

Review

# Implementation Strategies for Web-Based Apps for Screening: Scoping Review

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## Abstract

**Background:** Screening is an effective primary prevention strategy in health care, as it enables the early detection of diseases. However, the uptake of such screening remains low. Different delivery methods for screening have been developed and found to be effective in increasing the uptake of screening, including the use of web-based apps. Studies have shown that web-based apps for screening are effective in increasing the uptake of health screening among the general population. However, not much is known about the effective implementation of such web-based apps in the real-world setting. Implementation strategies are theory-based methods or techniques used to enhance the adoption, implementation, and sustainability of evidence-based interventions. Implementation strategies are important, as they allow us to understand how to implement an evidence-based intervention. Therefore, a scoping review to identify the various implementation strategies for web-based apps for screening is warranted.

**Objective:** This scoping review aims to identify (1) strategies used to implement web-based apps for health screening, (2) frameworks used for implementing web-based apps for health screening, (3) outcome measures of implementation strategies, and (4) effective implementation strategies.

**Methods:** This scoping review was conducted based on Arksey and O'Malley's framework. After identifying the review question, two researchers independently screened and selected relevant literature from PubMed, Embase, Cochrane, Cumulative Index of Nursing and Allied Health Literature, PsycINFO, International Standard Randomised Controlled Trial Number Registry, OpenGrey, ClinicalTrials.gov, World Health Organization International Clinical Trials Registry Platform, and Web of Science. This was followed by charting the data using a standardized form. Finally, we collated, summarized, and reported the results quantitatively and qualitatively based on the review objectives.

**Results:** A total of 16,476 studies were retrieved, of which 5669 were duplicates. From a total of 10,807 studies, 10,784 studies were excluded based on their titles and abstracts. There were 23 full-text articles reviewed, and 4 articles were included in the final analysis. Many studies were excluded because they focused on the effectiveness and not on the implementation of web-based apps. Facilitation was the most cited implementation strategy used, followed by reminders, clinical champions, and educational meetings and materials. Only 2 studies used implementation frameworks to guide the evaluation of their studies. Common outcome measures for implementation strategies were feasibility, fidelity, and penetration. Implementation strategies reported to be effective were quality improvement meetings, facilitation, educational meetings, and clinical champions.

**Conclusions:** There is a dearth of literature on the implementation of web-based apps for health screening. Implementation strategies were developed without any reported use of implementation theories or frameworks in most studies. More research on the development and evaluation of web-based screening app implementations is needed.

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## KEYWORDS

internet; mHealth; eHealth; mass screening; implementation strategies

## Introduction

### Background

Screening is one strategy for health promotion and disease prevention. Screening is the process of identifying healthy people who may be at an increased risk of a particular disease or health problem [1]. Screening enables early detection of disease so that steps can be taken quickly, when relatively little damage has been done, to prevent the disease from progressing [2].

### Prior Research

Many studies have shown screening to be effective in the prevention of diseases. A study in Korea reported that participation in cardiovascular disease (CVD) health screening was associated with lower CVD and all-cause mortality from CVD. There was also an increase in the early detection of CVD and a reduction in health care use and cost [3]. A systematic review of colorectal cancer (CRC) screening using fecal occult blood test showed that it is effective in reducing CRC mortality [4]. However, not all health screening tests are beneficial [5]. Studies have shown, for example, that prostate-specific antigen testing has led to overdiagnosis in up to 40% of the patients screened [6]. Screening tests are not uniformly accurate and are liable to false-positive results and overdiagnosis, which can cause harm to patients [5]. Therefore, care is needed in discussing the pros and cons of screening tests with patients, and to come to shared decision making about screening [5].

### Methods of Screening Delivery

However, even when screening is beneficial and effective, its uptake remains suboptimal [7]. One reason is that screening cannot be done using just a single method, a “one size fit all” solution [7]. Different delivery methods must be used to address patient needs. A systematic review looking at improving health screening uptake in men showed that there was a variety of delivery methods for screening, ranging from use of education materials or video decision aids to web-based approaches [8].

Information and communication technology (ICT) has become an important platform to improve health care in the general population [9,10]. ICT use in health is sometimes also known as electronic health (eHealth) [11]. Many forms of eHealth interventions have been developed to improve public health care, in particular, web-based apps [12]; although, the use of electronic health records is another approach using ICT. Our focus in this study was on web-based approaches that do not require the use of an electronic health record, which is often not available, especially in low-resource settings.

A web-based app is defined as a program that is accessed over a network connection using HTTP rather than existing within a device’s memory. Web-based apps often run inside a web browser. However, web-based apps may also be client-based, where a small part of the program is downloaded to a user’s desktop, but processing is done over the internet on an external server [13]. With the proliferation of the internet and the accessibility of Wi-Fi and mobile data, web-based apps have become highly accessible to the general population, even in low-resource settings. The availability of smartphones enables the general population to have easy access to many web-based apps instantaneously from anywhere around the world. Web-based apps addressing different health needs like health screening, health promotion, and health advice have proliferated over the last decade. Many studies have shown that these web-based apps can be effective in changing health behaviors and improving health status [12]. For example, a completed systematic review showed that computer-based interventions are effective in improving sexual health knowledge [14].

Web-based apps for screening use questionnaires to accomplish screening. This screening can include mental and behavioral health as well as risk factor assessment. Examples include screening for depression risk, alcoholic addiction, and smoking. Users (patients) enter their responses based on the questions, and the web app sometimes provides appropriate advice to the patient. Several studies have shown that web-based apps for screening are effective in increasing the uptake of health screening among the population [15-17]. However, how successful implementation of these web-based health apps is accomplished has not yet been studied.

### Rationale for Implementation Research

Implementation research involves the study of “the use of strategies to adopt and integrate evidence-based health interventions and change practice patterns within specific settings” [18]. Implementation science approaches use a systematic process of getting an evidence-based intervention (EBI) to reach the target population. Many frameworks, theories, and models are available to guide the implementation process [19]. By using frameworks appropriately to guide the implementation process, including development and design of strategies, *implementation strategies* can be developed to facilitate the uptake of EBIs in a specific health care setting. *Implementation strategies* are activities to enhance the adoption, implementation, and sustainability of EBIs [20]. Explicit implementation increases the likelihood of getting the EBI to the target population compared to leaving it to usual processes. For example, a study done in a clinic found that by attaching a reminder to each patient’s chart about guidelines on the management of dyslipidemia, 94% of patients received the