

Science & Society

Ensuring the Value of Cancer Research: Opportunities in Implementation Science

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Implementation science is the study of methods to ensure the uptake and integration of evidence-based interventions in cancer control. Three key approaches to effective implementation include multilevel approaches, stakeholder engagement, and sustainability. This commentary describes the use and benefits of implementation science as well as opportunities for cancer researchers.

Ensuring the Use of Cancer Research in Practice

The National Cancer Institute (NCI) has supported research that has led to the development of effective interventions, guidelines, programs, practices, and policies (hereafter referred to collectively as effective interventions) for cancer prevention and control. Over 200 of these effective interventions are available for download and use from NCI's Evidence-Based Cancer Control Programs database. Substantial progress has been made in preventing and controlling cancer, as measured by the achievement of national cancer-related targets for Healthy People 2020, as well as declining cancer mortality rates for most types of cancers [1].

However, many gaps remain in cancer prevention, detection, diagnosis, treatment, and the care of cancer survivors. These gaps are in part due to the slow, insufficient, and unequal delivery of effective interventions to populations at risk. For example, the human papillomavirus

(HPV) vaccine can prevent six types of cancers, yet barely half of all eligible teens are up to date with the vaccine [2]. Colorectal cancer screening not only prevents cancer but also reduces diagnoses of late-stage disease, yet less than 60% of eligible adults are up to date on screening guidelines [2], and rates of screened adults are lower for racial and ethnic minority populations.

Implementation science seeks to understand the barriers to delivery and strategies to overcome those barriers, to ensure that effective interventions are adopted, integrated, implemented, sustained, and scaled up across a variety of settings to meet the needs of all populations. In this article, I describe the use and benefits of implementation science, provide examples of outcomes from implementation studies, and highlight gaps that remain. Furthermore, I describe resources and opportunities to support future research directions and collaborations.

Use and Benefits of Implementation Science

Implementation science is the study of methods to promote the adoption and integration of effective interventions into routine healthcare, public health, and community settings to improve population health and health equity [3]. By focusing explicit and rigorous attention to the study of how best to implement effective interventions, cancer researchers can help stakeholders ensure their implementation efforts are feasible, cost-effective, and benefit all populations at risk. Moreover, through the use of rigorous, valid, and reliable designs and measures, we can generate generalizable knowledge about the best ways to implement effective interventions that can inform efforts beyond the context of a given study and advance our understanding of not just what works but how and why things work.

Effective implementation benefits from three components: multilevel approaches, stakeholder engagement, and sustainability.

Multilevel approaches can ensure that critical barriers to implementation at the client, provider, clinic, system, and/or community level may be addressed with an appropriate set of strategies. For example, clinical reminders can support clinician practice only if system administrators accept, invest in, and integrate them into electronic medical records systems. Stakeholder engagement at multiple levels to address a practice problem can ensure that the development, selection, and implementation of an effective intervention will be a good fit for the relevant populations and settings. Furthermore, stakeholders can help to inform the necessary adaptations that may be needed, while still maintaining the integrity or core components of the intervention. For implementation efforts to impact health, they also need to be sustained over time. Considering factors that influence sustainability can further ensure the longevity of implementation efforts and subsequent health benefits. The next section describes outcomes from implementation studies to illustrate the value of multilevel approaches, stakeholder engagement, and sustainability.

Effective Implementation Requires Multilevel Approaches

Effective implementation depends on addressing challenges that may occur at multiple levels including the provider, clinic, organization, community, and state or national level. The HPV vaccine serves as one example of the importance of addressing these multilevel challenges. Despite the safety and effectiveness of the HPV vaccine in preventing several types of cancer, many parents and caregivers are reluctant to vaccinate their children. Less than half of all eligible teens are up to date with their vaccine, and in some settings the rate is substantially lower. In one southeastern federally qualified health center (FQHC) that serves 30000 patients, vaccination rates were only 11% at the start of 2014. After using a multifaceted, multilevel set of strategies to accelerate the adoption and integration

of HPV vaccinations at the FQHC, a quality improvement team succeeded in increasing the vaccination rate to 57% 1 year later, and a nearly 70% year-to-date average 18 months later [4]. They used multilevel strategies including patient-, provider-, and staff-based education; patient outreach and tracking; provider reminders; task shifting and staff empowerment enabling support staff to deliver vaccination messaging; and standing orders. Although vaccine hesitancy continued to pose a challenge, the multipronged approach to ensuring the adoption and integration of HPV vaccination helped to overcome that barrier. This example can inform future efforts to implement vaccination programs, accounting for the multiple levels and stakeholders involved in implementation, as well as strategies to enable not only the adoption by clinics and providers but also the integration into routine practice to support delivery.

Effective Implementation Requires Stakeholder Engagement

Effective implementation also relies on stakeholder buy-in, input, and engagement. Engaging stakeholders in implementation studies can provide indispensable knowledge about the barriers, context, and capacity to deliver effective interventions, which can in turn help to develop strategies to optimize implementation. Further, engaging stakeholders in intervention development, adaptation, and evaluation can ensure implementation efforts are feasible, acceptable, and can be sustained. Most importantly, stakeholders should inform the practice problems as well as potential solutions that our science aims to address, increasing the relevance and value of our studies. PLANET MassCONNECT is an example of the value of stakeholder engagement to optimize implementation of effective interventions in community settings [5]. PLANET MassCONNECT is a community-based participatory research project that aims to build capacity in community-based organizations to deliver effective health

interventions in three Massachusetts communities. A collaboration among researchers, practitioners, and community representatives co-developed an engagement network that could support information exchange, use, and delivery of effective health interventions. They examined the relationship between the degree of engagement and usage of effective interventions and found that greater engagement was positively associated with the use of effective interventions in practice settings [5]. This study demonstrates not only the value of partnering with stakeholders to develop solutions, but also the value of ensuring those solutions are delivered.

Effective Implementation Requires Sustainability

Effective implementation requires that interventions and their health benefits can be sustained beyond the lifespan of a study. To ensure sustainability of interventions, implementation studies must account for factors that influence sustainability and plan for strategies that can maximize the capacity to sustain. A group of researchers at Washington University in St. Louis investigated the major determinants of sustainability through a literature review, concept mapping, and expert input. They found eight major factors that influence sustainability, comprising funding stability, partnerships, program adaptation, strategic planning, political support, organization capacity, program evaluation, and communication [6]. They developed a Program Sustainability Assessment Tool (PSAT) that can help researchers and public health practitioners to build sustainability capacity. One such group that took advantage of this tool is the Colorado Cancer Screening Program (CCSP), which works with safety-net health systems across the state to provide free patient navigation services to support cancer screening. Given the unique context for patient navigation which straddles clinical and community settings, CCSP worked with the original

developers of PSAT as well as with external stakeholders to adapt the tool, creating a Patient Navigation Sustainability Assessment Tool (PNSAT). By working with stakeholders, CCSP not only was able to develop a relevant tool but also positioned well to disseminate the tool to target audiences. The PNSAT is now being used by health systems in Colorado to assess and plan for sustainability of patient navigation programs for cancer screening. The original PSAT is being studied further in an NCI-funded R01 that examines its ability to support state level tobacco control program sustainability [1R01CA203844-01A1].

Resources and Opportunities in Implementation Science

The NCI along with 20 other institutes, centers, and offices at the National Institutes of Health issued funding announcementsⁱⁱⁱ to support implementation science and build the knowledge base. The Cancer Moonshot has also supported multiple funding opportunities for implementation science in cancer control. As we continue to monitor our portfolio and raise opportunities for growth, we encourage researchers to look at our funding announcements. The NCI's implementation science team^{iv} maintains up to date information about funding opportunities, new research publications, trainings, webinars, and other resources and opportunities for collaboration to advance the field.

Remaining Gaps

While we have learned much about what works to support adoption and integration of effective interventions into routine practice, many gaps remain. Namely, we have much to learn about how best to adapt, sustain, and scale effective interventions to reach all populations who could benefit, as well as deimplement practices that are no longer effective or never were. Further, although we may know what works, we do not necessarily understand why or how it works. Understanding the mechanisms behind our strategies can help us to winnow

down those critical components and support their feasibility, cost-effectiveness, and reach across even the lowest resource settings. We also need to build additional capacity in our field: to improve the validity and reliability of our measures, to support the infrastructure for a range of implementation studies in a variety of settings, and to develop study designs that can assess implementation in a rapid, relevant, and rigorous way, meeting the urgent needs of decision makers.

By focusing on implementation science and attending to the multilevel complexities and sustainability of implementation efforts, we hope to ensure the products of cancer research benefit population health in a timely and equitable manner.

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Resources

ⁱ<https://grants.nih.gov/grants/guide/pa-files/PAR-19-274.html>

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ⁱⁱⁱ<https://grants.nih.gov/grants/guide/pa-files/PAR-19-276.html>

^{iv}<https://cancercontrol.cancer.gov/IS/>

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