

# Advancing Social Marketing in Healthcare: Leveraging the Internet of Behavior Technology to Overcome Data Collection and Analysis Challenges

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## Letter

Social marketing aims to address public health challenges by promoting positive behavior change through the application of marketing principles and techniques. This approach involves the creation, communication, and delivery of value-based interventions designed to drive social change and enhance public welfare (1). By leveraging commercial marketing concepts and tools, social marketing advances social objectives and improves societal well-being. It emphasizes understanding and addressing the needs, wants, and motivations of the target audience to effectively influence behavior (2). This method involves the systematic planning and execution of campaigns aimed at achieving specific social goals, such as improving health outcomes, promoting environmental sustainability, and encouraging civic engagement (3). Social marketing plays a crucial role in healthcare by reaching diverse populations, raising awareness, changing attitudes, and ultimately motivating individuals to adopt healthier behaviors. Notable applications include smoking cessation (4), promoting vaccination uptake (5), combating obesity and encouraging healthy eating habits (6), raising mental health awareness and reducing stigma (7), HIV/AIDS prevention (8), road safety and injury prevention (9), controlling the spread of pandemic (10), and increasing awareness about organ donation (11).

Following the situation analysis, the first stage of social marketing is audience research, which involves gathering data on the behaviors, attitudes, beliefs, and preferences of the target audience (1). In the context of healthcare and medicine, social marketing faces several challenges in data collection and analysis:

**Complexity of Health Behaviors and Data Collection:** The complexity of capturing the multifaceted nature of health behaviors in social marketing campaigns poses significant challenges in designing effective data collection instruments. Health behaviors are influenced by a variety of social, psychological, and environmental factors, making it difficult to create comprehensive methods that accurately reflect this complexity (12).

**Accuracy and Reliability of Self-Reported Data:** Many social marketing studies rely on self-reported data, which is often biased and unreliable, leading to incomplete or fragmented

analyses. Innovative approaches are needed to validate self-reported behaviors and outcomes (13).

**Integration of Diverse Data Sources:** The integration of qualitative and quantitative data from diverse sources-such as surveys, social media, and health records-is often inadequately addressed, leading to incomplete or fragmented analyses (14).

**Longitudinal Data Collection and Analysis:** Although longitudinal studies are essential to provide insights into the long-term impact of social marketing interventions, the long-term data collection methods to monitor and evaluate the sustainability of behavior change remains underdeveloped. Without these long-term insights, it is challenging to assess the true effectiveness of social marketing interventions, as short-term success might not translate into long-term behavior change (15). Therefore, developing and implementing more sophisticated longitudinal data collection methods is crucial for advancing the field and ensuring that social marketing efforts lead to lasting, meaningful change.

**Evaluation of Data Collection Methods:** In social marketing, collecting accurate and actionable data is essential for designing effective interventions. However, there is a significant gap in systematically assessing the various methods used for data collection. This deficiency means that the tools and techniques employed may not always be the most effective in capturing the complex, multifaceted data required for social marketing campaigns. As a result, the data gathered may not be as reliable or actionable, which can undermine the effectiveness of the social marketing efforts (13, 16).

A promising approach to overcoming the challenges associated with data collection and analysis in social marketing is the Internet of Behavior (IoB). IoB involves the collection and analysis of data generated by users' behaviors to understand, predict, and influence human behavior. This data is sourced from smartphones, wearable devices, social media, and other connected technologies (17). IoB extends the capabilities of IoT by focusing on behavioral data for applications in personalized marketing, healthcare management, and user experience enhancement (18). While IoT refers to the network of physical devices (e.g., sensors, cameras, smartwatches) connected to the internet, capable of collecting and exchanging data, IoB refers to the analysis and use of behavioral data collected through IoT devices (and other sources) to influence or understand human behavior, often to drive decision-making or improve services. IoB seeks to understand the psychological aspects of behavior to drive specific outcomes, integrating data analytics, machine learning, and behavioral science (19). By leveraging data from IoT devices, organizations can gain insights into users' habits and preferences, enable the creation of personalized interventions, potentially increase the impact of social marketing campaigns (20). The use of real-time data collection and analysis tools, such as mobile health apps and other connected technologies (e.g., wearable, ingestible, implantable, and injectable smart objects), can significantly improve the accuracy and timeliness of data in social marketing (17). Moreover, IoB employs advanced analytical techniques, including artificial intelligence, machine learning, and data mining, to process and analyze large datasets in social marketing (21).

The IoB significantly enhances healthcare social marketing by integrating data analytics and behavioral science to influence health behaviors. IoB enables personalized health campaigns, improves medication adherence, and supports disease prevention through tailored interventions. Examples include Fitbit's activity tracking for lifestyle changes (22). During COVID-19, IoB guided targeted vaccine campaigns to address hesitancy. IoB's potential lies in delivering personalized, scalable, and cost-effective health solutions that improve engagement and public health outcomes (18).

Overall, the IoB approach effectively overcomes the challenges of collecting, integrating, storing, and analyzing big data within social marketing programs. It provides implementers and developers of social marketing initiatives in the healthcare sector with precise and

profound insights into audience behavior. Future research in social marketing should prioritize addressing the potential challenges associated with IoB, including behavioral factors (e.g., persuading individuals to share their data), ethical concerns (e.g., privacy, security, confidentiality, transparency), legal considerations (e.g., data ownership and access), and technological limitations (e.g., the energy consumption of connected devices).

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