

Strategies and Emerging Interventions for Improving Medication Adherence



Medication nonadherence is when patients don't take medications as prescribed. Nonadherence to medications for cardiovascular disease is a major public health concern for chronic disease prevention and management because heart disease and stroke are the first and fifth leading causes of death in the United States.^{1,2}

What is already known on this topic?

About 20% to 30% of medication prescriptions are never filled,³ and patients do not continue treatment as prescribed in about 50% of cases.^{2,4} In the United States, medication nonadherence accounts for about 125,000 deaths and \$100 billion to \$300 billion in both direct and indirect health care costs each year.²

The World Health Organization (WHO) has stated that, "increasing the effectiveness of adherence interventions may have a far greater effect on the health of the population than any improvement in specific medical treatments."⁵ Unfortunately, no gold standard solution exists to improve medication adherence.¹ Although studies have identified several strategies that can improve adherence, many factors influence nonadherence.¹ WHO classifies these factors into five categories (Table 1).⁵

A combination of evidence-based strategies and emerging practices is likely the best approach to increasing medication adherence for cardiovascular disease.¹ Key considerations for effective interventions include:

- Understanding that different tools are needed for different populations, contexts, and conditions.
- Combining two or more intervention strategies across different dimensions may work best.
- Acknowledging that medication adherence is a complex, multidimensional problem.
- Viewing adherence as a behavioral process for both health care professionals and patients.
- Aiming for an appropriate measurable health outcome (e.g., improved symptom control, fewer deaths).²

This Science-in-Brief feature highlights key findings from five recent articles that address current US initiatives, emerging interventions, and facilitators and barriers related to medication adherence.

Table 1. Five Key Factors That Affect Medication Nonadherence

Factor	Examples
Socioeconomic factors	Poverty, illiteracy, unemployment, lack of social support networks, unstable living conditions, greater distance from treatment centers, higher out-of-pocket cost of medications and care, lack of transportation, cultural beliefs reflecting mistrust in the health care system, family dysfunction, patient demographic characteristics, levels of education, and literacy.
Health care system factors	Lack of patient engagement skills of health care professionals, little focus on team-based care, and lack of adherence monitoring.
Medical condition factors	Multiple health conditions, depression, and the simultaneous use of multiple drugs to treat a single ailment or condition (polypharmacy).
Therapy-related factors	Side effects, complexity of the medical regimen, long duration of regimen, and frequent changes to regime.
Patient-related factors	Visual, hearing, cognitive, mobility, and swallowing impairments; difficulty filling prescriptions (due to few resources or literacy); lack of knowledge or understanding about the disease or need for the prescribed medication; expectations about and perceived benefits of treatment; ability and motivation to follow a medical regimen; frustration; anxiety; and substance or alcohol abuse.

What is added by these studies?

Current US Initiatives

A recent article by Ferdinand and colleagues describes a collaborative initiative between the US Food and Drug Administration (FDA) and other agencies and campaigns, including the Million Hearts Campaign, National Forum for Heart Disease and Stroke Prevention, National Consumer League, Duke Adherence Alliance, and Enhanced Adherence Strategic Initiative Consortium.⁶ This initiative identified an overall strategy for improving medication adherence that emphasizes knowledge dissemination, patient advocacy, monitoring and engagement strategies, and alleviation of health disparities. The article provides an overview of four measures that may improve medication adherence (Table 2). These measures attempt to:

- Address challenges associated with measuring medication adherence.
- Minimize opinions and beliefs based on anecdotal reports by improving the evidence base and associated communications.
- Reduce fragmentation in care among health care professionals.
- Reduce health disparities.⁶

The authors concluded that collaborative efforts at the national level can produce tools for clinicians, but patient engagement that focuses on health literacy and health disparity is foundational to improving medication adherence.

Table 2. Measures to Improve Medication Adherence

Measure	Current effort
Methods for measuring and monitoring adherence	Expanding use of electronic monitoring as an alternative to pill counts to improve the accuracy of adherence measurements.
Improvement of evidence base	Improving the evidence databases of the Agency for Healthcare Research and Quality to minimize differences of opinion among clinicians and unfounded concerns by patients.
Patient/health care professionals team-based engagement strategies	Increasing use of patient portals for e-visits and telemedicine, with interoperability across multiple health care professionals, and use of e-mail messaging, clinical reminders, and medication education to help patients share concerns about side effects, cost barriers, or other factors that may contribute to nonadherence.
Alleviation of health disparities	Broadening efforts beyond FDA interventions to include patient education, communication, behavioral intervention, multilevel settings, cultural competency training, community interventions, and social support. Examples include an African American health initiative where eligible patients receive free treatment and a BARBER-1 program where blood pressure measurements are taken in barbershops that African American men patronize.

Emerging Interventions

A critical step in improving medication adherence is developing cost-effective and innovative methods for measuring and monitoring adherence. Three recent articles describe emerging interventions:

- Kim and colleagues reported on the conditions under which wireless self-monitoring programs result in positive behavior changes, better medication adherence, and blood pressure control among patients with high blood pressure.⁷ The authors examined a subset of 95 patients with high blood pressure from a 6-month randomized controlled trial designed to determine the usefulness of a wireless self-monitoring program. The program included a blood pressure monitoring device connected with a mobile phone, reminders for self-monitoring, a web-based disease management program, and a mobile application (app) for monitoring and education. The authors reported that the program was effective in helping patients stop smoking, reduce alcohol consumption, and improve blood pressure control. However, no changes were reported in patients' adherence to medication.
- Haase and colleagues reviewed desirable features on mobile apps that may help improve medication adherence among patients with chronic conditions.⁸ The authors identified 30 easily accessible apps that had some of the following features: medication lists, reminders and refill alerts, education, secure networks, and information on drug-drug interactions. All of the apps provided a medication list with dosage reminders, but there was wide variation in the other features. This study illustrated the potential of wireless technology to be tailored to meet the specific needs of patients with chronic diseases.
- Smith and colleagues conducted an economic evaluation that compared usual care with cardiovascular therapies, interactive voice recognition (IVR) reminders linked to electronic medical records, and IVR plus educational materials (IVR+).⁹ Estimated costs for IVR ranged from \$9 to \$17 per patient, while the cost for IVR+ ranged from \$36 to \$47. When compared with usual care and IVR interventions, IVR+ was cost-effective and significantly improved medication adherence and clinical outcomes among patients with high cholesterol levels. IVR+ may be cost-effective in promoting adherence to some cardiovascular medications, especially among populations with elevated low-density lipoprotein values at baseline.

These three articles expand the list of intervention options for program planners and decision makers looking for effective ways to improve patient self-management and health outcomes, especially among patients with high blood pressure who want to change their health behaviors. They also align with the priorities and initiatives described in the article by Ferdinand and colleagues.

Health Care System Facilitators and Barriers

As indicated by WHO, health care system factors should be taken into account as part of a multifaceted approach to addressing medication adherence.⁵ A recent article by Banerjee and colleagues identified health system facilitators and barriers related to adherence to medications used for secondary cardiovascular disease prevention.¹⁰ In this study, the authors used an established framework to categorize facilitator and barriers into the following key domains:

- **Governance:** Who can make what types of decisions (e.g., who has the authority to make policy, professional, organizational decisions).
- **Financing:** How organizations are funded, how professionals are paid, and what incentives are offered to patients (e.g., copayments, insurance costs, cost sharing).
- **Delivery:** What types of support are offered by health care providers and health systems (e.g., education provided by providers to patients, changes made to improve the quality of care).
- **Health system resources:** What types of physical, human, intellectual, and social resources are available.¹¹

The authors identified seven facilitators and four barriers related to medication adherence at the health system level (Table 3).

Table 3. Facilitators and Barriers Related to Medication Adherence for Secondary Prevention of Cardiovascular Disease

	Facilitators	Barriers
Health care system arrangement	<ul style="list-style-type: none"> • Patient counselling. • Hospital-level quality improvement. • Institutional living. • Physician training. • Fixed-dose combination therapy. • Generic versus branded medication. 	<ul style="list-style-type: none"> • Complexity of treatment regimen.
	<ul style="list-style-type: none"> • Reduced copayments and full prescription coverage. 	<ul style="list-style-type: none"> • High copayments for medical care. • Lack of health insurance. • Out-of-pocket costs.

What are the implications for public health practice?

Public health professionals play an important role in identifying the health needs of their community, conducting chronic disease surveillance, and identifying populations at risk. By being aware of current initiatives, emerging interventions, and facilitators and barriers, public health professionals can help improve medication adherence in the United States. They can also support this important public health effort by:

- Being aware of collaborations between public health agencies, health departments, and academia that can support the development of effective adherence strategies.⁶
- Recognizing that medication nonadherence is a multifactorial problem that requires the involvement of health care systems, health care teams, and patients and their families.¹⁰
- Identifying gaps in research and barriers related to medication nonadherence.⁷⁻⁹

Resources

CDC Division for Heart Disease and Stroke Prevention

- [Calculating Proportion of Days Covered \(PDC\) for Antihypertensive and Antidiabetic Medications: An Evaluation Guide for Grantees](#)
- [Methods & Resources for Engaging Pharmacy Partners](#)
- [Using the Pharmacists' Patient Care Process to Manage High Blood Pressure: A Resource Guide for Pharmacists](#)

Million Hearts

- [Action Guide for Health Benefit Managers](#)
- [Action Steps for Public Health Practitioners](#)

CDC Vital Signs

- [Vital Signs Fact Sheet on Medication Adherence](#)
- [Vital Signs: Disparities in Antihypertensive Medication Nonadherence Among Medicare Part D Beneficiaries — United States, 2014](#)

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