

Strategies to Increase Health System Referrals to Chronic Disease Prevention and Management Programs



THIS DOCUMENT:

- Identifies strategies shown to increase health system referrals to chronic disease prevention or management programs and preventive services.
- Describes the context and settings in which the strategies have been implemented.
- Provides considerations for strategy implementation for type 2 diabetes prevention and management programs.

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Strategies to Increase Health System Referrals to Chronic Disease Prevention and Management Programs

Introduction and Overview

The Need for Chronic Disease Programs

Chronic diseases are the leading cause of death and disability in the United States and the leading driver of health care costs,¹ making prevention and management critical to improving health and reducing costs. One way to improve prevention and management is to increase health system referrals to effective chronic disease prevention and management programs and other preventive services (henceforth chronic disease programs), including type 2 diabetes prevention and diabetes management programs.

Health System Referrals

For the purposes of this document, a health system referral is defined as a process by which a person in a clinical setting is recommended to receive a specific service or attend a specific program delivered by another entity (clinical or community based). A health system referral can serve as a [community-clinical linkage](#), connecting the clinical sector (e.g., a physician's office) to the community sector (e.g., a community-based diabetes prevention program). It can also connect one clinical setting (e.g., a physician's office) to another clinical setting (e.g., a hospital).

Referrals to chronic disease programs may be made by a variety of health care providers, including physicians, nurse practitioners, physician assistants, registered nurses, midwives, diabetes educators, pharmacists, dietitians, nutritionists, dentists, and community health workers. **However, for reimbursement purposes, only certain providers can make referrals to** certain programs or services. For example, only physicians and qualified nonphysician health care providers (e.g., physician assistants, nurse practitioners, and advanced practice nurses) can make referrals to diabetes self-management and education support (DSMES) services.²

Why Focus on Increasing Health System Referrals to Effective Chronic Disease Programs?

- **Many people eligible** for chronic disease programs are **not aware of and do not participate in them**.³⁻⁶
- **Limited referral by health care providers** is one reason for low program participation.^{7,8}
- **Health care provider referral can predict enrollment** for some types of programs.^{9,10}
- **Health care providers are often viewed as credible sources of health advice**, and thus likely to influence behavior change.¹¹

What Is the Purpose of This Document?

- To describe common health system referral strategies and the context and settings in which they have been implemented.
- To identify strategies shown to increase health system referrals to chronic disease programs.
- To describe what health systems need to consider when implementing referral systems for these programs and services.

Chronic Disease Programs

Chronic disease prevention programs educate and support participants to reduce their risk for one or more chronic diseases. Examples of these programs include the National Diabetes Prevention Program lifestyle change program and smoking cessation programs.

Chronic disease management programs help participants learn how to take care of themselves, follow treatment plans, and monitor their condition to better manage their condition and prevent complications. Examples include diabetes self-management education and support services and cardiac rehabilitation programs.

Referral Barriers to Diabetes Management and Type 2 Diabetes Prevention Programs

Many health care providers lack information on chronic disease programs, such as local program availability, programs within network, or program coverage and eligibility.

Prediabetes may not be viewed as a high priority for providers who have patients with multiple chronic conditions.

Who Is the Audience for This Document?

- State and metropolitan health departments working to increase health system referrals to chronic disease programs, especially the National Diabetes Prevention Program (National DPP) lifestyle change program (LCP) or DSMES services.
- Chronic disease program entities wanting to increase health system referrals to their programs, particularly those offering the National DPP LCP or DSMES services.
- Health systems working to increase referrals to chronic disease programs.

How Were the Health System Referral Strategies in This Document Identified?

The strategies in this document were identified as part of a 2019 systematic review. Diabetes management and type 2 diabetes prevention programs can apply learnings from referral strategies used with other types of chronic disease programs and preventive services. For that reason:

- The review included studies of referrals to chronic disease programs covering smoking cessation counseling, cardiac rehabilitation, and nutrition and weight loss.
- It also included studies of referrals to preventive services, such as mammograms and HIV testing.

You can review details of the methods used for this systematic review in [Appendix B](#).

Review the Glossary in [Appendix A](#) for definitions of the following terms included in the 2019 systematic review.

- Strategies to Increase Health System Referrals
- Health System Referral
- Health Care Providers
- Chronic Disease Programs
- Chronic Disease Prevention Programs
- Chronic Disease Management Programs
- Other Preventive Services

The four referral strategies in this document are listed below with brief definitions.

Health System Referral Strategies

[Provider Education](#): Strategies with a primary focus on health care staff education or training (such as dissemination of referral guidelines or provider assessment and feedback).

[System Change](#): Large-scale strategies that involve the movement of health staff, expansion of roles for existing staff, integration of nontraditional staff into the care team, relocation of clinics, or financial arrangements for referrals, such as incentives.

[Process Change](#): Small-scale strategies that involve some aspect of the individual referral process (such as introducing electronic referral systems, bi-directional referrals, and automatic referrals).

[Multiple](#): Interventions using a combination of at least two of the referral strategies above.

How Is This Document Organized?

This document is organized by the four health system referral strategies. For each strategy, it:

- Highlights the strategies that have been shown to increase referrals, based on available information in the systematic review and methods developed by the Guide to Community Preventive Services.¹²
- Summarizes the studies included, details about the referral setting, and the common types of referring providers.
- Identifies and defines specific strategies and gives an example of how each strategy was implemented.
- Outlines implementation considerations.

To learn more about how strategies were examined for evidence of increasing referrals, you can review the methods in [Appendix B](#) and the criteria to show evidence for increasing referrals in [Appendix C](#).

Summary of Findings

Strategies shown to increase referrals are provided below, each with its own icon. Follow the links or page numbers provided for complete information about the strategy category or specific strategy shown.

PROVIDER EDUCATION STRATEGIES (p. 7)

Strategies that focus on health care staff education or training (such as dissemination of referral guidelines or provider assessment and feedback).



[Formal Training/
Professional
Development](#)



[Educational
Materials](#)



[Audit &
Feedback](#)

Implementation Considerations:

- Most provider education strategies involved physicians as the referring providers.
- Many studies included multiple provider education strategies. Implementing multiple strategies may be an effective approach.

SYSTEM CHANGE STRATEGIES (p. 12)

Large-scale strategies that involve the movement of health staff, expansion of roles for existing staff, integration of nontraditional staff into the care team, relocation of clinics, or financial arrangements for referrals, such as incentives.



[Team-Based
Care](#)

Implementation Considerations:

- System change strategies often focused on changing how health care team members worked together to increase referrals. Thus, focusing these strategies on the entire team may be an effective approach.
- System change strategies focused on a more collaborative approach could account for the extent to which staff already collaborate. Processes implemented are recommended to be mutually agreeable for all provider types involved.

PROCESS CHANGE STRATEGIES (p. 15)

Small-scale strategies that involve some aspect of the individual referral process (such as introducing electronic referral systems, bi-directional referrals, and automatic referrals).



[Decision
Support](#)

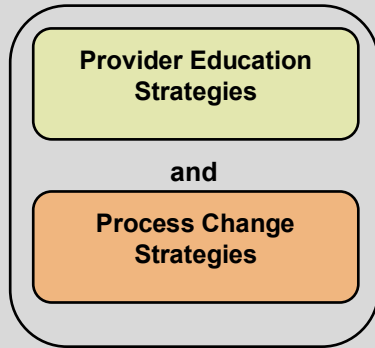
Implementation Considerations:

- Most process change strategies involved physicians and nurses as the referring providers.
- Many strategies used health information technology (IT), such as electronic health record (EHR) systems. In these cases, you will need to connect with staff who understand the relevant technologies or with IT vendors.
- Some studies included multiple process change strategies. Implementing multiple strategies may be an effective approach.

MULTIPLE STRATEGIES (p. 19)

Interventions using at least two of the referral strategies above.

The only combination of strategies that showed sufficient evidence for increased referrals was:



Implementation Considerations:

- Most interventions using multiple strategies involved physicians and nurses as the referring providers.
- Among interventions using provider education and process change strategies, most involved a formal training/professional development strategy and a decision support strategy.
- Consider provider needs before implementing multiple strategies to avoid overwhelming providers and existing workflows.

See below for descriptions and examples of each referral strategy (including those that were not shown to increase referrals).

Provider Education Strategies

Overview

Provider education strategies **focus on health care staff education or training.**

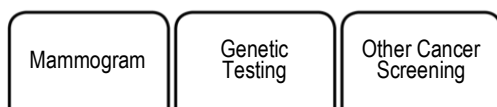
Summary of Key Study Characteristics

Referral Setting Characteristics

- Most studies involved referrals to the following **chronic disease programs**:



Some studies involved referrals to the following preventive services:



- Most referrals in these studies were made in a primary care clinic setting. Other settings included hospitals and specialty clinics.

Referring Provider Characteristics

- Physicians were most often the referring providers. Other referring providers included physician assistants, nurse practitioners, and nurses.

Details about the number of studies of provider education strategies in different referral settings, referring providers, and characteristics of referred patients are available in [Appendix D](#).

Specific Provider Education Strategies at a Glance

Strategies shown to increase referrals are indicated with a **large dot**. Strategies that do not have a large dot did not meet the criteria to show evidence for increasing referrals ([Appendix C](#)).

Strategy Shown to Increase Referrals	Provider Education Strategy
	Formal Training/Professional Development
	Educational Materials
	Audit and Feedback
	Academic Detailing
	Individual Consultation

Types of Provider Education Strategies



Formal Training or Professional Development

- **Referring health care providers attend workshops or other** trainings to learn about when and how to make referrals, build their knowledge and skills, or learn how to incorporate a formal referral protocol into their clinical practice.
- Trainings and workshops vary in frequency and delivery and may include webinars, workshops or lecture sessions, discussion sessions, phone education, group meetings, demonstrations or role-play, simulation, symposiums, and by-mail courses.



[Review the 18 studies of formal training or professional development strategies.](#)

An Implementation Example of Formal Training/Professional Development

Program or service referred to: Smoking cessation

Description: One study¹³ aimed to educate providers about tobacco quitlines, referral methods, and tobacco interventions. Researchers developed a case-based online continuing medical education/continuing education (CME/CE) program that included quitline education and intervention and referral skills training tailored to the specific type of provider (e.g., physician, nurse, dental provider, pharmacist) and to the specific patient setting (e.g., emergency, outpatient, inpatient). The program included a module about strategies to enhance patient motivation. This intervention led to an increase in fax referral rates to tobacco quitlines.



Educational Materials

Referring health care providers receive one or more of the following:

- Marketing materials describing the chronic disease program or service available to refer patients to.
- Guidance documents or formal steps that provide details on how and when to refer individuals to chronic disease prevention/management programs.
- Resources, tools, and templates to help facilitate referrals.
- Educational materials such as materials from a training or education session, pocket cards, examples of screening materials, information about billing codes, information about where to refer patients, educational websites, newsletters, direct mailings, promotional materials, and fact sheets.



[Review the nine studies of educational materials strategies.](#)

An Implementation Example of Educational Materials

Program or service referred to: Diabetes management

Description: A study¹⁴ aimed to inform general practitioners about the existence of community-based, dietitian-led diabetes clinics and the type of patient who would benefit most from the care at these clinics. Researchers developed posters with information about the clinics and mailed them to individual general practitioners. The posters outlined:

- How to refer patients to the clinic dietitian.
- The types of patients with diabetes who would benefit most from the clinics.
- The locations and schedules of the clinics.

This intervention led to an increase in referrals of patients with diabetes to community-based diabetes clinics.



Audit and Feedback

- A third-party reviews current provider referral behaviors and delivers feedback to the referring provider on their progress and whether they are referring appropriately.
- May include referral rates of other referring providers so that providers can compare their referral progress with that of their colleagues.

[Review the three studies of audit and feedback strategies.](#)



An Implementation Example of Audit and Feedback

Program or service referred to: Smoking cessation

Description: One study¹⁵ used a group-randomized clinical trial to assess the impact of a comparative feedback intervention versus general reminders on health system referrals to a tobacco cessation quitline. Every quarter for six quarters, clinicians received a mailed comparative feedback report (the audit and feedback intervention) or a general postcard reminder about quitline services. The feedback report was a single page, with one graph showing quarter benchmarks for referrals for the individual clinician, his or her practice group, and the study group. The second graph showed the actual number of referrals made by the individual clinician per quarter. The intervention group referred more patients to the tobacco cessation quitline compared to the control group.

Academic Detailing

- Referring health care providers receive university or non-commercial educational outreach. Academic detailing involves brief face-to-face education with referring providers by trained health care professionals, typically pharmacists, physicians, or nurses, repeated at periodic intervals.
- Detailers sometimes share materials and approaches that are tailored to address the provider's barriers to referral.

[Review the three studies of academic detailing strategies.](#)



An Implementation Example of Academic Detailing

Program or service referred to: Cancer screening

Description: An academic detailing intervention¹⁶ aimed to increase referral to breast cancer screening by physicians working in medically underserved urban areas. Intervention physicians received four academic detailing visits from two master's-level health educators. Visits averaged about 9 minutes, and physicians received self-learning packets that included professionally designed print materials, scientific articles, and a sample verbal transcript. The visits and materials highlighted American Cancer Society breast cancer screening recommendations. With physician consent, the materials were shared with other staff. The intervention supplemented office visits with dinner seminars and dissemination of a newsletter to decrease attrition. This intervention resulted in an increase in recommendations for breast cancer screening.

Individual Consultation

- Referring health care providers receive individual consultation to go over strategies, tools, guidelines, or suggestions that could help them increase referrals to programs or preventive services.
- This may include meetings or consultations with other providers, one-on-one supervision, individual skills demonstrations or simulations, and individual workshops.

[Review the eight studies of individual consultation strategies.](#)



An Implementation Example of Individual Consultation

Program or service referred to: Pulmonary rehabilitation

Description: Researchers¹⁷ examined how an education program affected the quality of care for patients with chronic obstructive pulmonary disease (COPD). The education program included individual consultation for general practitioners and their staff (nurses, laboratory technicians, and administrative staff) and examined the impact on referral to pulmonary rehabilitation. Specifically, the education program included an individual meeting with a consultant focused on international guidelines for COPD care, a regional meeting with about 30 general practitioners and their staff focused on a discussion of international guidelines with experts, and a symposium for all participating general practitioners and their staff with plenary sessions and workshops addressing practical issues. The intervention led to an increase in referrals for COPD rehabilitation. However, the individual consultation strategy did not meet the criteria to show evidence for increasing referrals (Appendix C).

Implementation Considerations for Provider Education Strategies

The considerations listed below could inform your implementation of provider education strategies to increase referrals to diabetes management and type 2 diabetes prevention programs.

- Currently, studies using formal training or professional development, educational materials, or audit and feedback provide strong evidence to show that they increase referrals. Individual consultation strategies and academic detailing strategies can be used, but because less is known about whether they will increase referrals, program evaluation is especially important.
- Most provider education strategies were implemented in the primary care setting. Other settings may work as well, but less is known about them.
- It is important to understand referral practices in your specific setting and tailor your strategy to the referring providers. Most provider education strategies involved physicians as the referring providers. Other health care team members or staff may be able to serve as referring providers, but less is known about these situations.

- Many studies included multiple provider education strategies. For example, formal training and professional development strategies were often accompanied by individual consultation or educational materials. Implementing multiple strategies may be an effective approach.
- Because most studies did not report on patient characteristics, the effectiveness of provider education strategies to increase referrals for specific populations is not known. Therefore, programs and interventions could be evaluated for evidence of increasing referrals in specific populations.

System Change Strategies

Overview

System change strategies include large-scale changes that involve the movement of health staff, expansion of roles for existing staff, integration of nontraditional staff into the care team, relocation of clinics, or changes to financial arrangements for referrals, such as incentives.

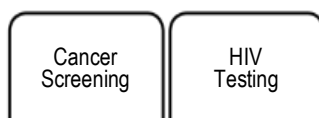
Summary of Key Study Characteristics

Referral Setting Characteristics

- Most studies involved referrals to the following **chronic disease programs**:



Two studies involved referrals to the following preventive services:



- Most referrals in these studies were made in a primary care setting. Other settings included specialty clinics and hospitals.

Referring Provider Characteristics

- Referrals in these system-focused studies were most often made by multiple members of the health care team, including physicians, health advocates, nurses, and clinical social workers.

Details about the number of studies of system change strategies in different referral settings, referring providers, and characteristics of referred patients are available in [Appendix D](#).

Specific System Change Strategies at a Glance

Strategies shown to increase referrals are indicated with a **large dot**. Strategies that do not have a large dot did not meet the criteria to show evidence for increasing referrals ([Appendix C](#)).

Strategy Shown to Increase Referrals	System Change Strategy
	Team-Based Care
	Addition of Clinics

Types of System Change Strategies



Team-Based Care

- A new team member is added to the health care team or an existing team member's role is expanded to facilitate referrals to chronic disease programs within the health system. Team-based care can also include adding trained staff to implement new patient-focused activities.
- Team members in the studies reviewed included physicians, nurses, patient health advocates, and medical support staff.

[Review the 12 studies of team-based care strategies.](#)



An Implementation Example of Team-Based Care

Program or service referred to: Physical activity/nutrition programs and mental health services

Description: A study¹⁸ used practice nurses as case managers of patients with depression and diabetes or depression and heart disease. Practice nurses acted as case managers, identifying depression and reviewing pathology results, lifestyle risk factors, and patient goals and priorities. Practice nurses received training in a 2-day workshop to prepare them for their enhanced roles in nurse-led collaborative care. Training included use of tools to screen for depression, behavioral techniques, and protocols for care management based on patient depression scores. The intervention was designed to fit into normal clinic operations. The intervention led to an increase in referrals to exercise programs and mental health services. Despite some limitations of the evidence, team-based care is a promising strategy for increasing referrals (Appendix C).

Addition of Clinics

- Involves implementing a collaborative care approach by adding a specialty clinic in a primary care setting to facilitate referrals to chronic disease programs or preventive services.

[Review the two studies of addition of clinics strategies.](#)



An Implementation Example of Addition of Clinics

Program or service referred to: Alzheimer's and dementia care

Description: To help improve care for patients with cognitive impairments, a family medicine practice in Canada implemented an interdisciplinary memory clinic.¹⁹ One aim was to allow for access to comprehensive assessment and care. Another aim was to improve referring physicians' knowledge of dementia management, as well as their confidence in managing cognitive challenges. Clinic staff included a family physician lead, two registered nurses, a social worker, a pharmacist, and a receptionist. A geriatrician was available to support the lead physician in more complex cases. The clinic operated 1–2 days per month, with four new assessments and two follow-up appointments scheduled on each clinic day. Referring family physicians were encouraged to inform patients about the memory clinic assessment. They were also given handouts for patients outlining what to expect. Referring physicians were informed when patients declined to schedule an assessment, and clinic staff were available to help physicians use strategies to increase likelihood of referral acceptance. The intervention did not directly measure referral rates, but an audit of charts by two independent geriatricians showed agreement with the decisions to refer patients to specialists, suggesting that the intervention led to appropriate referrals. However, this strategy did not meet the criteria to show evidence for increasing referrals (Appendix C).

Implementation Considerations for System Change Strategies

The considerations listed below could inform your implementation of system change strategies to increase referrals to diabetes management and type 2 diabetes prevention programs.

- Despite some limitations of the evidence, studies using team-based care had sufficient evidence to show that they increase referrals. Addition of clinic strategies can be used, but because less is known about whether they will increase referrals, program evaluation is especially important.
- Most system change strategies were implemented in the primary care setting. Other settings may work as well, but less is known about them.
- Most system change strategies focused on changing how health care team members work together to increase referrals. Thus, focusing these strategies on the entire team may be an effective approach.
- System change strategies, which tend to focus on a collaborative approach, could account for the level of collaboration between staff members. Implementing these types of strategies in a way that is mutually agreeable for all provider types involved may be most effective.
- Because most studies did not report on patient characteristics, the effectiveness of system change strategies to increase referrals for specific populations is not known. Thus, programs could be evaluated for evidence of increasing referrals in specific populations.

Process Change Strategies

Overview

Process change strategies include small-scale changes to some aspect of the individual referral process (such as introducing electronic referral systems, bi-directional referrals, and automatic referrals with opt-out provisions).

Summary of Key Study Characteristics

Referral Setting Characteristics

- Most studies involved referrals to the following **chronic disease programs**:



A smaller number of studies involved referrals to the following preventive services:



- Most referrals in these studies were made in a primary care clinic setting. Other settings included hospitals, specialty clinics, community health centers, social service providers, and acute and ambulatory care centers.

Referring Provider Characteristics

- Physicians and nurses were most often the referring providers. Other referring providers included nurse practitioners, physiotherapists, and medical assistants.

Details about the number of studies of process change strategies in different referral settings, referring providers, and characteristics of referred patients are available in [Appendix D](#).

Specific Process Change Strategies at a Glance

Strategies shown to increase referrals are indicated with a **large green dot**. Strategies that do not have a large dot did not meet the criteria to show evidence for increasing referrals ([Appendix C](#)).

Strategy Shown to Increase Referrals	Process Change Strategy
	Decision Support
	Automatic Referral
	Electronic Referral
	Bi-Directional Referral
	Referral Letters

Specific Types of Process Change Strategies



Decision Support

- Prompts, alerts, reminders, or screening and treatment algorithms are used to help health care providers make referrals.

[Review the 10 studies of decision support strategies.](#)



An Implementation Example of Decision Support

Program or service referred to: Smoking cessation

Description: The quality improvement team of an academic family medicine clinic created a tobacco registry, which included a decision support tool for referring patients to a tobacco quitline or nicotine dependence program.²⁰ Smokers who expressed a readiness to quit could choose one, both, or neither option. Medical assistants used the decision support tool to assess patients' level of tobacco use and to ask about quitting. The tool included prompts for fax referral to the quitline, referral to the nicotine dependence program, offering medication, supporting self-management, offering a pneumococcal vaccine, and screening for depression and aortic aneurysm. Providers used the information obtained by the medical assistants and a list of prompts for recommended services to guide their advice to patients and to develop an appropriate treatment plan. The intervention increased the number of quitline referrals. Despite some limitations of the evidence, decision support is a promising strategy for increasing referrals (Appendix C).

Automatic Referral

- Process that triggers a referral based on specific patient criteria without the health care provider making the decision to refer.
- **Electronic or paper-based** formats can be used.

[Review the two studies of automatic referral strategies.](#)



An Implementation Example of Automatic Referral

Program or service referred to: Cardiac or stroke rehabilitation

Description: In one study,²¹ hospital electronic patient records were used to prompt referrals to an outpatient cardiovascular rehabilitation program for all eligible patients with cardiac diseases. The referral was initiated in the inpatient ward as a discharge order, printed on a hospital network printer, and again screened for eligibility. After being discharged from the hospital's cardiovascular rehabilitation center, each patient was mailed an information package. This package included a personalized letter stating the name of the referring physician, a program brochure, a schedule of classes, and a request that the patient call to book an appointment. Patients who lived outside of the geographic area were sent a similar package and were provided the contact information of the site closest to their home. The automatic referral intervention resulted in significantly more patients reporting referral compared to the control group. However, this strategy did not meet the criteria to show evidence for increasing referrals (Appendix C).

Electronic Referral (e-Referral)

- Referrals are electronically transmitted.
- Referrals are often emailed or sent through an electronic health record (EHR) system.
- Messages may include supplemental attachments.

[Review the 2 studies of e-referral strategies.](#)



An Implementation Example of e-Referral

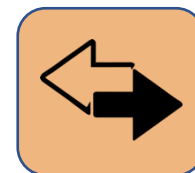
Program or service referred to: Smoking cessation

Description: A regional health system, an EHR vendor, a tobacco cessation quitline vendor, and a university research center worked together to create an e-referral system in the health system's EHR.²² The modification included adjustments in clinic workflow and EHR prompts. This change to e-referral resulted in referrals of a higher percentage of adult tobacco users to the quitline compared to the previous fax referral system. However, this strategy did not meet the criteria to show evidence for increasing referrals (Appendix C).

Bi-Directional Referral

- Information (referral) goes from the health care provider to the program or service, and feedback goes from the program or service back to the health care provider.

[Review the one study of a bi-directional referral strategy.](#)



An Implementation Example of Bi-Directional Referral

Program or service referred to: Smoking cessation

Description: In Massachusetts,²³ a referral program called QuitWorks was used to link health care organizations, providers, and patients to the state's tobacco cessation quitline and provide feedback reporting. The state launched a fully electronic version of QuitWorks in 2010, in partnership with a large health system. The program accepted referrals from any EHR with patient medical record identification. The program also had the capability to transmit feedback reports electronically to the referring provider organization. The intervention resulted in a higher percentage of adult tobacco users being referred to the quitline compared to paper fax referral. However, this strategy did not meet the criteria to show evidence for increasing referrals (Appendix C).

Referral Letters

- Patients receive a mailed letter from their health care provider referring them to a program or service.

[Review the one study of a referral letter strategy.](#)



An Implementation Example of Referral Letters

Program or service referred to: Cancer screening

Description: A 2-year study²⁴ aimed to increase breast cancer screening. Physicians who agreed to participate obtained a list of all female patients in their practices and identified appropriate candidates. Personalized letters on physicians' letterhead were signed and mailed to eligible participants, along with fact sheets and maps. The letters explained the purpose of screening and asked women to book screening appointments during a 2-week period. For women who did not book appointments, follow-up letters signed by their physicians were mailed 2 weeks after the initial letter. The intervention resulted in a trend toward increased screening referrals by physicians. However, this strategy did not meet the criteria to show evidence for increasing referrals (Appendix C).

Implementation Considerations for Process Change Strategies

The considerations listed below could inform your implementation of process change strategies to increase referrals to diabetes management and type 2 diabetes prevention programs.

- Despite some limitations of the evidence, studies using decision support had sufficient evidence to show that they increase referrals. Automatic referral, e-referral, or referral letter strategies can be used, but because less is known about whether they will increase referrals, program evaluation is especially important.
- Many process change strategies use health IT, such as EHR systems. Use of these strategies involves connecting with staff who know how to use the relevant technologies and implement changes. You may need to involve other parties, such as EHR vendors.
- Most process change strategies were implemented in the primary care setting. Other settings may work as well, but less is known about them.
- It is important to understand referral practices in your specific implementation setting and tailor your strategy to the referring providers. Most strategies involved physicians and nurses as the referring providers. Other health care team members (including non-clinical staff) may be able to serve as referring providers, but less is known about these situations.
- Some studies included multiple process change strategies. For example, one study used both decision support and automatic referrals. Implementing multiple strategies may be an effective approach.
- Because most studies did not report on patient characteristics, the effectiveness of process change strategies to increase referrals for specific patient populations is not known. Thus, interventions could be evaluated for effectiveness in specific populations.

Multiple Strategies

Overview

Multiple strategies include at least two of the referral strategies already defined in this document (i.e., provider education, system change, and process change strategies).

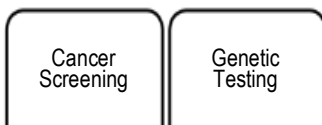
Summary of Key Study Characteristics

Referral Setting Characteristics

- Most studies involved referrals to the following **chronic disease programs**:



A smaller number of studies involved referrals to the following preventive services:



- Most studies involved referrals made in a primary care clinic setting. Other settings included hospitals, specialty clinics, nursing homes, community-based organizations, county government, and medical schools.

Referring Provider Characteristics

- Physicians and nurses were most often the referring providers. Other referring providers included nurse practitioners, nutritionists or dietitians, medical assistants, clinic managers, occupational therapists, physiotherapists, and physician trainees. In some cases, front office staff also made referrals.

Details about the number of studies of multiple strategies in different referral settings, referring providers, and characteristics of referred patients are available in [Appendix D](#).

Multiple Strategies at a Glance

Combinations shown to increase referrals are indicated with a **large dot**. Combinations that do not have a large dot did not meet the criteria to show evidence for increasing referrals ([Appendix C](#)).

Shown to Increase Referrals	Combination of Strategies		
	Provider Education	+	Process Change
	Provider Education	+	System Change
	System Change	+	Process Change
	Provider Education	+	Process Change + System Change

Specific Combinations for Multiple Strategies



Provider Education + Process Change

The specific strategies in this multiple strategy category include strategies described previously in this document and one new process change strategy (fax referral programs).

Provider education strategies include:



**Formal Training/
Professional
Development**



**Educational
Materials**



**Audit and
Feedback**



**Academic
Detailing**

Process change strategies include:



**Decision
Support**



e-Referral



**Fax Referral
Programs**

Fax Referral Programs: The referring health care provider filled out a fax referral form with the patient, then faxed the form to the program (mostly used for tobacco cessation quitlines).

Note: the most common combination of strategies was Formal Training/Professional Development and Decision Support.

[Review the 15 studies of provider education combined with process change strategies.](#)

An Implementation Example of *Provider Education + Process Change*

Program or service referred to: Type 2 diabetes prevention program

Description: The Bronx CATCH (Collective Action to Transform Community Health) partnership²⁵ implemented an e-referral strategy and a formal training strategy to increase referrals in federally qualified health centers to the YMCA-based Diabetes Prevention Program (YDPP). For the e-referral strategy, a referral template was added to the EHR system to make patient referrals to the YDPP easier. Health care providers received formal training to use the EHR to increase and sustain clinic-based YDPP referrals over time. The intervention resulted in an increase in the number of patients referred to the YDPP.

Provider Education + System Change

The specific strategies applied in this multiple strategy category include strategies described previously in this document and one new system change strategy (regional outreach specialists).

Provider education strategies include:



**Formal Training/
Professional
Development**



**Educational
Materials**



**Academic
Detailing**

System change strategies include:



**Team-Based
Care**



**Regional
Outreach
Specialists**

Regional Outreach Specialists: Outreach specialists are assigned to specific geographic regions to help health systems establish referral programs (mostly used with tobacco cessation) programs).

[Review the five studies of provider education and system change strategies.](#)

An Implementation Example of Provider Education and System Change

Program or service referred to: Diabetes and hypertension management

Description: In a 2016 study,²⁶ a formal training strategy and a team-based care strategy were used to increase referrals to health coaches to help patients with chronic disease management. Two health coaches joined the existing health care providers. The health coaches received 40 hours of training on chronic disease care, motivational interviewing, goal setting, documentation, identifying barriers, and professional boundaries. They received an additional 20 hours of in-depth motivational interviewing instruction.

Primary care physician training included introduction to health coaches, explanation of criteria for referrals to a health coach, and specific language to use. Refresher trainings at department meetings reminded primary care physicians how and when to make referrals and to share stories of patients using the health coach program. The intervention resulted in 24% of eligible patients being referred to a health coach program. However, the provider education + system change strategy did not meet the criteria to show evidence for increasing referrals (Appendix C).

System Change + Process Change

The strategies applied in this multiple strategy category include strategies described previously in this document and two new strategies (pay for performance and investment in IT).

System change strategies include:



**Team-Based
Care**



**Pay for
Performance**

Pay for Performance: Referring health care providers are offered financial incentives for meeting certain referral performance measures.

Process change strategies include:



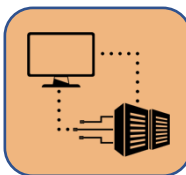
**Decision
Support**



**Automatic
Referral**



**Fax
Referral**



**Investment
in IT**

Investment in IT: Health systems invest in new electronic tools or health information technology to facilitate referrals.

[Review the four studies of system change and process change strategies.](#)

An Implementation Example of Process and System Change

Program or service referred to: Cardiac or stroke rehabilitation

Description: To make improvements to the post-stroke patient discharge process,²⁷ the Neurology Stroke Service established multidisciplinary teams that included a case manager, a social worker, a physical therapist, an occupational therapist, a speech and language pathologist, charge nurses, and liaisons from each of the follow-up care programs. The teams planned for patient discharge, identified follow-up care placement options, identified and attempted to remove barriers to discharge, and organized follow-up care resources.

Case managers and social workers received phones with texting capabilities. Case managers, social workers, and therapists received tablet computers to help them manage referrals to stroke rehab and follow-up care, additions to patient charts, communication about discharge recommendations, and increased communication. The intervention increased the rate of referrals to rehabilitation services compared to baseline measurements. However, the system change + process change strategy did not meet the criteria to show evidence for increasing referrals (Appendix C).

Provider Education + Process Change + System Change

The specific strategies applied in this multiple strategy type category include strategies described previously in this document and a new system change strategy (operating costs reimbursement).

Provider education strategies include:



**Formal Training/
Professional
Development**



**Educational
Materials**



**Audit and
Feedback**



**Academic
Detailing**

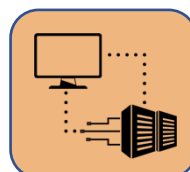
Process change strategies include:



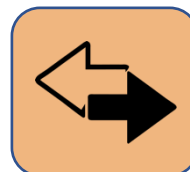
**Decision
Support**



**Fax
Referral**



**Investment
in IT**



**Bi-Directional
Referral**

System change strategies include:



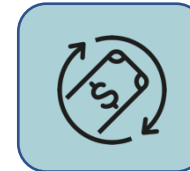
**Team-Based
Care**



**Pay for
Performance**



**Regional
Outreach
Specialists**



**Operating
Costs**

Operating Costs: Health systems are provided with upfront costs or a portion of operating costs to cover the referral systems they establish.

An Implementation Example of Provider Education, Process Change, and System Change

Program or service referred to: Alzheimer's and dementia care

Description: To improve quality of care for dementia by primary care physicians,²⁸ physicians at two community-based clinics participated in an intervention with the following components:

- Audits of medical records of five patients with dementia per physician.
- Decision support, with prompts to address the condition with appropriate data collection, diagnostics, and follow-up care.
- A physician fax referral form to local Alzheimer's Association chapters, and an Alzheimer's Association fax response form to support bi-directional referral.
- Training to support physicians in incorporating recommended processes into patient visits.
- Training for office staff to support implementation activities.

The intervention resulted in increased referral of patients to Alzheimer's Association chapters. However, the provider education + process change + system change strategy did not meet the criteria to show evidence for increasing referrals (Appendix C).

[Review the three studies of provider education, process change, and system change strategies.](#)

Implementation Considerations for Multiple Strategies

The considerations listed below could inform your implementation of multiple strategies to increase referrals to diabetes management and type 2 diabetes prevention programs.

- Currently, the studies using a combination of provider education and process change strategies provided strong evidence that they increased referrals. The most common combination of specific provider education and process change strategies is formal training/professional development with decision support. Other combinations of strategy types can be used, but because less is known about whether they will increase referrals, program evaluation is especially important.
- Most interventions involving multiple strategies were implemented in the primary care setting. Other settings may work as well, but less is known about them.
- It is important to understand referral practices in your specific implementation setting and tailor your strategy to the referring providers. Most studies involved physicians and nurses as the referring providers. Other health care team members (including non-clinical staff) may be able to make referrals but less is known about these situations.
- Implementation of multiple strategies could be done with attention to provider needs to avoid overwhelming demands on providers and existing workflows.
- Because most studies did not report on patient characteristics, the effectiveness of multiple strategies focused on referrals for specific patient populations is not known. Thus, programs are suggested to be evaluated for effectiveness in specific populations.

Summary and Further Considerations

Health system referrals are important because of their potential to connect more patients with chronic disease prevention and management programs. Participation in these programs can lead to lifestyle improvements, better quality of life, and, ultimately, reduced illness, premature death, and health care costs.²⁹⁻³²

Increased referrals do not necessarily translate to increased enrollment. Enrollment in chronic disease prevention and management programs can be affected by other factors, such as patient or program characteristics.³³

Needs assessments can help identify specific gaps in connecting patients with chronic disease prevention and management programs. In some cases, strategies to increase enrollment may be implemented alongside strategies to increase health system referrals. Needs assessments might also reveal a need for improved patient education, risk detection, access to local programs, or retention of patients who do enroll in chronic disease prevention or management programs. Ultimately, a comprehensive and tailored approach to improving access, referral, enrollment, and retention is important for improving access to and participation in chronic disease prevention and management programs.

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The references below were a part of the systematic review and are organized by referral strategy type and specific strategy. All references within a strategy type were included in summaries of study characteristics. References with an asterisk (*) were included in determinations of whether specific strategies had evidence of increasing health system referrals. Non-comparative studies were included in a scoping review but excluded from the effectiveness analysis.

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Formal Training or Professional Development

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Educational Materials

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SYSTEM CHANGE STRATEGIES

Team-Based Care

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Addition of Clinics

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* References with an asterisk were included in determinations of whether specific strategies had evidence of increasing health system referrals.

Appendix A: Glossary

CDC researchers developed the definitions below specifically for the systematic review that provided the evidence for the referral strategies covered in this document. These definitions are not intended to be all encompassing.

Chronic Disease Management Programs

Chronic disease management programs are organized, coordinated efforts to promote self-efficacy in managing chronic diseases or conditions and preventing complications. These programs offer training in problem-solving skills, finding and using resources, removing barriers, developing self-management skills, and partnering with health system staff. Chronic disease management programs can improve health and minimize health care costs for these conditions.

Examples

- Diabetes management programs (e.g., DSMES services, diabetes-related dietitian services)
- Cardiac/stroke rehabilitation programs
- Alzheimer's/dementia care programs
- Substance abuse programs

Chronic Disease Prevention Programs

Chronic disease prevention programs are organized, coordinated efforts to prevent chronic diseases among people at increased risk. Chronic disease prevention programs educate and support participants to help them make lifestyle changes to reduce their risk of developing chronic disease. Examples of lifestyle changes include increasing physical activity, improving nutrition, and discontinuing tobacco use.

Examples

- Behavior change programs, such as weight management, physical activity, or diet and nutrition programs
- Tobacco quitlines and other smoking cessation programs
- The National DPP LCP

Chronic Disease Programs

Chronic disease programs are planned events or activities designed to motivate participants to improve or manage their health. For this review, a chronic disease program consists of active engagement with a coach or counselor who guides a person or group through the program's activities. Chronic disease programs often have multiple sessions that vary in frequency and duration and can be delivered either in person, via telephone, or electronically. This review included chronic disease prevention programs and chronic disease management programs.

Community-Clinical Linkages

Community-clinical linkages are connections between community and clinical sectors to improve population health.²

Community Health Worker

A community health worker (CHW) is a frontline public health worker who lives in or is trusted by the community. A CHW connects people to health and social services by breaking down barriers related to the social determinants of health.³

Health Care Provider

For the purposes of this systematic review, health care provider refers to any member of the health system who can make a referral to a chronic disease prevention program, chronic disease management program, or preventive services as described by the study author.

² Centers for Disease Control and Prevention. (2016). Community-Clinical Linkages for the Prevention and Control of Chronic Diseases: A Practitioner's Guide. Retrieved from <https://www.cdc.gov/high-blood-pressure/docs/CCL-Practitioners-Guide.pdf>

³ Centers for Disease Control and Prevention. (2024). Resources for Community Health Workers. Retrieved from <https://www.cdc.gov/chronic-disease/php/community-health-worker-resources/>

Health Advocate / Health Promotion Advocate

For the purposes of this systematic review, health advocates serve as a resource between the patient and a health care provider or system. They may assist in the screening and referral process.

Health System Referral

A health system referral describes the practice of transferring some aspect of a patient's care from one setting to another. It is a process whereby a health system employee recommends that the patient receive a specific service or program delivered by another entity.

Referrals may be initiated by physicians, nurse practitioners, physician assistants, registered nurses, midwives, diabetes educators, pharmacists, dietitians, nutritionists, dentists, and community health workers. These referrals facilitate engagement in services or programs designed to prevent or manage chronic disease.

Examples

A primary care physician refers her patient with a hemoglobin A1C of 6.2% (prediabetes) to a CDC-recognized organization offering the National DPP LCP.

A chronic smoker states that he is ready to quit smoking; his nurse practitioner completes a referral form and faxes it to a tobacco quitline, which will contact him for cessation services.

A 45-year-old male with poorly controlled persistent asthma is referred by his family doctor for a home visit by a trained community health worker, who will assess the household for environmental triggers.

Other Preventive Services

Other preventive services are routine screening tests or counseling interventions for people without recognized symptoms or signs of the target condition. Preventive services are used to prevent disease, detect health problems early, or get people the information they need to make good decisions about their health. Preventive services can be delivered in clinical or community settings. For this review, only preventive services recommended by the U.S. Preventive Services Task Force for screening were included.

Examples

Mammography

Colorectal cancer screening

Bone density testing to screen for osteoporosis

Strategies to Increase Health System Referrals

Strategies to increase health system referrals include strategies or interventions that aim to increase rates of referral from one setting to another by influencing or affecting health systems, staff, or processes.

Examples

Issuing referral guidelines to health staff

Formal training of health staff

Auditing and feedback on referral rates

Decision support tools

Bi-directional referrals

Automatic referrals/opt-out default referrals

Performance incentives

Appendix B: Methodology for the Systematic Review

Search Strategy

- A CDC librarian with expertise in conducting systematic review searches conducted the systematic search for this review.
- A combination of terms related to referrals, provider attributes, chronic diseases, and management and prevention programs was used.
- Databases searched:
 - Medline
 - Embase
 - PsychInfo
 - CINAHAL
 - Scopus
 - ProQuest Central
 - WorldCat
- Search period: Beginning of database through February 2017

Inclusion Criteria

Chronic Diseases and Conditions

The following chronic diseases and conditions were included in the review:

- Arthritis
- Asthma
- Autism spectrum disorders
- Cancer (all except non-melanoma skin cancer)
- Cardiac arrhythmias
- Chronic kidney disease
- Chronic obstructive pulmonary disease
- Congestive heart failure
- Coronary artery disease
- Depression
- Diabetes
- Hepatitis
- HIV
- Hyperlipidemia
- Hypertension
- Obesity
- Osteoporosis
- Schizophrenia
- Stroke
- Substance abuse disorders

Health System Staff Population

Any member of the health system who can make a referral to a chronic disease prevention program, chronic disease management program, or preventive services as described by the study author.

Patient Population

Any patient at risk of developing a chronic disease or condition or those already diagnosed with a chronic disease as described by the study author. Participants had to be at risk or already diagnosed with at least one of the chronic diseases/conditions listed above.

Interventions

Studies included in this review had to incorporate one or more strategies designed to influence rates of health system referrals **to** at least one of the following:

- Chronic disease prevention programs
- Chronic disease management programs
- Other preventive services

Referral strategies were implemented alone or as part of a multicomponent intervention.

Comparators

All comparator types: Health system referral strategies compared to no strategy (e.g., usual care); health system referral strategies compared to another health system referral strategy; health system referral strategies with no comparator.

Study design

All evaluative study designs.

Duration of intervention

All durations.

Setting

All health care and community-based settings.

Primary Outcomes

Studies had to report at least one of the following:

- Any measure of referrals.
- Any measure of patient behavior in response to a referral, such as enrolling in a program or receiving a preventive service.

Exclusion Criteria

The following types of studies were excluded:

- Evaluations of strategies to increase referrals to specialist care.
- Evaluations of strategies to increase referrals for diagnostics.
- Evaluations of strategies to increase referrals to tools or resources in the absence of a program.
- Studies published in languages other than English.

Analysis and Assessing Evidence

- All information was abstracted from each study by two reviewers independently using a standard abstraction form developed for this review. Disagreements between the two reviewers were resolved by consensus.
- Studies were categorized according to the following referral strategy types:
 - Provider education strategies only.
 - Process change strategies only.
 - System change strategies only.
 - Multiple referral strategies.
- Reviewers used methods developed by the Guide to Community Preventive Services^{4,5} to:
 - Assess the suitability of the study design.
 - Assess study quality.
 - Summarize the body of evidence to determine which strategies increased referrals.⁶
- To determine which referral strategies increased referrals, only study designs that included a baseline measure, comparison group, or both were used.

⁴ Briss, P. A., Zaza, S., Pappaioanou, M., Fielding, J., Wright-De Agüero, L., Truman, B. I., . . . Carande-Kulis, V. G. (2000). Developing an evidence-based Guide to Community Preventive Services—methods. *American Journal of Preventive Medicine*, 18(1), 35–43.

⁵ Zaza, S., Wright-De Agüero, L. K., Briss, P. A., Truman, B. I., Hopkins, D. P., Hennessy, M. H., . . . Pappaioanou, M. (2000). Data collection instrument and procedure for systematic reviews in the Guide to Community Preventive Services. *American Journal of Preventive Medicine*, 18(1), 44–74.

Appendix C: Criteria to Show Evidence for Increasing Referrals

Assessment of Study Design, Study Quality, and Study Outcomes

Researchers assessed the suitability of the study design using Community Guide methods.⁶ Study designs were categorized as follows:

- **Greatest suitability:** This category included randomized control trials, nonrandomized trials, and designs with a concurrent comparison.
- **Moderate suitability:** This category included interrupted time series designs and prospective or retrospective cohort designs.
- **Least suitability:** This category included cross-sectional and uncontrolled before-after designs.

Researchers also assessed study quality by identifying threats to validity, again using Community Guide methods.⁵ This assessment considered six types of threat to validity: (1) study population and intervention description, (2) sampling methodology, (3) exposure and outcome measurement, (4) data analysis, (5) interpretation of results, and (6) other. Study quality was categorized as follows:

- **Good quality of execution:** No limitations or one limitation identified.
- **Fair quality of execution:** Two to four limitations identified.
- **Limited quality of execution:** Five or more limitations identified.

Researchers also identified the outcome of each study, categorized as one of the following:

- Referral outcome in the favorable direction (e.g., referrals increased or provider more likely to refer) and statistically significant.
- Referral outcome in the favorable direction, but not statistically significant.
- Referral outcome in the unfavorable direction (e.g., referrals decreased, or provider less likely to refer) and statistically significant.
- Referral outcomes in the unfavorable direction, but not statistically significant.

Assessment of Body of Evidence for Each Strategy

To assess the **overall body of evidence for each strategy**, researchers used the Community Preventive Services Task Force Evidence Decision Table.^{5,7} A strategy was considered to show evidence of increasing referrals if it met the criteria to be considered strong or promising:

- **Strong evidence:**
 - Most studies were in the favorable direction, AND
 - The strategy included at least five studies of greatest or moderate suitability of design or at least two studies that were of greatest suitability of design, AND
 - The strategy included at least five studies that were of good or fair quality or at least two studies that were good quality.
- **Promising evidence:**
 - Most studies were in the favorable direction, AND

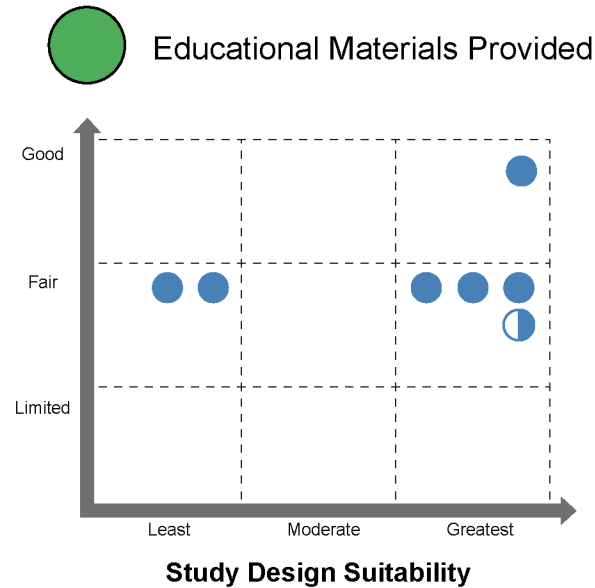
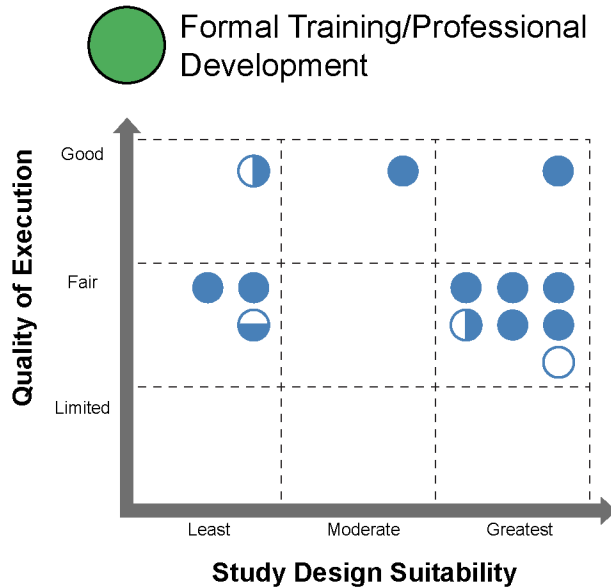
⁶ Community Preventive Services Task Force Guide to Community Preventive Services. Methods Manual for Community Guide Systematic Reviews. (2021). <https://www.thecommunityguide.org/methods-manual> 

⁷ Briss, P. A., Zaza, S., Pappaioanou, M., Fielding, J., Wright-De Agüero, L., Truman, B. I., . . . Carande-Kulis, V. G. (2000). Developing an evidence-based Guide to Community Preventive Services—methods. *American Journal of Preventive Medicine*, 18(1), 35–43.

- The strategy included at least one study of greatest suitability of design, at least three studies of greatest or moderate suitability of design, or at least five studies of least or higher suitability of design, AND
- The strategy included at least one study of good quality and three to five studies of good or fair quality.
- **Emerging evidence:**
 - The identified evidence does not meet minimum requirements or combinations based on design suitability, quality of execution, or number of studies, OR
 - Overall assessment is that study findings are inconsistent, OR
 - Overall assessment is that studies demonstrate no effect or small effects.

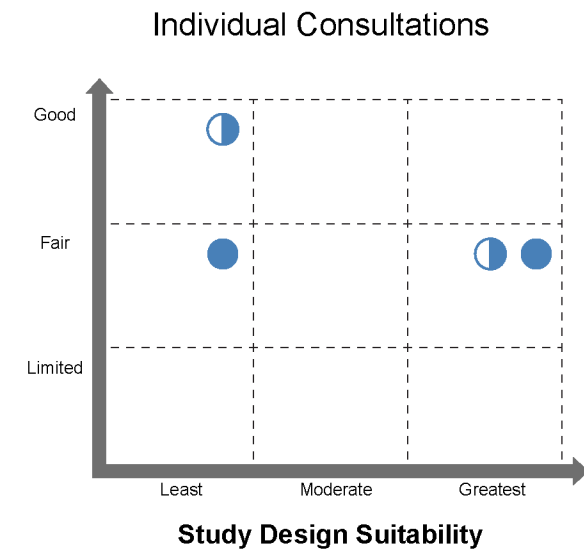
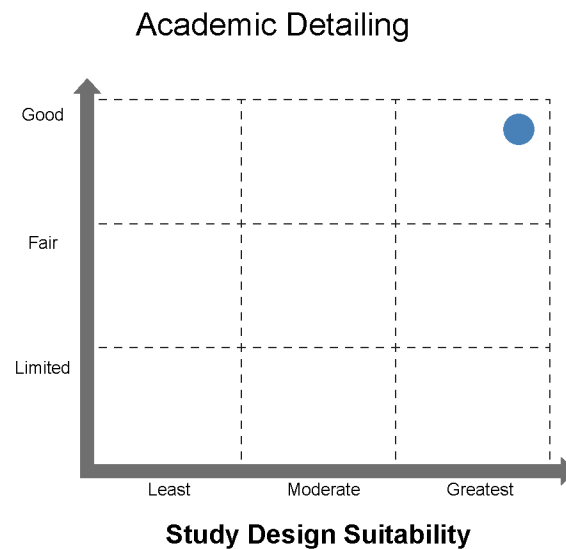
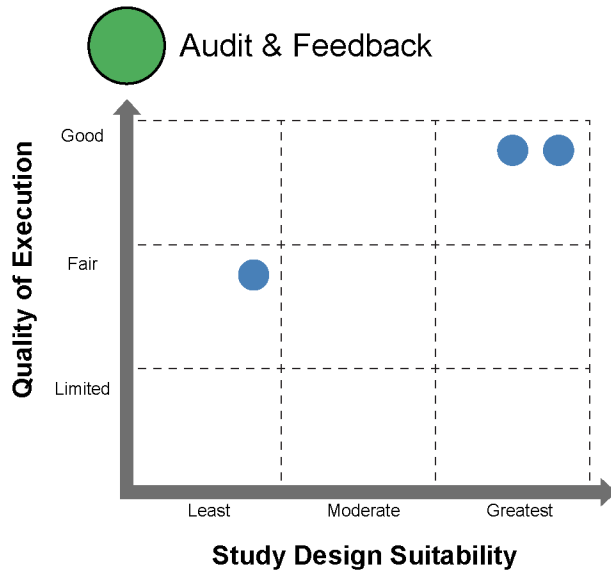
The charts on the pages that follow show the results of the study design, study quality, and outcome assessments for each strategy for the health system referral studies identified in this review.

Provider Education Strategies Findings

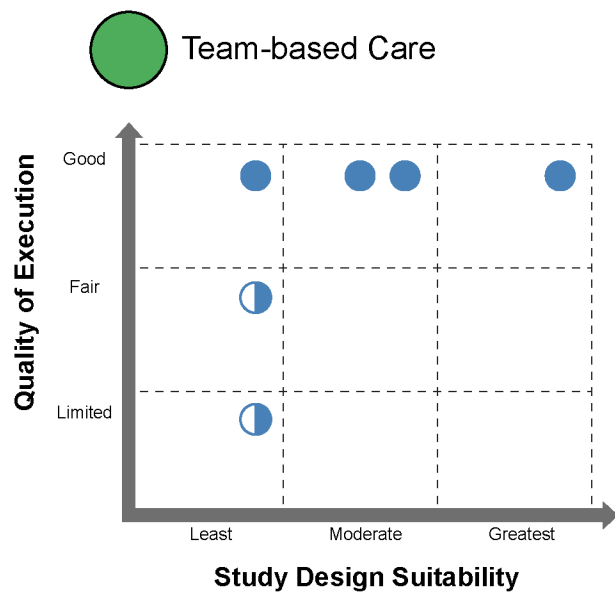


Key

- Study with referral outcome in favorable direction (e.g., referrals increased, or provider more likely to refer) and statistically significant.
- ◐ Study with referral outcome in favorable direction and not statistically significant.
- ◑ Study with referral outcome in unfavorable direction (e.g., referrals decreased or provider less likely to refer) and not statistically significant.
- Study with referral outcome in unfavorable direction and statistically significant.



System Change Strategies Findings

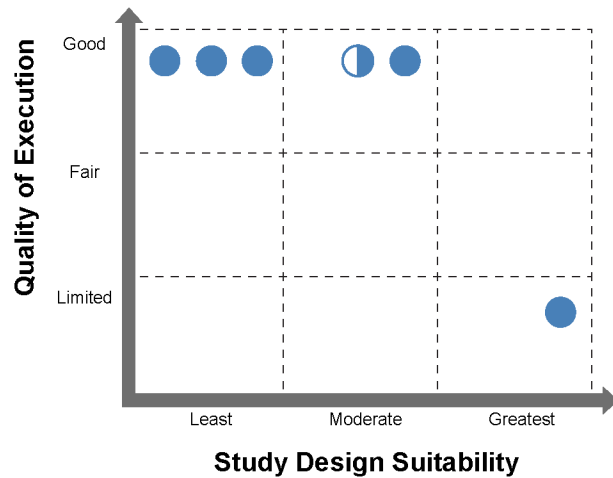


Key

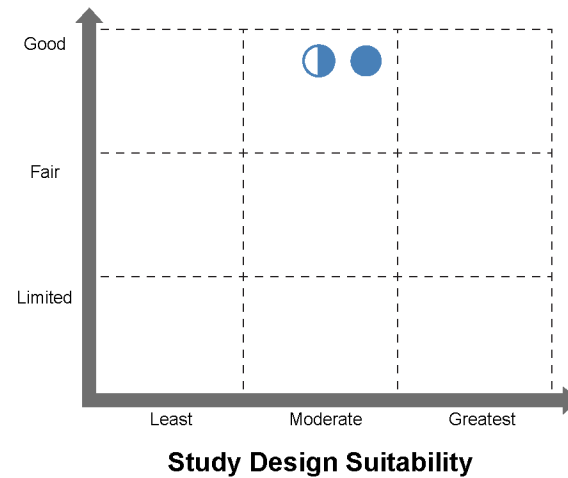
-  Study with referral outcome in favorable direction (e.g., referrals increased, or provider more likely to refer) and statistically significant.
-  Study with referral outcome in favorable direction and not statistically significant.
-  Study with referral outcome in unfavorable direction (e.g., referrals decreased or provider less likely to refer) and not statistically significant.
-  Study with referral outcome in unfavorable direction and statistically significant.

Process Change Strategies Findings

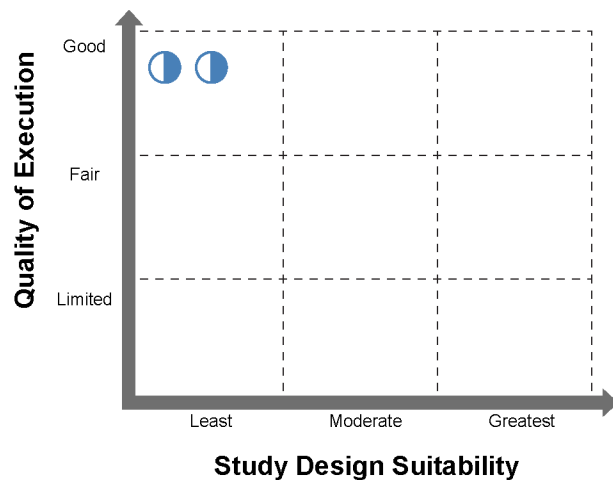
 Decision Support



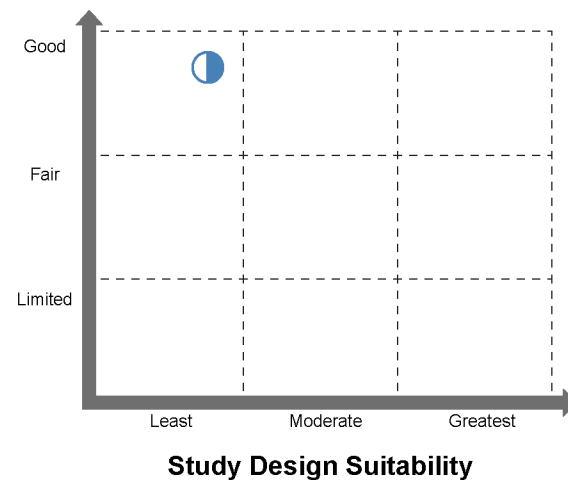
Automatic Referral



Electronic Referral



Bi-Directional Referral



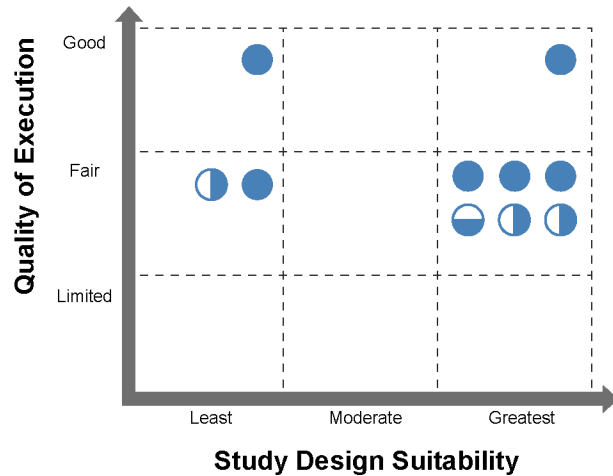
Key

-  Study with referral outcome in favorable direction (e.g., referrals increased, or provider more likely to refer) and statistically significant.
-  Study with referral outcome in favorable direction and not statistically significant.
-  Study with referral outcome in unfavorable direction (e.g., referrals decreased or provider less likely to refer) and not statistically significant.
-  Study with referral outcome in unfavorable direction and statistically significant.

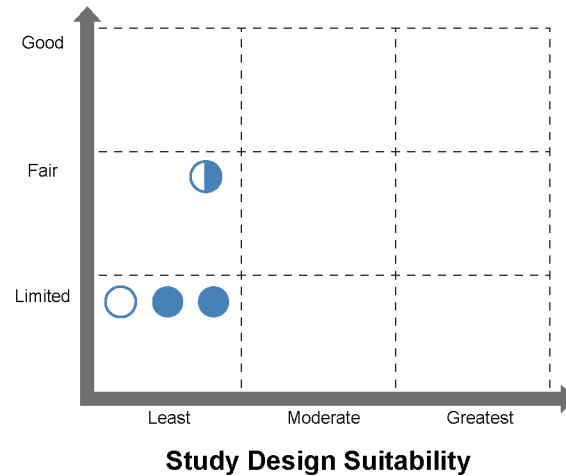
Multiple Strategy Types Findings



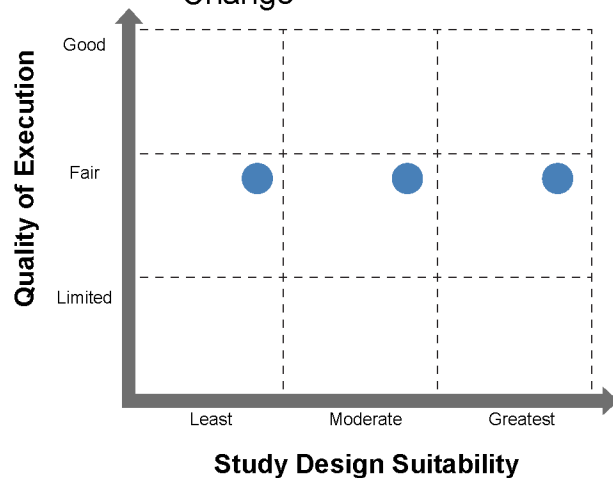
Provider Education & Process Change



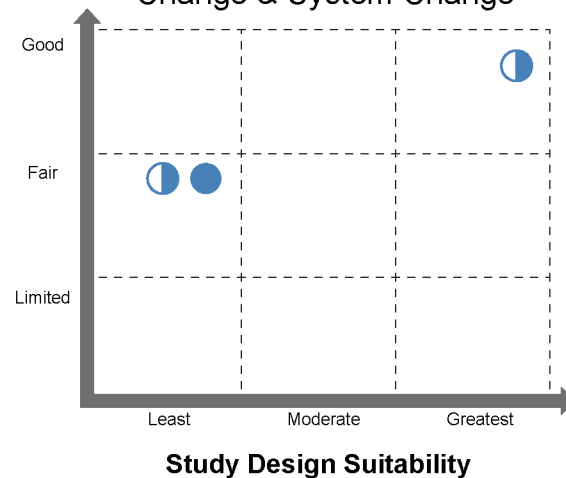
Provider Education & System Change



Process Change & System Change



Provider Education & Process Change & System Change



Key

- Study with referral outcome in favorable direction (e.g., referrals increased, or provider more likely to refer) and statistically significant.
- Study with referral outcome in favorable direction and not statistically significant.
- Study with referral outcome in unfavorable direction (e.g., referrals decreased or provider less likely to refer) and not statistically significant.
- Study with referral outcome in unfavorable direction and statistically significant.

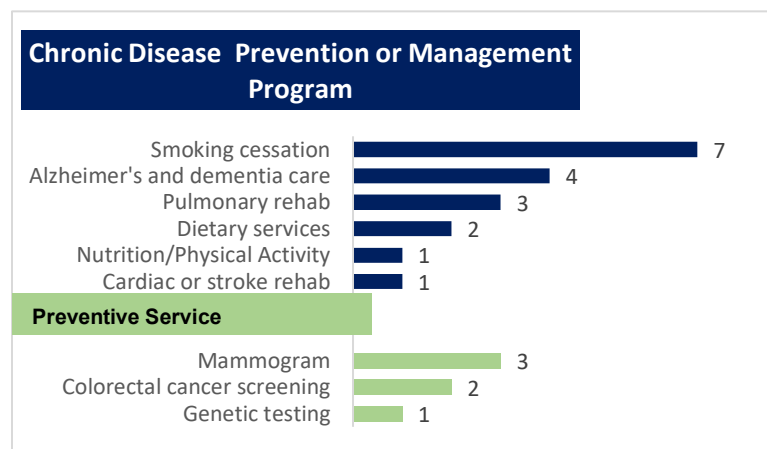
Appendix D: Referral Setting, Provider, and Patient Characteristics

The charts and tables on the pages that follow provide details of the referral settings, referring providers, and patient characteristics, as identified in the studies included in the health system referrals systematic review. The information is organized by strategy types.

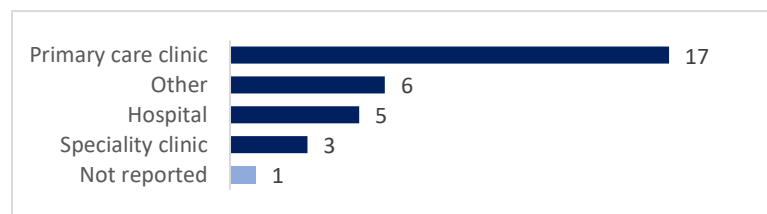
Provider Education Strategies (N=24)

All figures show number of studies. Some studies included multiple referral types, settings, or provider types and thus could fall under multiple categories.

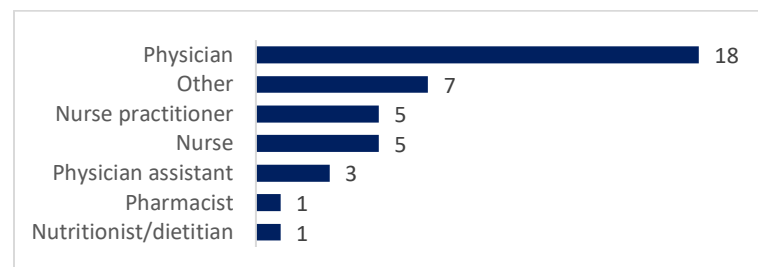
Referral Type



Referral Setting



Referring Provider



Patient Characteristics^{a*}

Categories	Number of studies or study arms	Median percentage ^b
Age	Number of studies	
18–44	1	--
45–64	4	--
65–74	3	--
≥75	0	--
Not reported	17	--
Sex	Number of study arms	
Male	8	38.3
Female	8	61.7
Not reported	16	--

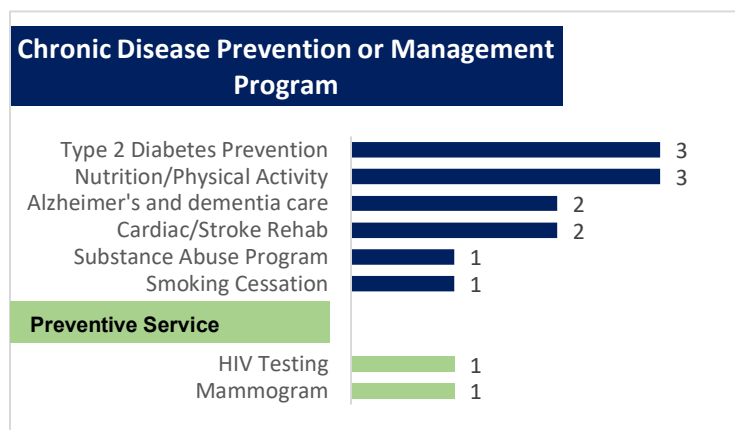
^a Patient income, education, race/ethnicity, employment status and insurance/payer type not reported for 83% or more of studies.

^b When available, the median percentage was calculated from the total number of studies reporting a certain characteristic. Using participant sex as an example, from the eight studies that reported the percentage of female participants in their study sample, the median percentage was calculated by ranking the percentage of female participants from each of the eight studies from least to greatest and averaging the two percentages in the middle of the dataset. For datasets with an odd number of studies, the middlemost percentage determined the median.

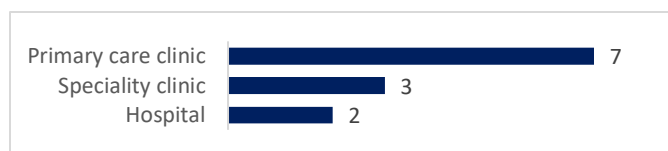
System Change Strategies (N=12)

All figures show number of studies. Some studies included multiple referral types, settings, or provider types and thus could fall under multiple categories.

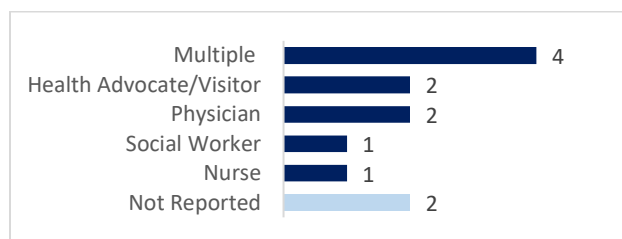
Referral Type



Referral Setting



Referring Provider



Patient Characteristics^a

Categories	Number of studies or study arms	Median percentage ^b
Age	Number of studies	
18–44	1	--
45–64	2	--
65–74	4	--
≥75	0	--
Not reported	5	--
Sex	Number of study arms	
Male	8	51.6
Female	10	48.4
Not reported	2	--
Race/ethnicity	Number of studies	
White	4	60.0
Black	2	31.0
Hispanic/Latino	1	18.0
Other	1	1.3
Non-white	4	31.5
Not reported	8	--
Insurance/payer type	Number of studies	
Private	2	77.5
Public	2	65.5
Uninsured/self-pay	1	6.4
Other	1	7.9
Not reported	8	--

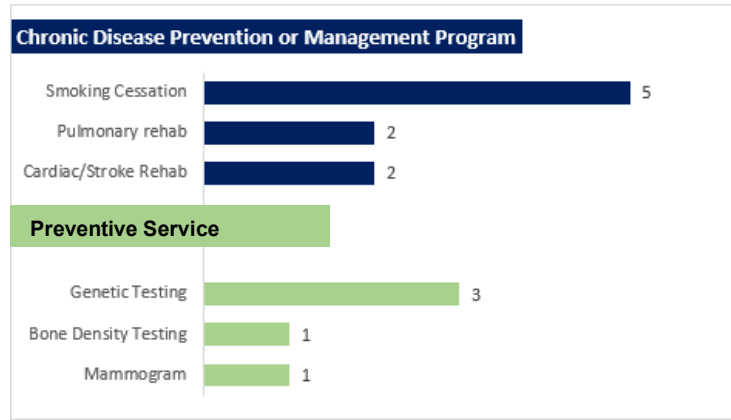
^a Patient income, education, and employment status not reported for 92% of studies.

^b When available, the median percentage was calculated from the total number of studies reporting a certain characteristic. Using participant sex as an example, from the 10 studies that reported the percentage of female participants in their study sample, the median percentage was calculated by ranking the percentage of female participants from each of the 10 studies from least to greatest and averaging the two percentages in the middle of the dataset. For datasets with an odd number of studies, the middlemost percentage determined the median.

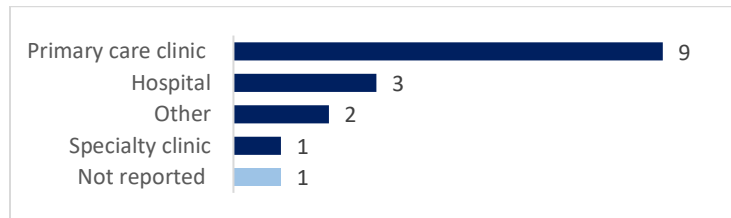
Process Change Strategies (N=13)

All figures show number of studies. Some studies included multiple referral types, settings, or provider types and thus could fall under multiple categories.

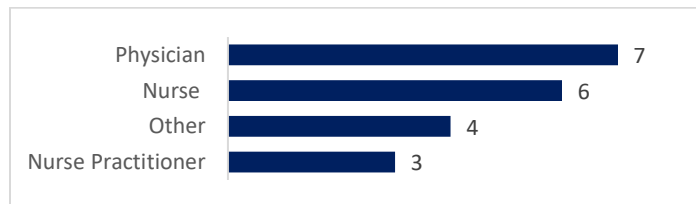
Referral Type



Referral Setting



Referring Provider



Patient Characteristics^a

Categories	Number of studies or study arms	Median percentage ^b
Age	Number of studies	
18–44	0	--
45–64	6	--
65–74	2	--
≥75	0	--
Not reported	5	--
Sex	Number of study arms	
Male	6	51.8
Female	8	57.7
Not reported	5	--
Race/ethnicity	Number of studies	
White	5	81.1
Black	3	23.1
Hispanic/Latino	1	44.0
American Indian/Alaska Native	1	1.0
Asian/Pacific Islander	1	4.0
Other	3	3.0
Non-white	5	18.2
Not reported	8	--
Insurance/payer type	Number of studies	
Private	3	--
Public	5	--
Uninsured/self-pay	2	--
Other	2	--
Not reported	7	--

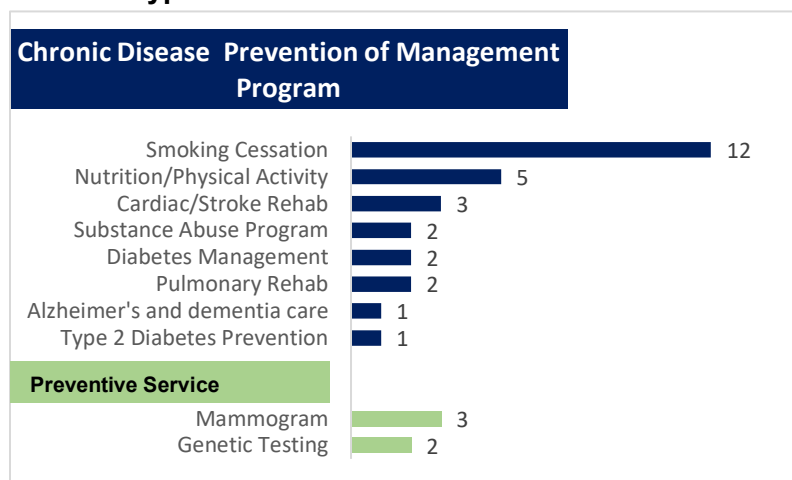
^a Patient income, education, and employment status not reported for 85% of studies.

^b When available, the median percentage was calculated from the total number of studies reporting a certain characteristic. Using participant sex as an example, from the eight studies that reported the percentage of female participants in their study sample, the median percentage was calculated by ranking the percentage of female participants from each of the eight studies from least to greatest and averaging the two percentages in the middle of the dataset. For datasets with an odd number of studies, the middlemost percentage determined the median.

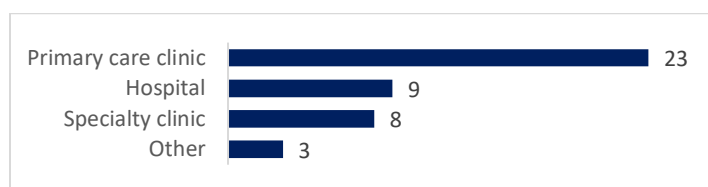
Multiple Strategies (N=28)

All figures show number of studies. Some studies included multiple referral types, settings, or provider types and thus could fall under multiple categories.

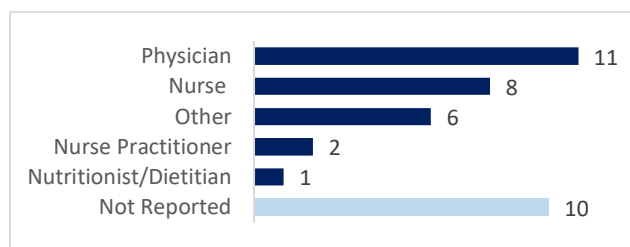
Referral Type



Referral Setting



Referring Provider



Patient Characteristics^a

Categories	Number of studies	Median percentage ^b
Age		
18–44	2	--
45–64	6	--
65–74	2	--
≥75	1	--
Not reported	14	--
Sex		
Male	12	42.8
Female	16	63.8
Not reported	12	--
Race/ethnicity		
White	7	87.6
Black	6	10.0
Hispanic/Latino	5	59.0
Other	6	2.2
Not reported	18	--
Insurance/payer type		
Private	4	45.9
Public	5	40.3
Uninsured/self-pay	4	2.3
Not reported	13	--

^a Patient income, education, and employment status not reported for at least 89% of studies.

^b When available, the median percentage was calculated from the total number of studies reporting a certain characteristic. Using participant sex as an example, from the 16 studies that reported the percentage of female participants in their study sample, the median percentage was calculated by ranking the percentage of female participants from each of the 16 studies from least to greatest and averaging the two percentages in the middle of the dataset. For datasets with an odd number of studies, the middlemost percentage determined the median.