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Review Article

Integrating Implementation Theory to Address Inequities in Cancer Care: Perspectives from an International Working Group

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Background . There are well-established, persistent inequities in cancer care and cancer outcomes within and between countries. The aim of this article is to explore how implementation theory, specifically the Consolidated Framework for Implementation Research (CFIR), alongside coproduction principles, could be used to maximise the effectiveness of innovations with a vision of reducing inequity in cancer care. *Methods*. Workshops were conducted with partners from US, Australia, and UK, participating in the University Global Partnership Network (UGPN), which funded the collaboration. From these workshops, three case studies were identified and the framework was applied to identify ways of using CFIR to maximise the effectiveness of innovations. *Results*. The three case studies focused on human papillomavirus (HPV) testing and vaccination, participation in clinical trials, and use of translation services. We identified opportunities, for each of the case studies, where CFIR could be applied to improve implementation and proposed recommendations to ensure effective implementation of innovations using CFIR domains, including individual constructs (e.g., awareness and cultural competence), inner setting constructs (e.g., technology infrastructure), and outer setting constructs (e.g., how services are monitored, evaluated, and commissioned). *Conclusions*. Applying CFIR as an implementation framework offers a structured and holistic approach to consider how to maximise the effectiveness of innovations in the context of reducing inequities in cancer care. Working with other countries to apply this framework also provides a uniform approach to understand and reduce inequities across a range of innovations and address the global mission to improve cancer care for all.

1. Introduction

There are well-established and persistent inequities in cancer care that contribute substantially to inequities in outcomes within and between countries [1]. Continuing to describe these differences, without taking action, is unethical, particularly in terms of the principle of justice [2], which emphasises fairness and equity among individuals. There is a need to shift from the principle of treating everyone the same and make research and policy changes to ensure access to, and experience of, cancer care is equitable across populations [1]. This ambition is aligned to the United Nations Sustainable Development goals to (1) reduce inequity within and among countries and (2) to strengthen the means of implementation and revitalize global partnership for sustainable development [3].

There are a number of existing innovations developed to address inequities in cancer care including community outreach, primary care endorsement, mass media campaigns, patient navigation, and patient reminders to take part in cancer screening [4]. Limitations include a predominance of early diagnosis innovations and the challenge of translating effective studies into clinical practice [4].

The aim of this article is to explore how implementation theory can be used to maximise the potential effectiveness of innovations [5], with the vision of reducing inequity in cancer care. Others have argued that health psychology theory, designed to represent mechanisms of action (i.e., mediators) on peoples' behaviour, does not adequately integrate factors such as socioeconomic status, which could limit the ability to use theory to address inequity [6]. The updated Consolidated Framework for Implementation Research (CFIR) provides a guiding framework when designing innovations and can be applied to reduce inequity in care [7].

CFIR is an implementation framework used to inform implementation strategies, generate hypotheses, and explain outcomes and was recently updated to highlight the role of health psychology theory. As part of this, the COM-B model of behaviour change categories of Capability, Opportunity, and Motivation was included for the first time [6], and other health psychology theories (e.g., Theoretical Domains Framework) [8] were also included. This is an important change because it means that CFIR encourages researchers to consider individual-level determinants when designing and evaluating innovations (e.g., knowledge, attitudes, skills, and motivation), while placing this in a broader contextual framework.

A review of studies that have applied CFIR to improve implementation of healthcare practices for vulnerable populations has already been published [9]. The review identified 81 studies, including 10 studies with specific reference to cancer; two of which related to prevention programs (e.g., tobacco control and physical activity) [10, 11], three related to implementing cancer screening [12–14], and five related to improving the quality of care for cancer patients in hospitals (e.g., reducing falls and addressing supportive care needs) [15–19]. All these studies focused on identifying factors that may be important when developing an innovation (e.g., fall prevention strategies and psychoeducational interventions) or when evaluating an existing program (e.g., colorectal cancer screening), but none focused on reducing inequity in cancer care.

To address this gap, in this article, we describe three international case studies of innovations with relevance to addressing inequities in cancer care. We use these case studies to exemplify how constructs within different domains of the updated CFIR can prospectively guide implementation strategies as interventions are designed, adapted, and evaluated. Our focus is on differences within high-income countries, with a long-term vision of applying this learning more broadly. We also involved people with lived experience throughout the collaboration and have produced an easy read version of this article (see Supplementary Material (available here)).

2. Methods

Colleagues from the US, Australia, and UK (KLW, AC, GM, KS, and CH) developed a Cancer INequalities Collaboration (CINC: https://www.surrey.ac.uk/research-projects/university-global-partnership-network-cancer-inequalities-collaboration), within the principles of the University Global Partnership Network (UGPN), whose vision is "Global partnership for social impact [20]." We drew on our existing networks of experts (by profession or experience) to build on this collaborative and held three international workshops to consider how to optimise implementation of innovations to address inequity in cancer care. The final workshop is described at the end of the Results section.

2.1. International Workshop 1: Online, Hosted by the University of Surrey. In November 2022, we held an online workshop between US, Australia, and UK, with 14 (all authors) clinical academics, academics, doctoral students, and people with lived experience presenting their work/experiences. Our objective was to accelerate the impact of our work by identifying innovations that can be used internationally to reduce cancer inequities.

2.2. International Workshop 2: In Person, Hosted by the University of Wollongong. In January 2023, representatives from the US, Australia, and UK met in person at the University of Wollongong for a two-day interactive workshop. Five academics (KW, AC, KS, CH, and GM) shared case studies detailing their approach to solving problems of inequity in cancer care and their implications for clinical practice. One case study was selected from each country and authors worked collaboratively to apply the CFIR to the case studies and to consider how the framework could optimise the potential to reduce inequity.

3. Results

During the three workshops, our international working group discussed a number of innovations to reduce inequity in cancer care that we have either evaluated or plan to evaluate imminently in our respective countries. This included (1) the use of HPV based testing and vaccination in the US, (2) the use of trial navigators in Australia, and (3) the evaluation of formal interpreting services in the UK. Below we provide an in-depth exploration of these case studies and consider how different domains of CFIR can guide implementation strategies and adaptations, including innovation (the "thing" being implemented, such as a new screening test), inner setting (the setting in which the innovation is implemented, e.g., hospital), the outer setting (where the inner setting exists, e.g., healthcare system), and the roles and characteristics of individuals. Within each domain, we describe the most pertinent constructs to the respective case studies (e.g., innovation adaptability and local attitudes) and suggest next steps for successful implementation (Table 1).

Table 1: Application of CFIR to case studies.

Innovation to reduce inequities in cancer care	Type of implementation	CFIR domain	CFIR construct	Next steps to ensure effective implementation
Ensure early detection tools have high utility for all	Adapting existing innovation	Innovation	Adaptability/cost	Assess the adaptability of existing detection tools, such as screening tests and affordability of new tests
		Outer setting	Policies and laws	Create new policies/legislation driven by local attitudes
		Individual	Capability (of high-level leaders/midlevel leaders/opinion leaders)	Influence attitudes and knowledge about inadequacies of existing tests
Make cancer clinical trials inclusive	Designing new innovation	Inner setting	Available resources, funding, space	Monitor/adapt infrastructure of individual sites (e.g., physical layout and staffing levels)
		Individual	Capability of innovation deliverers	Enhance cultural competence of healthcare professionals and researchers (e.g., to share trial information in a meaningful way)
Optimise uptake and experience of formal interpreting services in primary care	Evaluating existing innovation	Outer setting	Local attitudes and conditions to support innovation	Establish if/how services are monitored, evaluated (e.g., uptake), and subsequently funded
		Inner setting	Information technology infrastructure	Explore technology infrastructure in primary care and compatibility for use with formal interpreters given increased use of remote consultations
		Individual	Innovation deliverers and recipients need, capability, opportunity, and motivation	Improve patients' and healthcare professionals' awareness of and confidence in using interpreting services

3.1. Case Study 1 (US): HPV Screening Tests Need to Have High Utility for All

3.1.1. The Problem. Cervical cancer is a global public health issue [21]. Despite improvements in screening and prevention in the past fifteen years, cervical cancer incidence and mortality remain high among minority ethnic groups across countries [22]. This is, in part, because most HPV-based vaccination and screening for abnormal cytology and the most oncogenic HPV types involve pooled detection of any HPV or specifically of HPV16 and 18. Yet, the distribution of HPV types appears to vary by ethnicity and geography [23, 24].

3.1.2. Our Approach. In our research in the US, 572 English and Spanish-speaking women, who were initially screened for cervical abnormalities, with the Thin-Prep liquid-based cytology test (Cytyc), were enrolled from 10 Duke University clinics during 2010–2012 [25]. All biopsy specimens underwent pathologic review and 37 HPV DNA subtypes were tested. We found that while infection with HPV 16 and 18 was the most commonly found type in non-Hispanic white women, non-Hispanic black women were two times less likely to be infected with HPV 16 and 18. HPV types most prevalent in non-Hispanic black women with cervical abnormalities were HPV 45, 33, 58, 35, and 68. These findings have since been reported by others in different parts of the world [26, 27].

3.1.3. Application of CFIR and Implications for Clinical Practice. These findings suggest that as triage decisions are made based on infection with oncogenic HPV types 16 and 18, non-Hispanic black women may not receive follow-up care with comparable frequency, as they demonstrably harbour other genotypes. This difference in HPV genotype distribution in black women may explain the observed higher incidence and mortality, despite screening at higher frequencies in this group [28]. These data support our contention that, beyond cervical cancer screening, reducing health inequities will require the development of screening tests and other early detection tools that are effective for minoritized populations to create a test/tool with high utility for all.

Within the innovation domain of CFIR, adaptability (the innovation can be modified to fit local context or needs) and cost (the operating costs are affordable) were identified as being key. In the outer setting domain, policies and laws were likely to need amending (e.g., legislation supports the delivery of the innovation), which will involve galvanising the support of high level, midlevel, and opinion leaders by influencing their capability (competence, knowledge, and skills) to enact change.

3.2. Case Study 2 (Australia): Cancer Clinical Trials Need to Be Inclusive

3.2.1. The Problem. Cancer clinical trials represent the cutting edge in modern cancer medicine. In the last 10 years, there have been dramatic improvements in anticancer therapy, with innovations such as immunotherapy in melanoma (5-year overall survival of 50% now), and targeted therapy in lung cancer. However, research repeatedly demonstrates that ethnic minorities and native indigenous populations are underrepresented in research [29]. This issue echoes what we have outlined above in terms of innovations (e.g., implications for HPV vaccination) not being fit for purpose across populations.

The reasons for inequity in cancer clinical trials participation are diverse and involve barriers at the patient, site, and sponsor level. Research teams and clinical trial sites may lack cultural competence (defined as being sensitive to people's cultural identity or heritage), meaning they are unable to truly achieve equity in care. For example, in some cases, trials have exclusionary protocols when it comes to the necessity for patient-reported outcome measures (e.g., patients being able to understand English) [30].

3.2.2. Our Approach. In South Western Sydney Local Health District (a metropolitan region on the outskirts of Sydney, Australia), >50% of the population speak a language other than English in the home, with Arabic being most common. Arabic-speaking patients report high levels of fear and stigma regarding cancer and its treatment, resulting in lower engagement with cancer services and clinical trials [31]. A national survey with the Australian cancer clinical trials workforce recently confirmed ongoing inequity in clinical trials, with reports of low representation from native indigenous populations and poor recording of key data such as preferred language and ethnic background [32].

3.2.3. Application of CFIR and Implications for Clinical Practice. To address this, we are developing a scalable bilingual Trial Navigator (TN) model to support health and research literacy in Arabic-speaking cancer patients. US studies have found patient navigation effectively improves ethnic minority participation in cancer clinical trials [33]. We conducted a codesign workshop with service users, clinicians, and researchers and found that this idea was considered a useful strategy for improving clinical trial participation by ethnic minority populations.

We will develop and pilot an Arabic-speaking TN, who will be a bilingual/bicultural, community educator, trained and educated in clinical trial navigation. The training module will be coproduced in consultation with Arabic-speaking populations, service users, clinicians, and researchers. The TN will assist patients with information gathering, decision making, and navigating often complex clinical trial processes, with the aim of improving equity in access to clinical trials. Within the inner setting of the CFIR domain, pertinent constructs identified for the innovations included having available resources, funding, and space to successfully deliver the navigation program. Within the individual domain, innovation deliverers having the capability (e.g., cultural competence) to support the implementation of the innovation were identified as being critical.

3.3. Case Study 3 (UK): Existing Healthcare Innovations Need to Be Evaluated

3.3.1. The Problem. Most cancers are diagnosed following symptomatic presentation in primary care [34]. Optimising this route to diagnosis is important to avoid the worse prognosis that follows other routes to cancer diagnosis such as emergency presentations at hospital [35]. Formal interpreting services are provided in primary care in the UK (and elsewhere) as one avenue to improve equitable access, by addressing language barriers for those with limited English language proficiency. Uptake of these services is vital to ensure patients and clinicians understand each other and to avoid exacerbating inequities in healthcare access. The evidence base for whether this innovation has been successfully implemented is scarce [36].

3.3.2. Our Approach. In the UK, we conducted a pilot study which showed that, in people with limited English language proficiency, there is variation in uptake of formal interpreting services, potentially driven by patient-related factors, including perceived barriers and knowledge of services. However, this research was limited by only exploring experiences of patients as recipients of the innovation [37].

We are currently evaluating formal interpreting services in primary care practices across England for people with limited English language proficiency. We are including patients' views, focusing on South Asian groups in England (Pakistani, Bangladeshi, and Indian groups) because South Asian languages combined (Punjabi, Urdu, Bengali, Gujarati, and Hindi) are the most commonly spoken languages in the UK after English [38]. We are also gathering views from the primary care workforce and those involved in implementing the service, such as primary care doctors, receptionists, interpreters, providers of interpreting services, and those organising and commissioning services.

3.3.3. Application of CFIR and Implications for Clinical Practice. This research will provide an in depth understanding of different CFIR domains, including the outer setting (e.g., local attitudes and conditions to support formal interpreting services), inner setting (e.g., information technology infrastructure), and individual (e.g., patients' knowledge and beliefs about interpreting, and other personal attributes that influence uptake as well as primary care staff, interpreters' and commissioners'/policy makers' experiences and beliefs about service implementation). Ultimately, this will lead to the provision of updated coproduced guidance for commissioners, frontline staff and interpreters, and patients to improve the uptake and experience of interpreting services in primary care, as well as patient outcomes.

International Workshop 3: In person, hosted by the University of Surrey

In July 2023, four academics (KS, GM, KLW, and AC) representing the US, Australia, and UK met in person at the University of Surrey to collaboratively create a diagram to illustrate the alignment between CFIR and the case studies (Figure 1). We present the domains of CFIR and pose questions that can be asked of any innovation to optimise the likelihood of success. The pertinent questions for each innovation will vary (see Table 1) because they are dependent on the stage of the innovation and its implementation. We also include coproduction as an all-encompassing aspect of successful innovation design and implementation (e.g., ensuring adaptability of the innovation and advocacy for change).

4. Discussion

4.1. Main Findings. We identified a gap in the literature related to the application of CFIR to improving effectiveness of innovation and to reducing inequities in cancer care. To address this gap, we used three international case studies to consider and apply the CFIR framework for different types of implementation challenge—adapting an innovation (screening test), designing a new innovation (trial navigators), and evaluating an innovation operating in clinical practice (formal interpreting services).

This helped identify specific aspects for respective innovations that need careful consideration to maximise their effectiveness. For example, to ensure screening tests have high utility for all, there may need to be some adaptions to the test itself, which is likely to have cost implications and will therefore need changes in policy to enact (by getting buy in from key people such as opinion leaders). To make cancer trials inclusive will require adequate resource, in terms of staffing and physical space, as well as upskilling in cultural competence of individuals involved in delivering the innovation. Finally, to optimise uptake and experience of formal interpreting services in primary care is going to need an understanding of how services are currently funded and monitored, as well as information about infrastructure and individual capability, opportunity, and motivation to provide or use services.

While the CFIR provides a framework to consider multiple stakeholder views of barriers to implementation, the involvement of an expert by experience in our international workshop and the coproduction of the easy read version of this article highlighted the importance of cocreating solutions to inequity. Including stakeholders at the point of conception and throughout the research life cycle can ensure barriers are considered and addressed from the outset, and coproduction is therefore included as an overarching theme within the explanation of CFIR in Figure 1. This involves recognising the value of the recipients' knowledge and experience in the design and production of their research [10]. As an international collaborative, we place coproduction at the centre of our projects [11] and conceptualise and implement coproduction in line with Smith et al.'s typology of "equitable and experientially informed research [12]."

We argued that research and subsequent innovations need to be coproduced in response to the needs and preferences of previously excluded groups, and with an understanding of the unique barriers to implementation within their communities. The challenges involved in coproducing research need addressing if inequity in cancer care is to be

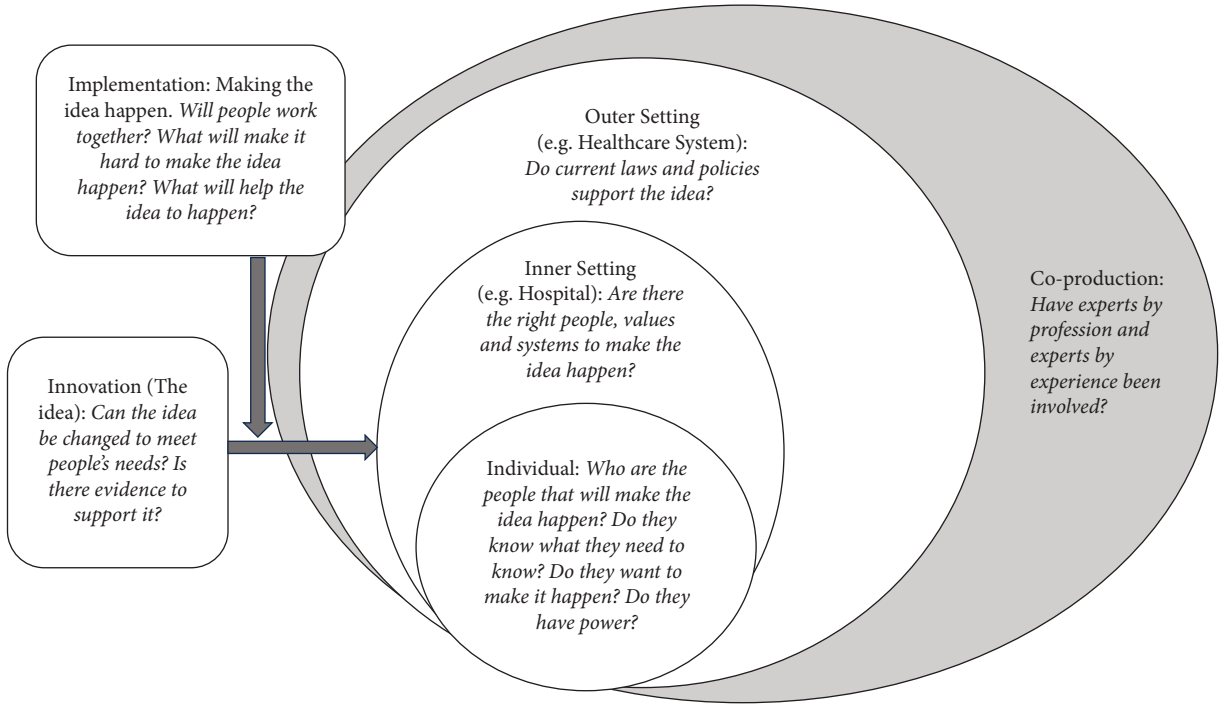

Figure 1: Domains from the Consolidated Framework for Implementation Research informing questions to ask for effective implementation and the role of coproduction.

tackled by this approach. For example, there is a tension between the ethos and ethics of coproduction [13]. The ethos is inclusivity, but the research ethics process hinders this ethos with blanket ideas about vulnerability and protecting people with lived experience. The funding, governance, and process of research all need to be reconsidered to ensure truly inclusive research [14].

5. Strengths and Limitations

A strength is to present a new way of learning from each other by conducting workshops across three high-income countries with the shared goal of reducing inequities in cancer care. As this was formed as part of UGPN, this was limited to countries within the network, but our ambition is for this work to be transferrable to other countries. We highlight several opportunities—in terms of how CFIR is applied to reduce inequity; how coproduction is embedded within research; and how we can learn from each other to provide collective impact for change. CFIR acknowledges the role of racism and other systems of oppression on inequities in care [5], and this will involve exploring and assessing the unique lived experience of people holding multiple intersectional identities (e.g., race/ethnicity and sexual orientation) within systems of oppression and discrimination (e.g., racism). This will improve our understanding of the root causes of inequities in cancer care and find solutions to improve equity in access to innovations for minoritized populations [9].

6. Conclusion

We have presented three case studies from the US, Australia, and UK to highlight examples of inequities in cancer care arising from standard care practices: HPV testing and vaccination, participation in clinical trials, and translation services—all of which contribute to inequities in cancer care outcomes. We use CFIR to propose potential actions needed to improve inequities in cancer care; these examples are not intended to be exhaustive, but rather illustrative of how frameworks such as CFIR can be useful in anticipating and addressing barriers to implementation. By applying theory and embedding coproduction from the outset, research will have the greatest chance of reducing inequities at every stage of the cancer care pathway.

Data Availability

No data were used to support this study.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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Supplementary Materials

Supplementary file: easy read version of the manuscript—"*Making cancer and outcomes equally good for everyone.*" (*Supplementary Materials*)

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