregnant women” study
- **Shisha No Thanks Facebook content analysis (Chapter 5)**
Appendix 4.2: Ethics approval for “Analysis of social comments in response to *Shisha No Thanks* Social Media Campaign” study
- **Healthy Lunch Box ‘Back-to-School’ campaign focus group study (Chapter 6)**
Appendix 4.3: Ethics approval for “How and why people engaged with the *Healthy Lunch Box* campaign on social media” study

For some of the research studies of this dissertation, ethics approval was organised by collaborators at other institutions. Details of these ethics approvals are listed below:

- **Movements Matter campaign evaluation (Section 3.3)**
The study was approved by the Mater Misericordiae Ltd Human Research Ethics Committee (HREC 14/MHS141) in 2015.
- **Still Six Lives campaign evaluation among general community (Section 3.5)**
The community survey evaluation research component was approved by the Mater Misericordiae Ltd Human Research Ethics Committee (HREC/MML/67302(V3)) on 30/07/2020.
- **Shisha No Thanks campaign evaluation (Section 4.4 - 4.5)**
This study was approved by the University of New South Wales Human Research Ethics Committee HC190149 on 09/04/2019.

ADDRESS FOR ALL CORRESPONDENCE

RESEARCH ETHICS AND GOVERNANCE OFFICE
ROYAL PRINCE ALFRED HOSPITAL
CAMPERDOWN NSW 2050
TELEPHONE: (02) 9515 6766
EMAIL: SLHD-RPAEthics@health.nsw.gov.au
REFERENCE: **X20-0340 & 2020/ETH02044**



22 September 2020

This letter constitutes ethical approval only. You must NOT commence this research project at ANY site until you have submitted a Site Specific Assessment Form to the Research Governance Officer and received separate authorisation from the Chief Executive or delegate of that site.

Dear Dr Gordon,

Re: Protocol No X20-0340 & 2020/ETH02044 - "Evaluating the impact of a national stillbirth campaign on awareness and knowledge among pregnant women"

The Executive of the Ethics Review Committee, at its meeting of 22 September 2020 considered your correspondence of 21 September 2020. In accordance with the decision made by the Ethics Review Committee, at its meeting of 12 August 2020, ethical approval is granted.

- The research project meets the requirements of the *National Statement on Ethical Conduct in Human Research*.

This approval includes the following:

- HREA (Version 3, 18 September 2020)
- Protocol (Version 3, 21 September 2020) * see additional condition below
- Participant Information Sheet (Version 4, 21 September 2020)
- Recruitment Script (Version 1, 14 September 2020)
- Survey (Version 3.0, 14 September 2020)
- Poster (Version 1, 11 September 2020)
- Flyer (Version 1, 11 September 2020)
- Research Data Management Plan

*(If applicable) In accordance with the National Statement, chapter 4.7; you must seek ethical approval from the HREC of the Aboriginal Health and Medical Research Council (AHMRC) if you intend to use ATSI status in any presentation or publication.

You are asked to note the following:

On the basis of this ethics approval, authorisation may be sought to conduct this study within any NSW/QLD/VIC/SA/WA/ACT public health organisation and/or within any private organisation which has entered into an appropriate memorandum of understanding with the Sydney Local Health District, Sydney Local Health Network or the Sydney South West Area Health Service.

The Committee noted that authorisation will be sought to conduct the study at the following sites:

- Royal Prince Alfred Hospital
 - Gold Coast University Hospital
 - Townsville Hospital
-
- This approval is valid for **five** years, and the Committee requires that you furnish it with annual reports on the study's progress beginning in **September 2021**. If recruitment is ongoing at the conclusion of the five year approval period, a full re-submission will be required. Ethics approval will continue during the re-approval process.
 - This human research ethics committee (HREC) has been accredited by the NSW Department of Health as a lead HREC under the model for single ethical and scientific review and is constituted and operates in accordance with the National Health and Medical Research Council's *National Statement on Ethical Conduct in Human Research* and the *CPMP/ICH Note for Guidance on Good Clinical Practice*.
 - You must immediately report anything which might warrant review of ethical approval of the project in the specified format, including unforeseen events that might affect continued ethical acceptability of the project.
 - You must notify the HREC of proposed changes to the research protocol or conduct of the research in the specified format.
 - You must notify the HREC and other participating sites, giving reasons, if the project is discontinued at a site before the expected date of completion.
 - If you or any of your co-investigators are University of Sydney employees or have a conjoint appointment, you are responsible for informing the University's Risk Management Office of this approval, so that you can be appropriately indemnified.
 - Where appropriate, the Committee recommends that you consult with your Medical Defence Union to ensure that you are adequately covered for the purposes of conducting this study.

Should you have any queries about the Committee's consideration of your project, please contact me. The Committee's Terms of Reference, Standard Operating Procedures, membership and standard forms are available from the Sydney Local Health District website.

A copy of this letter must be forwarded to all site investigators for submission to the relevant Research Governance Officer.

The Ethics Review Committee wishes you every success in your research.

Yours sincerely,



Patricia Plenge
Executive Officer
Ethics Review Committee (RPAH Zone)

HERC\EXCOR\20-09



Tuesday, 29 September 2020

Dr Blythe O'Hara
School of Public Health: Public Health; Faculty of Medicine and Health
Email: blythe.ohara@sydney.edu.au

Dear Blythe,

The University of Sydney Human Research Ethics Committee (HREC) has considered your application.

I am pleased to inform you that your project has been approved

Details of the approval are as follows:

Project No.: 2020/638
Project Title: Analysis of social comments in response to Shisha No Thanks Social Media Campaign
Authorised Personnel: O'Hara Blythe; Chan Lilian; Freeman Becky; Harris-Roxas Ben; Karezi Dalya; Woodland Lisa; MacKenzie Ross;
Approval Period: 29 September 2020 to 29 September 2024
First Annual Report Due: 29 September 2021

Documents Approved:

| Date Uploaded | Version Number | Document Name |
|---------------|----------------|---|
| 10/09/2020 | Version 1 | Request for Waiver of Consent - addressing criteria |

Special Condition/s of Approval

- Please provide a letter of agreement from Western Sydney Local Health District to demonstrate that they have given permission and agree to assistance in the Shisha No Thanks project.
- Please clarify the roles of external researchers Lisa Woodland and Dalya Karezi if the research is being conducted by a PhD student.

Condition/s of Approval

- Research must be conducted according to the approved proposal.
- An annual progress report must be submitted to the Ethics Office on or before the anniversary of approval and on completion of the project.
- You must report as soon as practicable anything that might warrant review of ethical approval of the project including:
 - Serious or unexpected adverse events (which should be reported within 72 hours).
 - Unforeseen events that might affect continued ethical acceptability of the project.
- Any changes to the proposal must be approved prior to their implementation (except where an amendment is undertaken to eliminate *immediate* risk to participants).
- Personnel working on this project must be sufficiently qualified by education, training and experience for their role, or adequately supervised. Changes to personnel must be reported and approved.



- Personnel must disclose any actual or potential conflicts of interest, including any financial or other interest or affiliation, as relevant to this project.
- Data and primary materials must be retained and stored in accordance with the relevant legislation and University guidelines.
- Ethics approval is dependent upon ongoing compliance of the research with the *National Statement on Ethical Conduct in Human Research*, the *Australian Code for the Responsible Conduct of Research*, applicable legal requirements, and with University policies, procedures and governance requirements.
- The Ethics Office may conduct audits on approved projects.
- The Chief Investigator has ultimate responsibility for the conduct of the research and is responsible for ensuring all others involved will conduct the research in accordance with the above.

This letter constitutes ethical approval only.

Please contact the Ethics Office should you require further information or clarification.

Sincerely,

Associate Professor Helen Mitchell
Chair
Human Research Ethics Committee (HREC 1)

The University of Sydney of Sydney HRECs are constituted and operate in accordance with the National Health and Medical Research Council's (NHMRC) [National Statement on Ethical Conduct in Human Research \(2018\)](#) and the NHMRC's [Australian Code for the Responsible Conduct of Research \(2018\)](#)



Tuesday, 15 December 2020

Dr Blythe O'Hara
School of Public Health: Public Health; Faculty of Medicine and Health
Email: blythe.ohara@sydney.edu.au

Dear Blythe,

The University of Sydney Human Research Ethics Committee (HREC) has considered your application. I am pleased to inform you that after consideration of your response, your project has been approved.

Details of the approval are as follows:

Project No.: 2020/826
Project Title: How and why people engaged with the Healthy Lunch Box campaign on social media
Authorised Personnel: O'Hara Blythe; Chan Lilian; Freeman Becky; Dibbs Jane; Edge Rhiannon; Hughes Clare; Richmond Korina;
Approval Period: 15/12/2020 to 15/12/2024
First Annual Report Due: 15/12/2021

Documents Approved:

| Date Uploaded | Version Number | Document Name |
|---------------|----------------|-------------------------------------|
| 10/12/2020 | Version 3 | Amended PIS and PCF - clean version |
| 09/11/2020 | Version 3 | Recruitment material |
| 09/11/2020 | Version 1 | Recruitment survey |
| 09/11/2020 | Version 1 | Focus Group Discussion Guide |

Condition/s of Approval

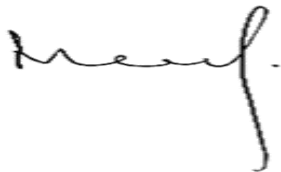
- Research must be conducted according to the approved proposal.
- An annual progress report must be submitted to the Ethics Office on or before the anniversary of approval and on completion of the project.
- You must report as soon as practicable anything that might warrant review of ethical approval of the project including:
 - Serious or unexpected adverse events (which should be reported within 72 hours).
 - Unforeseen events that might affect continued ethical acceptability of the project.
- Any changes to the proposal must be approved prior to their implementation (except where an amendment is undertaken to eliminate *immediate* risk to participants).
- Personnel working on this project must be sufficiently qualified by education, training and experience for their role, or adequately supervised. Changes to personnel must be reported and approved.

- Personnel must disclose any actual or potential conflicts of interest, including any financial or other interest or affiliation, as relevant to this project.
- Data and primary materials must be retained and stored in accordance with the relevant legislation and University guidelines.
- Ethics approval is dependent upon ongoing compliance of the research with the *National Statement on Ethical Conduct in Human Research*, the *Australian Code for the Responsible Conduct of Research*, applicable legal requirements, and with University policies, procedures and governance requirements.
- The Ethics Office may conduct audits on approved projects.
- The Chief Investigator has ultimate responsibility for the conduct of the research and is responsible for ensuring all others involved will conduct the research in accordance with the above.

This letter constitutes ethical approval only.

Please contact the Ethics Office should you require further information or clarification.

Sincerely,



Associate Professor Mark Arnold
Chair, Human Research Ethics Committee (HREC 2)

The University of Sydney of Sydney HRECs are constituted and operate in accordance with the National Health and Medical Research Council's (NHMRC) [National Statement on Ethical Conduct in Human Research \(2018\)](#) and the NHMRC's [Australian Code for the Responsible Conduct of Research \(2018\)](#)

Appendix 5:

OTHER PUBLICATION RELATING TO THIS THESIS

This appendix contains a publication which I contributed to and relates to the work of this dissertation; however, I was not the lead author in the conceptualisation and drafting of this publication.



Stillbirth in Australia 4: Breaking the Silence: Amplifying Public Awareness of Stillbirth in Australia

Adrienne Gordon^{a,b,c,*}, Lillian Chan^{c,d}, Christine Andrews^a, Keren Ludski^e, Jacquelyn Mead^f, Leigh Brezler^g, Claire Foord^h, Justin Mansfield^e, Philippa Middleton^{a,i}, Vicki J. Flenady^a, Adrian Bauman^{c,d}

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^b Sydney Institute of Women, Children and their Families, Sydney Local Health District, NSW Australia

^c Charles Perkins Centre, University of Sydney, NSW, Australia

^d Prevention Research Collaboration, Sydney School of Public Health, University of Sydney, Australia

^e Red Nose Australia

^f SANDS Australia

^g Stillbirth Foundation Australia

^h Still Aware

ⁱ SAHMRI Women and Kids, South Australian Health and Medical Research Institute, Adelaide, Australia

ARTICLE INFO

Article history:

Received 20 June 2020

Received in revised form 7 September 2020

Accepted 11 September 2020

Keywords:

Stillbirth
Public awareness
Mass media
Prevention

ABSTRACT

Prevention of stillbirth remains one of the greatest challenges in modern maternity care. Despite this, public awareness is low and silence is common within families, the community and even healthcare professionals. Australian families and parent advocacy groups given a voice through the Senate Enquiry have made passionate and articulate calls for a national stillbirth awareness campaign. This fourth paper in the Stillbirth in Australia series outlines why stillbirth needs a national public awareness campaign; and provides an overview of good practice in the design, development and evaluation of public awareness campaigns. The cognitive and affective steps required to move from campaign awareness to action and eventually to stillbirth prevention are described. Using these best practice principles, learning from previous campaigns combined with close collaboration with aligned agencies and initiatives should assist a National Stillbirth Prevention Campaign to increase community awareness of stillbirth, help break the silence and contribute to stillbirth prevention across Australia.

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1. Introduction

Prevention of stillbirth remains one of the greatest challenges in modern maternity care. Stillbirth affects 2.64 million babies globally each year and has well documented psychosocial and economic impacts on parents and families, caregivers and society [1–3]. Stillbirth in late pregnancy (>28 weeks) is more likely to occur in normally developed babies whose mothers have had uncomplicated pregnancies, thus offering real potential for prevention. Despite this, public awareness is low [4,5] and silence is common within families, the community and even health professionals [6–9]. In the 2011 Lancet Stillbirth Series Professor

Joy Lawn stated that “Almost no burden affecting families is so big and yet so invisible both in society and on the global public health agenda”. Meta-syntheses of studies of bereaved families show that raising public awareness of stillbirth is a common priority [10]. If stillbirth prevention campaigns are to have any impact they need to resonate with whole communities, not only with those who have experienced a loss. They also need to learn from and build upon previous successful campaigns.

Increased awareness and prevention messaging created through mass media public health campaigns for the similarly tragic outcome of sudden infant death syndrome, have shown substantial benefit. These campaigns build on the epidemiological evidence for prevention and communicate that to whole populations. The widely recognised “back to sleep” campaign/s resulted in an 85% reduction in sudden infant death syndrome within Australia and New Zealand [11,12]. The message was simple - a devastating outcome that could be substantially prevented by a key action from parents and carers. Stillbirth is also an incomprehensible event with some known risk

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factors that are amenable to public health messaging, but not necessarily well known by the community [5]. An effective campaign for stillbirth needs to address these known behaviour-evidence gaps using simple, consistent and unified messages to reach the target audience.

Effective communication alone does not replace adequate maternity care, and intractable health challenges such as smoking remain a huge challenge for public health campaigns. Thus, knowledge and skills in communicating effectively are essential for bridging the gap between what is known, what is said, and what is done in both health policy and health delivery.

This fourth paper in the Stillbirth in Australia series outlines why stillbirth is a public health issue that needs a national public awareness campaign; and provides an overview of good practice in the design, development and evaluation of public awareness campaigns using the Flowproof model [13]. We will describe the cognitive and affective steps required to move from campaign awareness to action and eventually to stillbirth prevention.

2. Rationale for a public awareness campaign about stillbirth

The size and reach of any awareness campaign depends on the scope of the problem being addressed. Campaigns that seek to change behaviour on a national scale need to address more social-ecological levels than targeted communications to address a health problem specific to a health service or a small localised target population.

Stillbirth rates in Australia have remained largely unchanged for several decades [14]. Rates of late stillbirth (≥ 28 weeks) differ between high-income countries, ranging from 1.7/1000 to 8.8/1000 births, with Australia at 2.7/1000 births [15]. These between country variations suggest it is possible to further reduce late-gestation stillbirth and achieve rates on par with the lowest

countries of <2 late stillbirths/1000 births by 2030 [15]. Such reductions can only be achieved by identifying and acting on modifiable risk factors.

Previous campaigns regarding risk factors in similar settings have contributed to significant reductions in late pregnancy stillbirths [16,17]. So far most of the experience of public awareness campaigns in stillbirth prevention is related to improving awareness of the importance of DFM and what to do when women are concerned.

As described in paper two of this series [18] increased awareness of the importance of DFM and clinical management protocols was a key component included in previous stillbirth prevention bundles of care. In England and Wales the Saving Babies' Lives Care Bundle (SBLCB) evaluation demonstrated a 20% reduction in stillbirth rates [17,19]. In fact, this important reduction occurred despite only 42% of frontline hospital staff being aware of the SBLCB, indicating that even further reduction in stillbirths may be possible with uplift through both targeted health professional campaigns and closely aligned mass media public health facing campaigns for the broader community.

In Australia, suboptimal awareness and delayed reporting of DFM is commonplace [20]. However, the Movements Matter Campaign in Victoria – a partnership between the Stillbirth CRE and Safer Care Victoria – demonstrates that improving knowledge and behaviour change for both pregnant women and clinicians is possible [21]. This short, targeted, low cost campaign in late 2018 predominantly used social media, posters and flyers in hospitals, combined with clinician education. Evaluation of over around 1500 women across 5 sites showed that pregnant women's knowledge of fetal movements as pregnancy progresses and recognising the importance of contacting their healthcare provider immediately if baby was moving less was 50% more likely following the campaign [22]. Post campaign, women were two and a half times as likely to

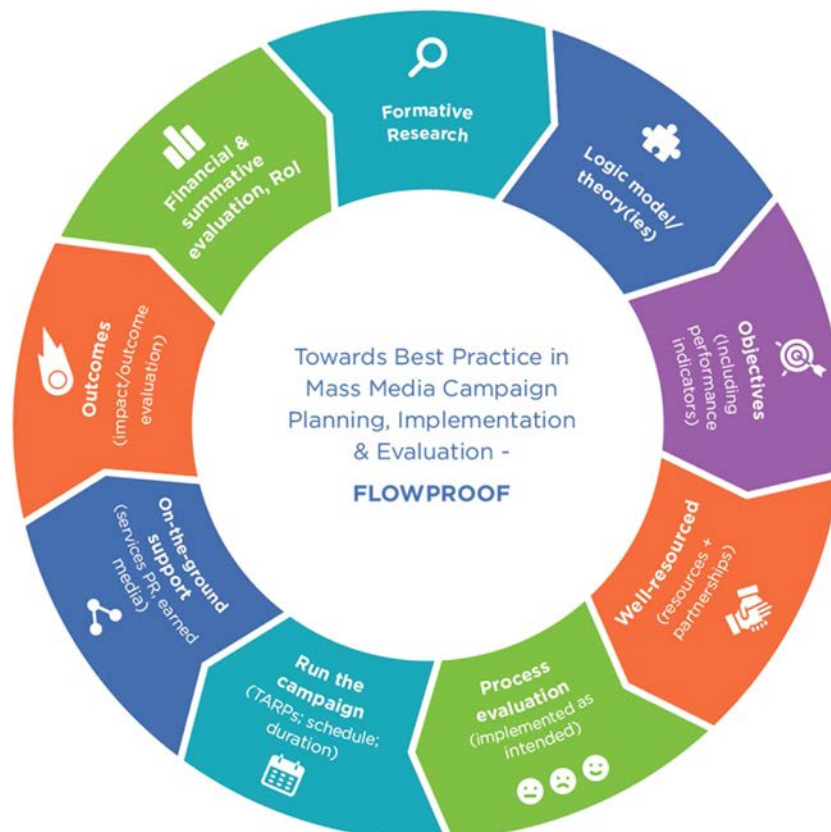


Fig. 1. Flowproof model for mass media campaign planning, implementation & evaluation (adapted with permission from The Australian Prevention Partnership Centre [13]).

report having received both written and verbal information about the importance of babies' movements compared to before the campaign. They were also significantly more likely to report that their clinician had explained this risk. These early data demonstrate that a multi-pronged approach using a combination of social media and hospital posters and flyers was a cost-effective method in raising awareness of DFM as a risk factor for stillbirth and could be trialled on a larger scale. National stillbirth message development, delivery and evaluation are the natural and needed next step to inform and empower women, families and community about stillbirth and related preventive actions.

3. Designing a national stillbirth public awareness campaign

Careful attention to design and delivery of a National Stillbirth Public Awareness Campaign is essential to align and bring together initiatives with the same goal and to deliver consistent clear messages to the women and the community. The Australian Stillbirth Senate Inquiry Report [23] recommended a *national stillbirth public awareness campaign that educates parents and the general public about the risks of stillbirth, and encourages public conversations about stillbirth as a public health issue*. Such a campaign needs to both increase whole-of-community understanding and encourage health-enhancing behaviours for pregnant women. Key considerations for a National Stillbirth Public Awareness Campaign based on published recommendations [13] include:

3.1. Campaigns should be part of an integrated, system-wide approach to stillbirth prevention

As stated in earlier papers in this series, the increasing National focus on stillbirth, the recent Senate Inquiry and the SBB are all part

of an Australian National coordinated approach to stillbirth prevention which is supported by the Stillbirth Centre of Research Excellence, its partners and collaborators and parent advocacy groups. A stillbirth mass media campaign will contribute to population-wide prevention by building upon this approach and the current momentum, to enhance community understanding about stillbirth, reduce stigma and reinforce behaviour change messaging included in other initiatives such as the SBB.

Integration with multi-sectoral strategies and on-the-ground programs is essential for mass media campaigns to be effective. Therefore, implementing a stillbirth prevention campaign needs concomitant supportive health policies, environments, government and non-government organisations working in partnership. Integration enhances collaboration, reduces confusion and contributes towards a common goal. As such a National Public Stillbirth Awareness Campaign should align with, and be integrated into the delivery of the SBB [18], account for other existing campaigns and messages to the community such as other smoking cessation programs, and be included as an accountable component of overarching stillbirth prevention strategies.

3.2. Campaigns and main messages should be consistent across Australia

For a National Campaign to be effective, messages need to be developed that are accepted, relevant and motivating to women in the target group. Message themes and taglines should be consistent across Australia. Aligned messages allow community perceptions and social norms to be influenced in a cohesive way. A recent Australian example is the COVID 19 pandemic where unprecedented national consensus on key messages such as handwashing and physical distancing occurred and was one of key contributors to suppression of the pandemic in Australia [24].



Fig. 2. Hierarchy of effects model.

3.3. Campaigns should follow a campaign planning and evaluation protocol

The FLOWPROOF protocol (Fig. 1) described by the Australian Prevention Partnership Centre is suggested as a model of best practice for the development and implementation of mass media campaigns [13]. The next section of this paper will describe the approach to planning a National Stillbirth Public Awareness Campaign through the stages of this protocol.

4. Best practice in mass media campaign design and planning

4.1. Campaigns should draw upon formative research and past lessons

Formative research should occur prior to any campaign to develop and test the campaign themes, messages and communication elements. For a National Stillbirth Public Awareness campaign the importance of including the community voice, in particular families with lived experience of stillbirth, in the formative work and message development cannot be overstated [25]. In addition, lessons from previous stillbirth campaigns should be incorporated. For example, the Movements Matter Campaign in Victoria demonstrated that post campaign, more clinicians felt that providing women with information about DFM would increase anxiety. This suggests that public awareness campaigns need to be closely linked and supported by clinical practice and aligned with clinician education resources.

4.2. Underpinning theory/logic models need to be made explicit and applied

A logic model is part of the planning process for a campaign that links activities and communications with a series of intermediate and endpoint outcomes. Campaign logic models are recommended as good practice but are rarely used in planning mass media campaigns [13]. Theoretical frameworks are helpful to guide both campaign planning and evaluation. The hierarchy of effects model [26] (Fig. 2) provides a useful conceptual framework for a national stillbirth prevention campaign, is particularly suited to evaluation of behaviour change interventions and will be used to guide design and evaluation for mapping national stillbirth campaign performance indicators and outcomes. The outcomes of a stillbirth campaign are not only to raise awareness, but to influence attitudes and relevance of the messages, ultimately to change behaviour, and thereby reduce the incidence of stillbirth in Australia.

4.3. Clear, measurable campaign goals and objectives should be specified

A National Stillbirth Public Awareness Campaign needs specific goals and quantitative targets to assess population level change. Campaign objectives of campaigns need to be specific, measurable, and can be influenced by a mass-reach campaign. The 'hierarchy of effects' model (Fig. 2) allows for performance indicators corresponding to each level to be clearly mapped to stillbirth awareness, specific message recall (eg "smoking increases the risk of stillbirth"), knowledge enhancement, attitudinal change (eg "stillbirth can happen to anyone"), confidence/intention to change behaviour (eg making plan to get help to quit smoking) or behavioural trialling/maintenance (eg stopping smoking).

4.4. Campaigns require sufficient resources to reach a defined impact threshold

Well-resourced campaigns are more likely to succeed. This includes both the financial and human resources required to

manage and implement a campaign as well as campaign partnerships with government and non-government organisations. All too often public awareness campaigns attempt to do too much with too little, either through budget or time constraints. Although impact can be demonstrated with short implementation schedules such as the previous Movements Matter Campaign, the most successful public health campaigns [27] such as road safety [28], sun protection [29], smoking [30] take the "long view" and have overarching goals and sufficient budget to be able to focus on clear messages in a rolling fashion sustained over time. The Australian Government have allocated \$3 m for an education and awareness campaign for women, as part of its response to the Senate Inquiry into Stillbirth Research and Education.

4.5. Implementing the campaign with appropriate on-the-ground support

Once the campaign begins, process evaluation allows assessment of whether campaign components were implemented as intended and what elements were planned versus opportunistic. This allows reflection and potential improvements of campaigns that follow. Running the campaign refers specifically to the volume of media purchased and delivered. Often this is measured as target audience rating points (TARPs) which describes the expected audience reach in relation to the amount of media delivered. On-the-ground support for a National Stillbirth Prevention Campaign refers to infrastructure, services associated with the campaign, public relations and earned media are needed to support the campaign. This includes provision of resources to the public or health care professionals, free access to information or tools to support behaviour change, public events and related campaign promotion activities.

4.6. Campaign evaluations should be made publicly available

Evaluation documents need to include description of the campaign execution, dose (i.e. target audience rating points (TARPs), range of media delivery channels and frequency of exposure) and effects on proximal and distal impact measures. Campaign expenditure, including a breakdown for media purchased, should also be made available.

4.7. Sustained campaign efforts over years are required to achieve population impact

Campaigns involving sustained, multi-phase efforts over several years are more likely to influence their target population [13]. Australia has some excellent examples in the long standing effective and innovative anti-tobacco and sun protection campaigns [29–31], both combined with environment and regulatory support, that have contributed to sustained declines in smoking and skin cancer. As increased evidence about stillbirth risk and prevention strategies is gained, support for sustained funding for stillbirth prevention campaigns with sequences of relevant messages developed under an overarching theme will be needed.

5. Conclusions

Australian families and parent advocacy groups given a voice through the Australian Senate Enquiry have made passionate and articulate calls for a national stillbirth awareness campaign, and the government has responded by allocating funding to a national campaign. Using best practice principles to design, implement and evaluate such a campaign, learning from previous campaigns, close collaboration with aligned agencies and initiatives including the Stillbirth CRE and its Safer Baby Bundle should assist a National

Stillbirth Prevention Campaign to increase community awareness of stillbirth, help break the silence and contribute to stillbirth prevention across Australia.

Contribution to authorship

All authors read and approved the final manuscript.

Adrienne Gordon conceived the design of the paper supported by Adrian Bauman. All authors read and approved the final manuscript.

Funding

This initiative falls within the work program of the Stillbirth CRE. Core funding to support the Stillbirth CRE is provided by the National Health and Medical Research Council (NHMRC, AP1116640). The National Stillbirth Public Awareness Campaign is supported by the Australian Government Department of Health “Stillbirth Education and Awareness Grant Opportunity” (GO2536) awarded to RedNose Australia in collaboration with planned evaluation by the Stillbirth CRE.

Details of ethics approval

Not required.

Disclosure of interests

Adrienne Gordon, Vicki Flenady and Phillipa Middleton are all chief investigators on the NHMRC Stillbirth Centre of Research Excellence. Keren Ludski, Jackie Mead, Leigh Brezler and Claire Foord are CEOs of the NGOs Red Nose, SANDS, Stillbirth Foundation Australia and Still Aware.

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