

Introduction

Public health strategies to detect, prevent, and control chronic disease can be implemented at many levels, from individual behavioral interventions to environmental or cultural strategies affecting entire communities.

Making changes to health system practices can eliminate barriers to quality care and improve the health of many people. Nowhere is the need for such approaches more apparent than in the efforts to prevent heart disease, the leading cause of death in men and women in the United States. Although treatments for hypertension and hyperlipidemia—two key risk factors for cardiovascular disease (CVD)—are very effective and relatively inexpensive, most people with these conditions do not have them under control.

Research on strategies to lower blood pressure and cholesterol levels in health care settings offers insights about effective practices, but more work is needed to translate this evidence into action.

[The Best Practices Guide for CVD Prevention] highlights strategies that have been found to be effective for widespread control of hypertension and hyperlipidemia, but which are not yet being used widely as standard practice.

This publication, *Best Practices for Cardiovascular Disease Prevention Programs: A Guide to Effective Health Care System Interventions and Community Programs Linked to Clinical Services* (hereafter called the *Best Practices Guide for CVD Prevention*), is intended as a translation resource. It highlights strategies that have been found to be effective for widespread control of hypertension and hyperlipidemia, but which are not yet being used widely as standard practice.

Together, heart disease, stroke, and other vascular diseases claim over 800,000 lives in the United States each year and cost over \$300 billion in annual health care costs and lost productivity from premature death.¹⁻³ An estimated one in every seven US dollars spent on health care goes toward CVD.^{3,4} This costly and deadly disease is at the forefront of public health priorities at the Centers for Disease Control and Prevention (CDC), and health care practitioners at many levels are looking for solutions. Several modifiable risk factors for CVD are well known, including hypertension, hyperlipidemia, smoking, being overweight, being inactive, and eating an unhealthy diet.

Identifying effective ways to directly lower high blood pressure and cholesterol in the US population is a priority for the Centers for Disease Control and Prevention's (CDC's) Division for Heart Disease and Stroke Prevention (DHDSP). Other divisions in CDC's National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP) prioritize other risk factors, such as smoking, diabetes, diet, and obesity. DHDSP supports all 50 states and the District of Columbia to work toward achieving DHDSP's mission to improve cardiovascular health for all, reduce the burden of CVD, and eliminate disparities associated with heart disease and stroke.

Background

Key Domains of Chronic Disease Prevention and Health Promotion

NCCDPHP takes a multifaceted approach to chronic disease detection, prevention, and control by focusing on four key domains: epidemiology and surveillance (Domain 1), environmental approaches (Domain 2), health care system interventions (Domain 3), and community programs linked to clinical services (Domain 4).⁵

Domain 1: Epidemiology and Surveillance

Epidemiology and surveillance involves the use of systems to regularly track and monitor current and emerging trends in chronic diseases and their related risk factors. Investing in this domain allows data to be collected to understand the incidence, prevalence, and risk factors of chronic diseases; identify effective approaches for detection, prevention, and control; and monitor and assess progress toward key program goals.^{5,6} Surveillance is essential for monitoring the detection, prevention, control, and treatment of CVD. CDC uses data from communities, health systems, and administrative systems to assess the burden of CVD. CDC tracks trends in cardiovascular risk factors and disease and shares findings with partners and collaborators working to apply public health strategies to improve cardiovascular health. Grantees of CDC-funded heart disease and stroke prevention programs collect surveillance data and use this information to guide, prioritize, and monitor program delivery.

Domain 2: Environmental Approaches

Environmental approaches involve the use of policy and structural changes to create environments where health is promoted and healthy choices are reinforced. Changes can be made to social and physical environments that make healthy behaviors easier and more convenient for individuals, while maintaining broad reach and sustaining health benefits for overall populations.^{5,6} CDC and its partners are working to make healthier environments a reality for those at greatest risk for CVD. Environmental strategies that can help reduce heart attacks and strokes include creating smoke-free environments and increasing access to healthier foods, including those with less sodium.

Domain 3: Health Care System Interventions

Health care system interventions are strategies used to improve the delivery and quality of care in clinical settings. Health system and quality improvement changes, such as using electronic health records (EHRs) and requiring reporting on blood pressure control, can encourage health care providers to better monitor and address key risk factors for CVD.^{5,6} Such strategies can result in earlier detection, improved disease management, and even prevention of the onset of CVD.

Domain 4: Community Programs Linked to Clinical Services

This domain—sometimes called community-clinical links—refers to strategies that connect community programs with health systems to improve chronic disease prevention, care, and management.⁵ Because this strategy relies on links between community and clinical settings, activities often overlap Domains 3 and 4. Community-clinical links aim to ensure that people with or at high risk for chronic diseases have access to quality community resources and support to prevent, delay, or manage chronic conditions once they occur. Strategies can include referrals by clinicians to community supports to improve chronic disease self-management or referrals by community programs to clinical services.^{5,6} These links can also involve community delivery and third-party payment for effective programs, which can reduce barriers and increase adherence to clinician recommendations.

Focus of the *Best Practices Guide for CVD Prevention*

The *Best Practices Guide for CVD Prevention* focuses specifically on strategies used in Domains 3 and 4, health care systems interventions (Domain 3) and community programs linked to clinical services (Domain 4). Improvements made in these areas can help create environments where people are better able to receive quality care, make healthier choices, and take control of their health. CDC funds state and local programs and key partner organizations to put health care system interventions and community-clinical links into action to prevent CVD. See [Appendix A](#) for a summary of effective strategies within these domains.

Health Care System Interventions (Domain 3)

Examples of health care system interventions include efforts to increase identification of undiagnosed hypertension, adopt clinical hypertension protocols, improve medication adherence, increase the use of health information technology to implement the ABCS (Aspirin when appropriate, Blood pressure control, Cholesterol management, and Smoking cessation), and make other quality improvements in health care practices.

Community Programs Linked to Clinical Services (Domain 4)

Examples of activities involving community-clinical links include health care systems collaborating with community groups that provide evidence-based lifestyle programs; using community health care extenders (i.e., non-MD health care professionals) to support self-managed blood pressure; and collaborating with chronic disease programs for effective program planning, implementation, and evaluation.

Intended Audience

The *Best Practices Guide for CVD Prevention* was developed for state and local health departments, decision makers, public health professionals, and other stakeholders with an interest in implementing effective strategies to improve cardiovascular health. To develop this publication, we searched for interventions and strategies that have been found to be effective for CVD prevention in multiple research and practice settings, but which are not yet widely used or considered standard practice. For each selected strategy, we provide brief summaries of the research evidence and links to information and resources on how to implement the strategy. The information presented here is not comprehensive, but instead provides a quick reference to selected strategies. The *Best Practices Guide for CVD Prevention* can be used as a resource by decision makers and stakeholders who wish to implement CVD prevention strategies that offer the best chances for successful outcomes in their communities and health care systems. In addition to the strategy summaries, this publication provides several appendices with additional information, including a glossary of important terms ([Appendix D](#)).

Guide Development

The strategies presented in this publication were identified and confirmed through an extensive review process, with input from subject matter experts (SMEs) and practice partners both within and external to CDC. Internally, strategies were reviewed and vetted by DHDSP senior leadership and staff in DHDSP's Program Development and Services Branch, Epidemiology and Surveillance Branch, Applied Research and Evaluation Branch, Million Hearts® team, and Office of Policy, External Relations, and Communications. Externally, we worked with academics, partners, and program directors with expertise in chronic care delivery, CVD prevention and control, and public health program management.

In addition to the review process, the *Best Practices Guide for CVD Prevention* was conceptualized and developed using several theoretical models. The concept of identifying public health best practices for hypertension and cholesterol control was primarily guided by the best practices framework developed by a CDC work group.² This framework also guided how we selected strategies, reported their impact, and offered considerations for implementation.

Best Practices Framework

According to the best practices framework (Figure 1), strategies considered best practices should be evidence-based; have high-quality evidence to support them; and demonstrate a positive impact in terms of effectiveness, reach, feasibility, sustainability, and transferability.² Where a particular practice falls on the best practices continuum at any point in time is dependent on the evidence available at that point. Thus, being labeled a “best practice” is not a static designation, but one that can change as new evidence becomes available. Practices can be categorized as emerging, promising, leading, or best.

Other Guiding Frameworks

In addition to using the best practices framework to develop this publication, we also followed a process adapted from the Rapid Synthesis and Translation Process (RSTP).⁸ For more information on RSTP, see [Appendix B](#). RSTP provides a structure for working with SMEs and practice partners to develop an evidence-based translation product. In addition, for each strategy, two evidence reviewers used an interactive, online tool called the Continuum of Evidence of Effectiveness to assess and rate the strength of evidence for each proposed best practice.⁹ For more information about this tool, see [Appendix C](#).

Figure 1. A Conceptual Framework for Planning and Improving Evidence-Based Practices



Interpreting the Results: Best Practice Strategy Template

We used the information collected and assessed through the review process to identify effective strategies, or best practices, for controlling blood pressure or cholesterol levels. We then summarized the evidence to support each of these strategies into a standard template. The sample template presented on the following pages describes what information is provided for each strategy and how this information is organized.

Domain 3: Health Care System Interventions
Team-Based Care

Promoting Team-Based Care to Improve High Blood Pressure Control

Team-based care is a strategy that can be implemented at the health system level to enhance patient care by having two or more health care providers working collaboratively with each patient. Within the context of cardiovascular disease (CVD) prevention, it often involves a multidisciplinary team working in collaboration to educate patients, identify risk factors for disease, prescribe and modify treatments, and maintain an ongoing dialog with patients about their health and care.^{1,2} These teams may include doctors, nurses, pharmacists, community paramedics, primary care providers, community health workers, and others (e.g., dieticians).

Summary	Evidence of Effectiveness						
<p>Team-based care, involving collaboration between doctors, nurses, pharmacists, paramedics, and others, is a cost-effective strategy for increasing medication adherence and lowering blood pressure among diverse populations and in various settings.</p> <p>Stories From the Field: WinMed Health Services (Cincinnati, Ohio).</p>	<table style="width: 100%; text-align: center;"> <tr> <td>Effect </td> <td>Implementation Guidance </td> <td>Research Design </td> </tr> <tr> <td>Internal Validity </td> <td>Independent Replication </td> <td>External & Ecological Validity </td> </tr> </table> <p>Legend: Well supported/Supported Promising/Emerging Unsupported/Harmful </p>	Effect	Implementation Guidance	Research Design	Internal Validity	Independent Replication	External & Ecological Validity
Effect	Implementation Guidance	Research Design					
Internal Validity	Independent Replication	External & Ecological Validity					
	<div style="background-color: #0070c0; color: white; padding: 5px; text-align: center; font-weight: bold;">Evidence of Impact</div> <table style="width: 100%; text-align: center;"> <tr> <td>Health Impact </td> <td>Health Disparity Impact </td> <td>Economic Impact </td> </tr> </table> <p>Legend: Supported Moderate Insufficient </p>	Health Impact	Health Disparity Impact	Economic Impact			
Health Impact	Health Disparity Impact	Economic Impact					

This box provides a short summary of the findings for the strategy.

An example of where the strategy has been implemented is provided here.

A brief description of the strategy starts each section.

Here we provide summary ratings indicating the strength of research evidence behind the strategy.

The reviewers used the Continuum of Evidence of Effectiveness to assess the effectiveness of each strategy according to six dimensions. The interactive continuum tool summarized their ratings for each dimension and we have summarized those results in a table like the example shown here. See Appendix A for a summary of the ratings for all strategies.

The Health Disparity Impact section describes the evidence from the research literature and provides a rationale for the rating for health disparity impact. The rating indicates whether the strategy is effective among the populations with the most need or has the potential to reduce health disparities.

Domain 3: Health Care System Interventions
Team-Based Care

Evidence of Effectiveness

The evidence base for implementing team-based care in health care systems and practices is very strong. Solid evidence exists that this strategy achieves desired outcomes, with studies demonstrating internal and external validity. This strategy has also been independently replicated, which shows reliability of impact. Several randomized controlled trials, which are often considered the gold standard in research, have been conducted and show positive results from using multidisciplinary teams as a way to improve hypertension control. Various organizations, such as the American Medical Association and the Agency for Healthcare Research and Quality (AHRQ), have developed guidelines to help health care systems and practices implement this strategy as part of their policies and protocols.

Evidence of Impact

Health Impact	Health Disparity Impact	Economic Impact
<p>A systematic review by the Community Preventive Services Task Force concluded that team-based care can lead to significantly improved hypertension control, lowered systolic and diastolic blood pressure levels (overall median reduction was 5.4 mmHg and 1.8 mmHg, respectively), and improved patient adherence to hypertensive medication.³</p> <p><i>The evidence base for implementing team-based care in health care systems and practices is very strong.</i></p>	<p>Team-based care has been found to be effective when used among diverse patient populations, including those with members of different racial and ethnic groups (e.g., whites, African Americans) and among patients with multiple health conditions.</p> <p>Evidence also exists that this strategy is effective among low-income populations. Additional research is needed to examine effectiveness among populations that are primarily Hispanic and in communities with other minority populations.³</p>	<p>Team-based care has proven to be cost-effective. The median total cost for providing team-based care for hypertension control was found to be \$355 per person per year. The median cost per quality-adjusted life year (QALY) gained over 20 years was either \$10,511 or \$15,137, depending on the QALY conversion method used.⁴ Both estimates were well below the commonly used and conservative cost-effectiveness threshold of \$50,000 per QALY.</p> <p>Researchers modeled the health and economic impact of nationwide adoption of team-based care for hypertension over 10 years and estimated a net savings to Medicare of \$5.8 billion (2012 US dollars) over this period.¹ This model also estimates an overall national savings of \$25.3 billion in averted disease costs, which offsets an estimated \$22.9 billion cost of using this intervention to the health care system. Costs for patient time over this period are estimated at \$15.8 billion, but are largely offset by an estimated \$11 billion in productivity gains.</p>

The Continuum of Evidence of Effectiveness is designed to assess the quality of the research evidence available, but it cannot directly assess a strategy's potential for public health impact, which is an important component of a best practices designation. To assess this component, reviewers examined the research literature for evidence of a strategy's potential to improve health, reduce health disparities, and show economic sustainability. They assigned ratings for each of these categories. These ratings are provided in a table like the example shown here.

The Health Impact section describes the evidence from the research literature and provides a rationale for the rating for health impact. The rating indicates whether the strategy achieves one or more desired outcomes related to CVD prevention—such as lowered blood pressure, increased adherence to blood pressure medication, or decreased disease and death.

The Economic Impact section describes the evidence available on a variety of economic factors, including overall cost-effectiveness; cost savings to health systems, patients, or other payers; net benefit; and return on investment (ROI). The economic impact rating reflects the degree to which evidence exists that the strategy can have a positive economic impact. Cost figures shown in this section are examples of possible impact according to the best available evidence. All costs are adjusted to 2015 US dollars using the price index for personal consumption expenditures prepared by the Bureau of Economic Analysis in the US Department of Commerce.

Stories from the Field
Team-Based Care 



Team-Based Care at WinMed Health Services

WinMed Health Services, an FQHC in Cincinnati, Ohio, is a 2014 Million Hearts® Hypertension Control Champion that successfully incorporated team-based care to help achieve hypertension control among its patients. To ensure a continuum of complete patient care, WinMed's care teams include physicians, pharmacists, and behavioral and dental professionals. WinMed focuses on increasing health care providers' expertise and skills, providing opportunities for patient education, ensuring that patient care is team-based, and using registry-based information systems. The WinMed care teams use electronic health records to increase proper communication between patients and the different providers. By improving community ties and patient education, encouraging greater patient engagement, and adding pharmacists and patient assistants to the health care team, WinMed achieved a 7% increase in hypertension control among its patients from 2013 to 2014.

For more information:
Website: www.winmedinc.org/index.htm

This section describes the strategy as it is being applied in a specific community, clinical, or health care setting. It provides contact information, results and clinical outcomes, and an assessment of factors that affect implementation and sustainability. This information can be useful to state and local health departments, decision makers, public health professionals, and related stakeholders.

This section provides information about the implementation of each strategy, including settings, implementation guidance, resources, and policy and law-related considerations.

Domain 3: Health Care System Interventions
Team-Based Care

Four Considerations for Implementation

- #### 1 Settings

Team-based care has been successfully implemented in multiple settings, including Federally Qualified Health Centers (FQHCs), patient-centered medical homes, and managed health care systems, in various locations throughout the United States.
- #### 2 Policy and Law Related Considerations

Scope-of-practice laws and organizational policies that allow nurses, physician assistants, pharmacists, and other health care providers to practice to the full extent of their licensure and training can facilitate team-based care.
- #### 3 Implementation Guidance

The American Medical Association and AHRQ have developed modules for implementing team-based care:

 - [American Medical Association's STEPSforward: Implementing Team-Based Care](#),⁴
 - [Agency for Healthcare Research and Quality's Practice Facilitation Handbook](#),⁷
- #### 4 Resources

Many federal initiatives and medical institutions support team-based care approaches. Examples include the following:

 - [Centers for Disease Control and Prevention's 6|18 Initiative](#),⁸
 - [National High Blood Pressure Educational Program, supported by the National Heart, Lung, and Blood Institute](#),⁷
 - [American Heart Association](#),⁹
 - [National Academy of Medicine](#).¹⁰

Current, high-level considerations related to policy and laws relevant to implementing the strategy.

Available resources, such as guides, examples, and guidelines that support implementation of the strategy.

Settings in which the strategy was successfully implemented.

Current implementation guidance available to assist with implementation of the strategy.

Limitations of This Guide

Although the *Best Practices Guide for CVD Prevention* is a useful resource on evidence-based strategies for preventing CVD, it has several limitations. First, it does not include every strategy found to be effective in CVD prevention. Other strategies may be used in practice that are not included here because of the approach we used to select and assess the evidence. This guide focuses on practices that are best characterized in the research literature and therefore most amenable to meaningful assessment by the methods we used. Second, this publication provides only a condensed version of the evidence available on each strategy. It is not a systematic review, like *The Guide to Community Preventive Services*, and thus could be missing potentially relevant information about strategy weaknesses and research limitations. References to longer and more detailed systematic reviews and meta-analyses are provided when available.

Third, our presentation of evidence is limited by the available literature. Consequently, if key data (for example, on economic factors) were not available at the time we reviewed the evidence, this information is missing. Fourth, information on the economic impact of the strategies is presented using a variety of methods, which limits the ability to make direct comparisons across practices. The numbers presented should be read only as examples of the best available evidence demonstrating positive economic impact. They should not be directly compared to examine the comparative efficiency of the different practices. Fifth, this initial version of the *Best Practices Guide for CVD Prevention* does not provide detailed information on strategy implementation or the estimated costs of implementation. Although we have provided links to available implementation resources when possible, providing complete implementation guidance for each strategy was beyond the scope of this publication. Such information may be included, to the extent possible, in future versions.

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