Strategies to Increase Health System Referrals to Type 2 Diabetes Prevention and Diabetes 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 (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 an individual 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).

Chronic Disease Programs

Chronic disease prevention programs provide lifestyle change support and education to reduce an individual's risk for a specific chronic disease. Examples of these programs include the National Diabetes Prevention Program (National DPP) lifestyle change program (LCP) and smoking cessation programs.

Chronic disease management programs aim to promote self-efficacy, self-monitoring, and adherence to treatment to better manage an individual's chronic disease and prevent complications. Examples include diabetes self-management education and support (DSMES) programs and cardiac rehabilitation programs.

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 health care providers can refer to some programs or services**. For example, only physicians and qualified non-physician health care providers can make referrals to DSMES programs.[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]

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.

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 or preventive services; and to **provide considerations for implementation for diabetes management or type 2 diabetes prevention programs.**

Centers for Disease Control and Prevention
National Center for Chronic Disease Prevention and Health Promotion
Division of Diabetes Translation

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 DPP LCP or DSMES programs.
- **Chronic disease program entities** wanting to increase health system referrals to their programs, particularly those offering the National DPP LCP or DSMES programs.
- **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 such as smoking cessation counseling, cardiac rehabilitation, nutrition and weight loss, and other programs.
- 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 strategy types in this document are listed below, with brief definitions.

Health System Referral Strategy Types

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 strategy types above.

How is this Document Organized?

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

- **Summarizes which strategies were shown to increase referrals**.
- **Provides an overview of the studies included**, details about the referral setting, and the common types of referring providers.
- **Identifies and defines specific strategies** and provides an implementation example for each strategy.
- **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]
- **Outlines implementation considerations**.

If you are interested in learning 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.5)

Strategies with a primary 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.10)

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 should account for the level of collaboration between staff members. Processes implemented should be mutually agreeable for all provider types involved.

PROCESS CHANGE STRATEGIES (p.13)

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

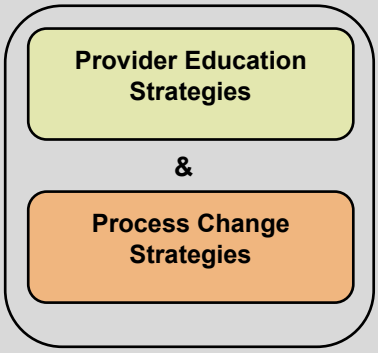
Implementation Considerations:

- 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 with knowledge of the relevant technologies, or with IT vendors.
- Some studies included multiple process change strategies. Implementing multiple strategies may be an effective approach.

MULTIPLE STRATEGY TYPES (p.17)

Interventions using a combination of at least two of the referral strategy types above.

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



Implementation Considerations:

- Most interventions using multiple strategy types 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.
- Implementation of multiple strategy types should be done with attention to provider needs, to avoid overwhelming demands on providers and existing workflows.

Refer to the rest of this guidance document for additional information, including descriptions and examples of each referral strategy (including those that were not shown to increase referrals).

Provider Education Strategies

Overview

Provider education strategies include a **primary 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**:

  Type 2 Diabetes Prevention | Smoking Cessation | Diabetes Management | Cardiac or Stroke Rehab | Pulmonary Rehab | Alzheimer's and Dementia Care

  Some studies involved referrals to the following preventive services:

  Mammogram | Genetic Testing | Other Cancer Screening

- 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.

Additional 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 green dot. Strategies that do not have a green dot did not meet the criteria to show evidence for increasing referrals.

Strategy shown to increase referrals	Provider Education Strategy
●	Formal Training/ Professional Development
●	Educational Materials Provided
●	Audit & Feedback
	Academic Detailing
	Individual Consultation

Specific 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 overall knowledge base and skillset, 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-based 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 or Professional Development*

Program or service referred to: Smoking cessation

Description: One study[13] 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:

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

Review the 9 studies of educational materials strategies.

An Implementation Example of *Educational Materials*

Program or service referred to: Diabetes management

Description: A study[14] 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 provide a referral to the clinic dietitian;
- the types of patients with diabetes who would benefit most from the clinics; and
- 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 referral 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 3 studies of audit and feedback strategies.

An Implementation Example of *Audit and Feedback*

Program or service referred to: Smoking cessation

Description: One study[15] used a group-randomized clinical trial to assess the impact of comparative feedback 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 performance of 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 noncommercial-based 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 3 studies of academic detailing strategies.

An Implementation Example of *Academic Detailing*

Program or service referred to: Cancer screening

Description: An academic detailing intervention[16] 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 in length, 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 8 studies of individual consultation strategies.

An Implementation Example of *Individual Consultation*

Program or service referred to: Pulmonary rehabilitation

Description: Researchers[17] 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.

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 enough 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 implementation 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 should be evaluated for evidence of increasing referrals in specific populations.**

System Change Strategies

Overview

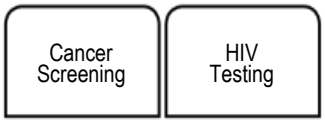
System change strategies include **large-scale changes** that involve the **movement of health staff, expansion of roles for existing staff**, integration of **nontraditional staff into the care team**, **relocation of clinics, or changes to financial arrangements for referrals**, such as incentives.

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 clinic 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.

Additional 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 green dot. Strategies that do not have a green dot did not meet the criteria to show evidence for increasing referrals.

Strategy shown to increase referrals	System Change Strategy
●	Team-based Care
	Addition of Clinics

Specific Types of System Change Strategies

Team-based Care

- A **new team member is added to the health care team to focus on facilitating referrals** within their health system, or a **current team member's role is shifted to focus on facilitating referrals** to chronic disease programs or preventive services. 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 study[18] 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.

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 2 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 difficulties. 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 provided with handouts for patients outlining what to expect. Referring physicians were informed when patients declined to schedule an assessment, and clinic staff were available to assist physicians with 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.

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.

- Currently, **studies using team-based care provide enough 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, should **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 should 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.

Additional 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 green dot. Strategies that do not have a green dot did not meet the criteria to show evidence for increasing referrals.

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 assist health care providers in making referrals.

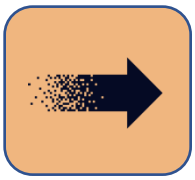
  Review the 10 studies of decision support strategies.

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 options. 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, providing self-management support, offering a pneumococcal vaccine, and administering depression and aortic aneurysm screening. 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 resulted in an increase in the number of quitline referrals.

Automatic Referral



- Process in place 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 2 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 a 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 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 participants reporting referral, compared to the control group.

Electronic Referral (e-Referral)

- Referrals are **electronically transmitted**.
- Referrals are often **emailed** or sent through an **EHR system**.
- Messages may include supplemental attachments.

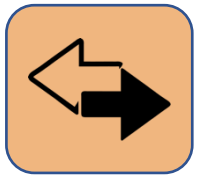
Review the 2 studies of e-referral strategies.

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 within 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.

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 1 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.

Referral Letters

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

Review the 1 study of a referral letter strategy.

An Implementation Example of *Referral Letters*

Program or service referred to: Cancer screening

Description: A two-year study[24] 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.

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.

- Currently, **studies using decision support provide enough 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. In these cases, you will need to connect with **staff with working knowledge of the relevant technologies and how to implement changes**. You may need to involve other stakeholders, 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 and staff (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, programs should be evaluated for effectiveness in specific populations**.

Multiple Strategy Types

Overview

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

Summary of Key Study Characteristics

Referral Setting Characteristics

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

  Type 2 Diabetes Prevention | Smoking Cessation | Diabetes Management | Cardiac or Stroke Rehab | Pulmonary Rehab | Alzheimer's and Dementia Care | Substance Abuse

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

  Cancer Screening | Genetic Testing

- 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.

Additional details about the number of studies of multiple strategy types in different referral settings, referring providers, and characteristics of referred patients are available in Appendix D.

Multiple Strategy Types at a Glance

Combinations shown to increase referrals are indicated with a green dot. Strategy type combinations that do not have a green dot did not meet the criteria to show evidence for increasing referrals.

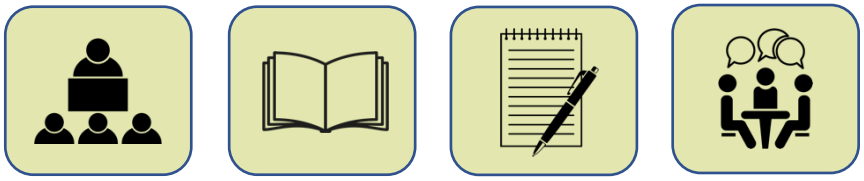
Shown to increase referrals	Combination of Strategy Types
●	**Provider Education** & **Process Change**
●	**Provider Education** & **System Change**
●	**System Change** & **Process Change**
●	**Provider Education** & **Process Change** & **System Change**

Specific Combinations for Multiple Strategy Types

Provider Education & Process Change

The specific strategies in this multiple strategy type 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 & 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 and process change strategies.

An Implementation Example of *Provider Education and Process Change*

Program or service referred to: Type 2 diabetes prevention program

Description: The Bronx CATCH (Collective Action to Transform Community Health) partnership[25] 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 individuals referred to the YDPP.

Provider Education & System Change

The specific strategies applied in this multiple strategy type 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 assist health systems in establishing referral programs (mostly used with tobacco cessation programs).

Review the 5 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

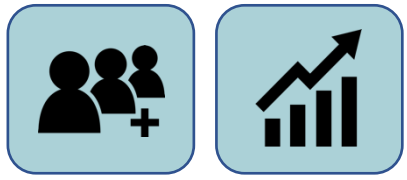
Description: In a 2016 study,[26] a formal training strategy and a team-based care strategy were used to increase referrals to health coaches to assist patients with chronic disease management. Two health coaches joined the existing health care providers. The health coaches received 40 hours of training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

System Change & Process Change

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

System change strategies include:

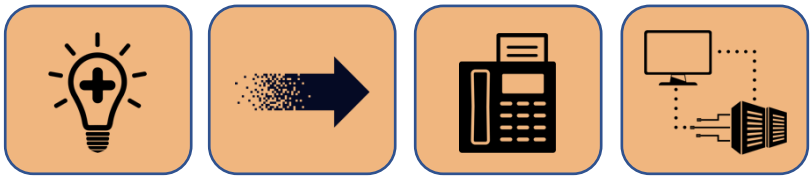


Team-based Care

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 4 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

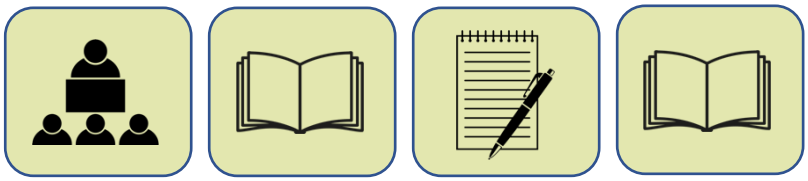
Description: To make improvements to the post-stroke patient discharge process,[27] the Neurology Stroke Service established multi-disciplinary teams that included a case manager, a social worker, a physical therapist, an occupational therapist, a speech and language pathologist, charge nurses, and liaisons 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 support management of 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.

Provider Education & Process Change & System Change

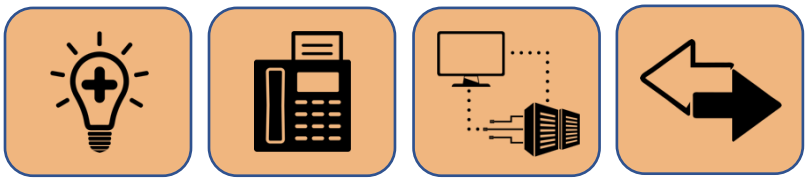
The specific strategies applied in this multiple strategy type category include strategies described previously in this document, and a new system change strategy (operating costs).

Provider education strategies include:



Formal Training/ Professional Development | **Educational Materials** | **Audit & 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.

Review the 3 studies of provider education, process change, and system change strategies.

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 that included:

- results of 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; and
- training for office staff to support implementation activities.

The intervention resulted in increased referral of patients to Alzheimer's Association chapters.

Implementation Considerations for Multiple Strategy Types

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

- Currently, **only studies using a combination of provider education and process change strategies** provide enough evidence to show that they **increase 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 strategy types 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/staff (including non-clinical staff) may be able to serve as referring providers, but less is known about these situations.
- Implementation of multiple strategy types should 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 strategy types focused on referrals for specific patient populations is not known. **Thus, programs should be evaluated for effectiveness in specific populations**.

Summary and Further Considerations

Health system referrals are important because of their potential to connect more individuals with chronic disease prevention and management programs. Participation in these programs can lead to lifestyle improvements, better quality of life, and ultimately, reduced morbidity and mortality, and reduced health care costs.[29-32]

Strategies with evidence for increasing referrals are not the same as strategies with evidence for increasing enrollment. Enrollment in chronic disease prevention and management programs can be affected by other factors, such as characteristics of the potential participant or characteristics of the potential programs in which participants can enroll.[33]

Needs assessments can help identify specific gaps in connecting people 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 those participants 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 in **bold** text were included in determinations of whether specific strategies had evidence of increasing health system referrals.

PROVIDER EDUCATION STRATEGIES

Formal Training or Professional Development

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Academic Detailing

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SYSTEM CHANGE STRATEGIES

Team-based Care

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Addition of Clinics

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PROCESS CHANGE STRATEGIES

Decision Support

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MULTIPLE STRATEGY TYPES

Provider Education & Process Change

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Provider Education & Process Change & System Change

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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.

Strategies to Increase Health System Referrals

Strategies to increase health system referrals include strategies or interventions that aim to have an impact on rates of referral from one setting to another by influencing and/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

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 patient is recommended to 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 mange 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 quit line, 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.

Community-Clinical Linkages

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

Chronic Disease Programs

Chronic disease programs are planned events or activities designed to elicit action by 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 of people 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 two types of chronic disease programs: chronic disease prevention programs and chronic disease management programs.

[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/dhdsp/pubs/docs/ccl-practitioners-guide.pdf

Chronic Disease Prevention Programs

Chronic disease prevention programs are organized, coordinated efforts to prevent the incidence of chronic diseases among people at increased risk. Chronic disease prevention programs provide education and support to participants to help them adopt health-promoting lifestyle modifications to reduce their risk of developing chronic disease. Lifestyle modifications include, but are not limited to, 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 quit lines and other smoking cessation programs
The National DPP LCP

Chronic Disease Management Programs

Chronic disease management programs are organized, coordinated efforts to promote self-efficacy in managing chronic diseases or conditions and preventing further complications. These programs offer training in problem solving skills, finding and utilizing resources, removing barriers, developing self-management skills, and partnering with health system staff. Chronic disease management programs aim to promote self-monitoring and management, thus improving health outcomes associated with chronic disease and minimizing health care expenditures for these conditions.

Examples
Diabetes management programs (e.g., DSMES programs, diabetes-related dietician services)
Cardiac/Stroke rehabilitation programs
Alzheimer's/Dementia care programs
Substance abuse programs (e.g., alcohol management)

Other Preventive Services

Other preventive services are routine screening tests or counseling interventions for persons without recognized symptoms or signs of the target condition. Preventive services are used to prevent disease, detect health problems early, or provide people with 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 (USPSTF) for screening were included.

Examples
Mammography
Colorectal cancer screening
Bone density testing to screen for osteoporosis

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-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 that incorporated one or more strategies designed to influence rates of health system referrals **had to** belong to at least one of the following:

- chronic disease prevention programs,
- chronic disease management programs, or
- other preventive services.

Referral strategies were implemented alone or as part of a multi-component intervention.

Comparators

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

Outcomes

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 other languages 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 strategy types
- Reviewers used methods developed by the Guide to Community Preventive Services[3,4] to:
  - assess the suitability of the study design,
  - assess study quality, and
  - summarize the body of evidence to determine which strategies were shown to increase referrals.
- To determine which referral strategies were shown to increase referrals, only study designs that included a baseline measure, comparison group, or both were used.

[3] 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.

[4] 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.[5] Study designs were categorized as:

- **Greatest suitability**: This category included randomized control trials (RCTs), non-randomized 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.[4] 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:

- **Good quality of execution**: 0-1 limitations identified.
- **Fair quality of execution**: 2-4 limitations identified.
- **Limited quality of execution**: 5 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 Guide Body of Evidence Table.[5] A strategy was considered to show evidence of increasing referrals if it met one of three criteria:

- Criteria 1:
    - Most studies were in the favorable direction, AND
    - Strategy included at least 5 studies of Greatest, Moderate, or Least suitability of design, AND
    - Strategy included at least 5 studies that were of Good or Fair quality.
- Criteria 2:
    - Most studies were in the favorable direction, AND

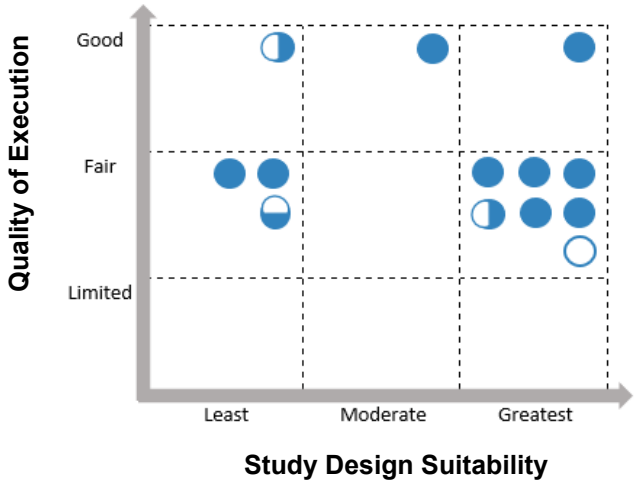
[5] Briss, P. A., Zaza, S., Pappaioanou, M., Fielding, J., Wright-De Agüero, L., Truman, B. I., . . . Carande-Kulis, V. G. (2000). Developing an evidence-based Guide to Community Preventive Services—methods. *American Journal of Preventive Medicine*, *18*(1), 35–43.

    - Strategy included at least 3 studies of Greatest or Moderate suitability of design, AND
    - Strategy included at least 3 studies of Good or Fair quality.
- Criteria 3:
    - Strategy included at least 2 studies, AND
    - Both studies were of Greatest suitability of design, AND
    - Both studies were of Good quality, AND
    - Both studies were in the favorable direction.

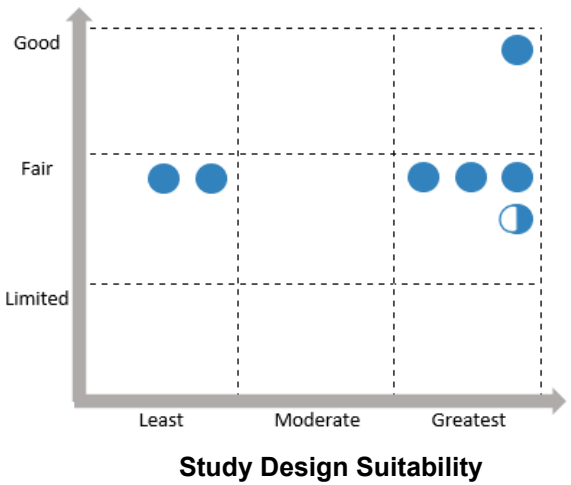
The **charts on the pages that follow show the results** of the study design, study quality, and outcome assessments for each strategy **for the health system referral studies identified in this review**.

Provider Education Strategies Findings

Formal Training/Professional Development



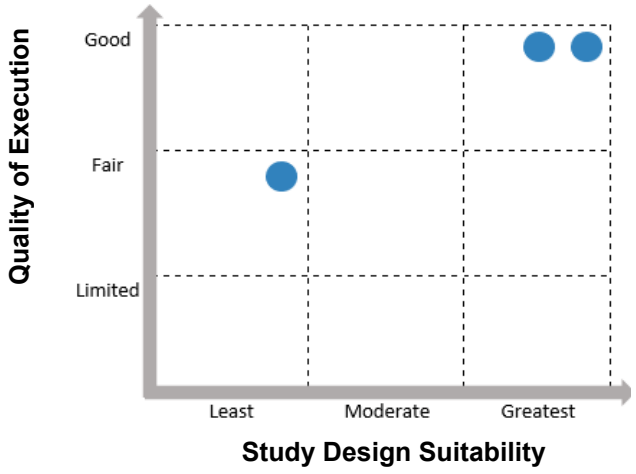
Educational Materials Provided



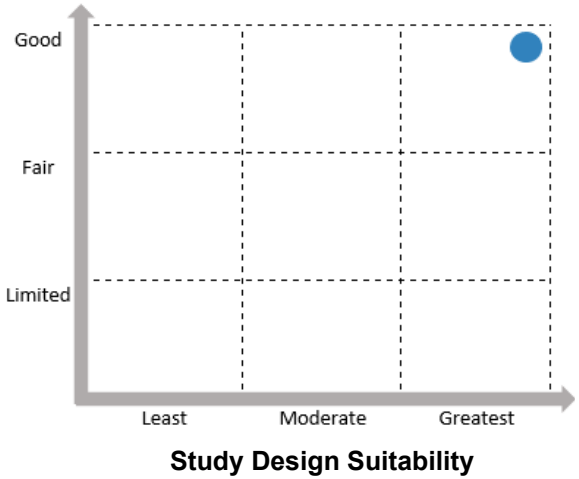
Key

- 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.

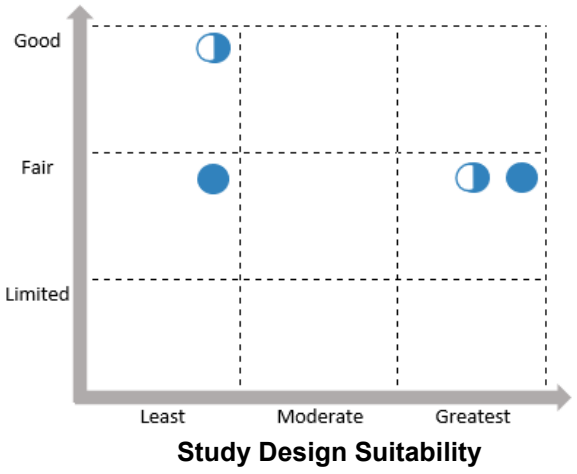
Audit & Feedback



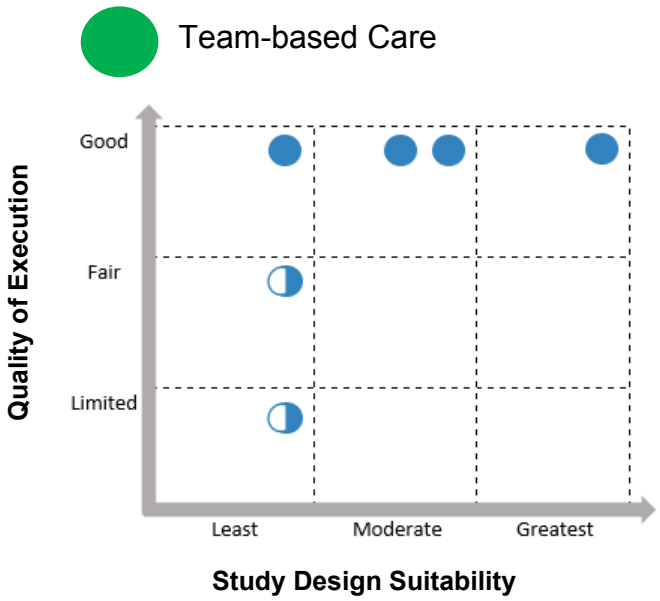
Academic Detailing



Individual Consultations



System Change Strategies Findings



Key

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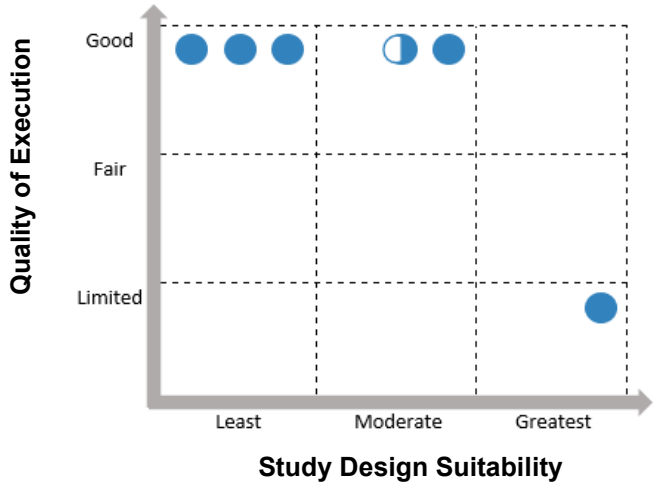
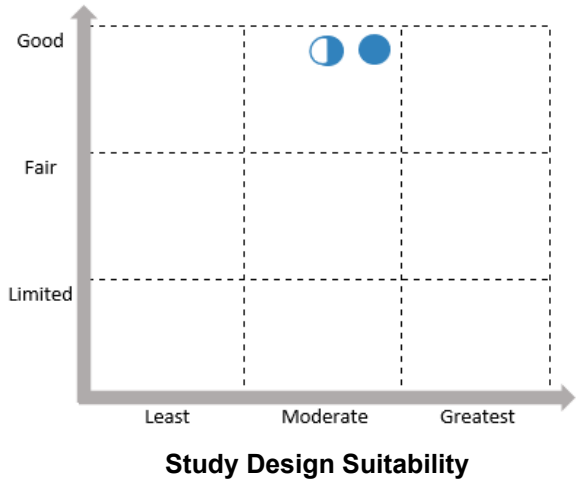
- Study with referral outcome in favorable direction and not statistically significant.
- Study with referral outcome in unfavorable direction (e.g., referrals decreased or provider less likely to refer) and not statistically significant.
- Study with referral outcome in unfavorable direction and statistically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

Process Change Strategies Findings

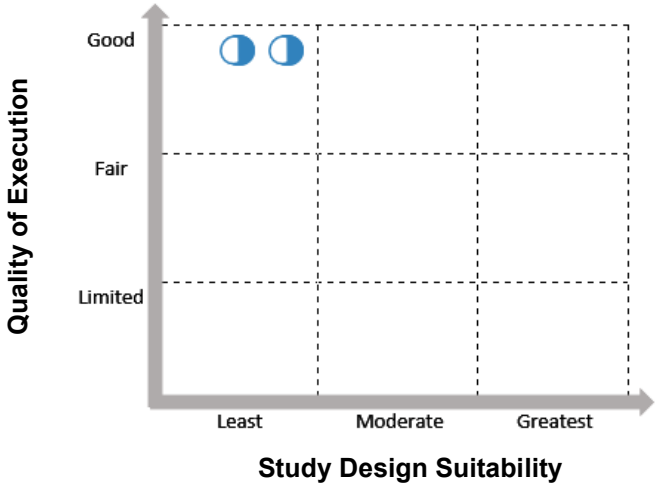
Decision Support



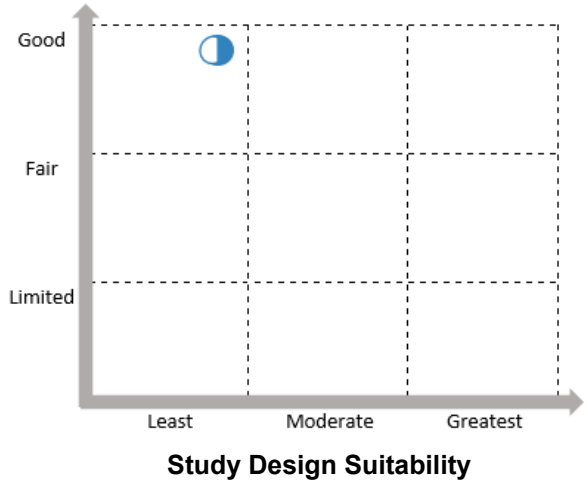
Automatic Referral



Electronic Referral



Bi-Directional Referral



Key

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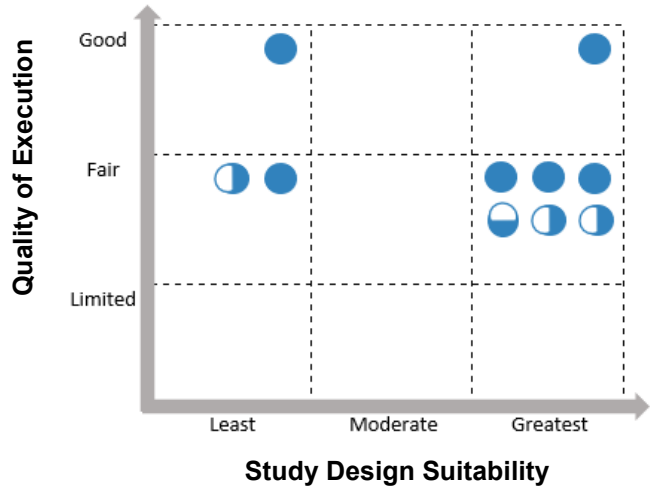
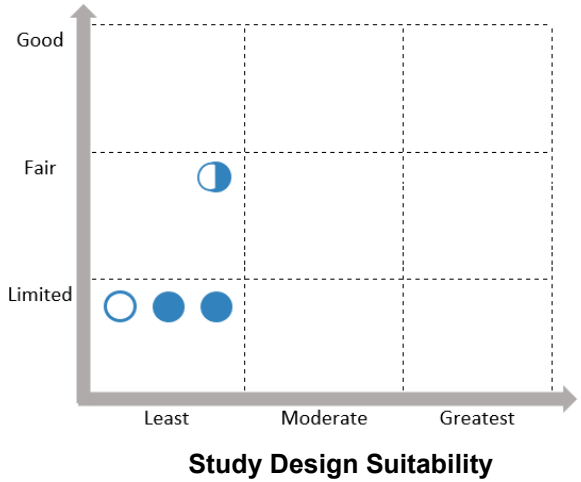
- Study with referral outcome in favorable direction and not statistically significant.
- Study with referral outcome in unfavorable direction (e.g., referrals decreased or provider less likely to refer) and not statistically significant.
- Study with referral outcome in unfavorable direction and statistically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

Multiple Strategy Types Findings

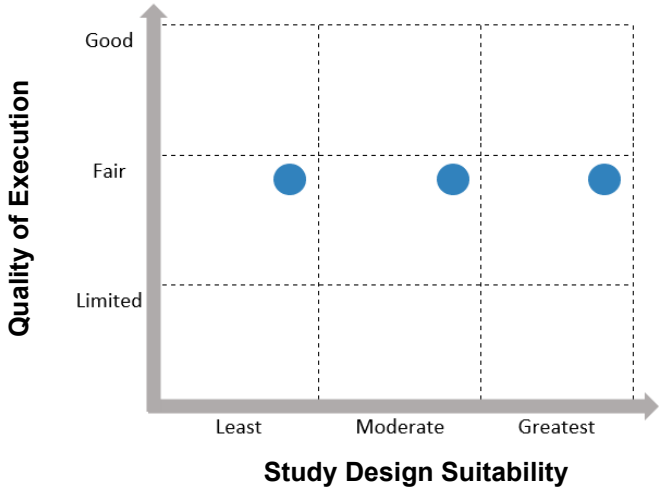
Provider Education & Process Change



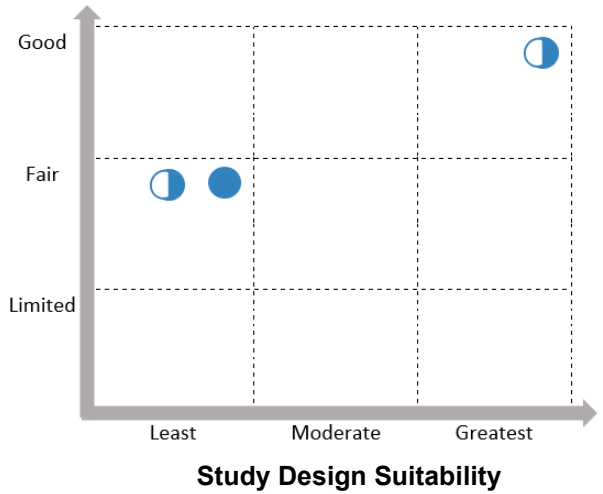
Provider Education & System Change



Process Change & System Change



Provider Education & Process Change & System Change



Key

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- 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.

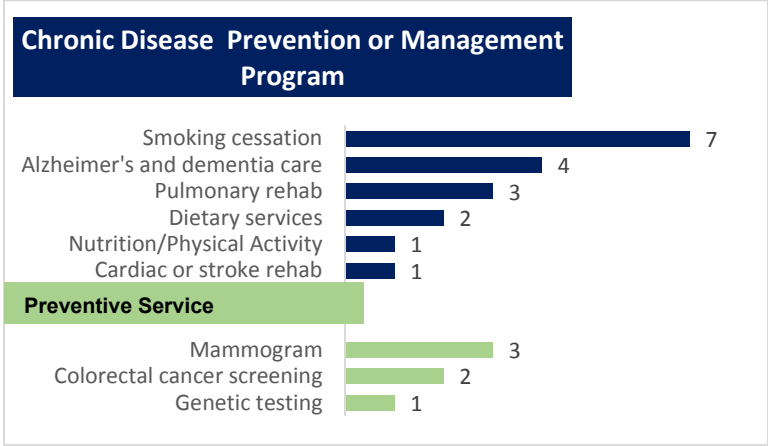
Appendix D: Referral Setting, Provider, and Patient Characteristics

The charts and tables on the pages that follow provide available 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.

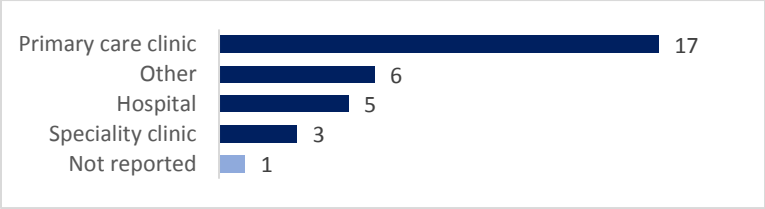
Provider Education Strategies (N=24)

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

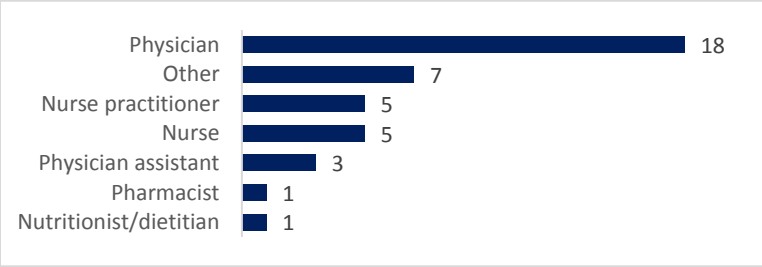
Referral Type



Referral Setting



Referring Provider



Patient Characteristics*

	Number of studies or study arms	Median percentage†
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	--

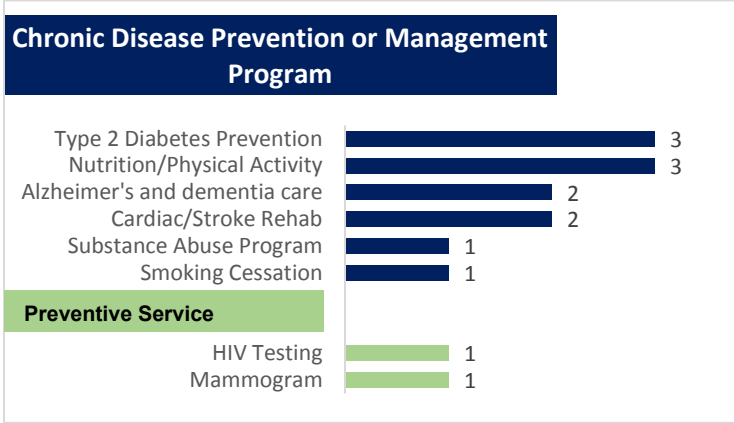
* Patient income, education, race/ethnicity, employment status and insurance/payer type not reported for 83% or more of studies.

†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 8 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 8 studies from least to greatest and averaging the two percentages in the middle of the data set For data sets with an odd number of studies, the middlemost percentage determined the median.

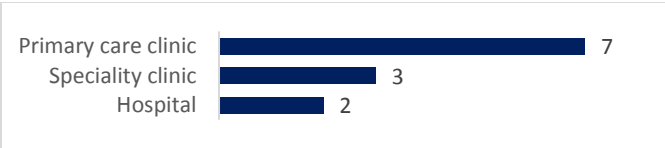
System Change Strategies (N=12)

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

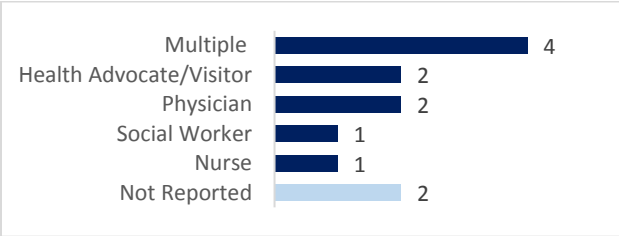
Referral Type



Referral Setting



Referring Provider



Patient Characteristics*

	Number of studies or study arms	Median percentage†
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	--

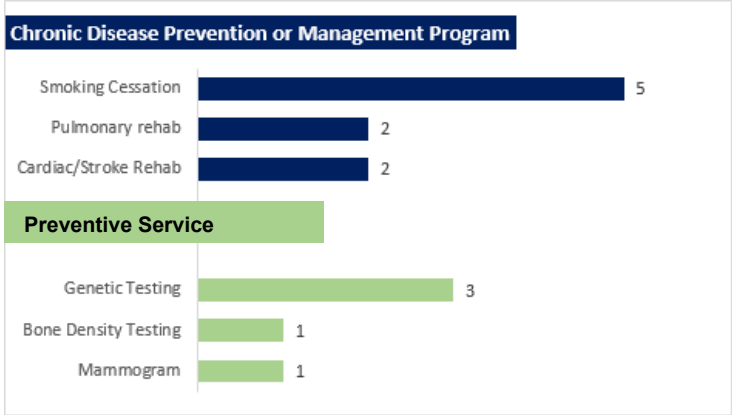
*Patient income, education, and employment status not reported for 92% of studies.

†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 data set For data sets with an odd number of studies, the middlemost percentage determined the median.

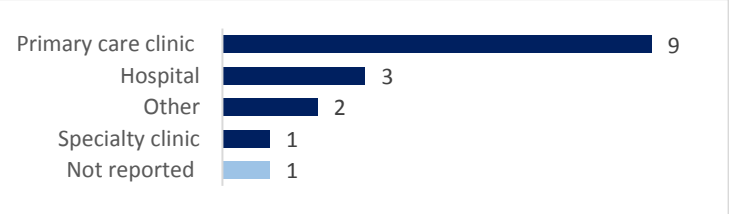
Process Change Strategies (N=13)

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*

	Number of studies or study arms	Median percentage†
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	--

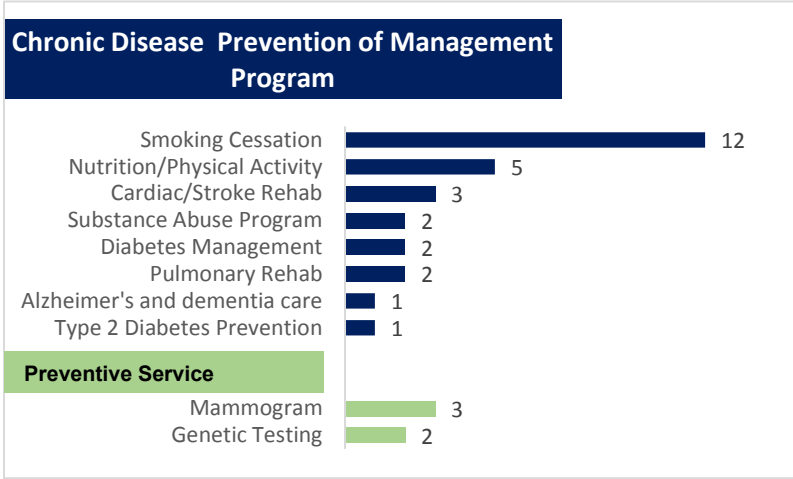
* Patient income, education, and employment status not reported for 85% of studies.

†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 8 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 8 studies from least to greatest and averaging the two percentages in the middle of the data set For data sets with an odd number of studies, the middlemost percentage determined the median.

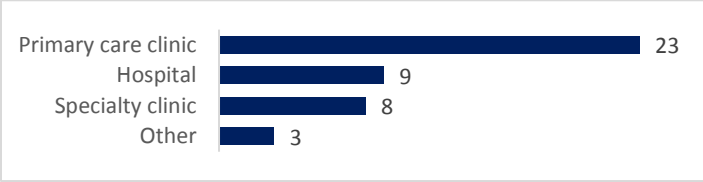
Multiple Strategy Types (N=28)

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

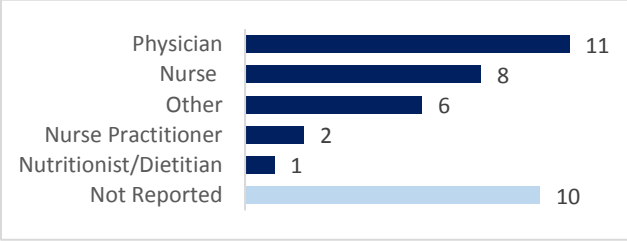
Referral Type



Referral Setting



Referring Provider



Patient Characteristics*

	Number of studies	Median percentage†
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	--

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

†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 data setFor data sets with an odd number of studies, the middlemost percentage determined the median.