



# Reporting on the Strategies Needed to Implement Proven Interventions: An Example From a “Real-World” Cross-Setting Implementation Study

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## Abstract

The objective of this study was to empirically demonstrate the use of a new framework for describing the strategies used to implement quality improvement interventions and provide an example that others may follow. *Implementation strategies* are the specific approaches, methods, structures, and resources used to introduce and encourage uptake of a given intervention's components. Such strategies have not been regularly reported in descriptions of interventions' effectiveness, or in assessments of how proven interventions are implemented in new settings. This lack of reporting may hinder efforts to successfully translate effective interventions into “real-world” practice. A recently published framework was designed to standardize reporting on implementation strategies in the implementation science literature. We applied this framework to describe the strategies used to implement a single intervention in its original commercial care setting, and when implemented in community health centers from September 2010 through May 2015. Per this framework, the *target* (clinic staff) and *outcome* (prescribing rates) remained the same across settings; the *actor*, *action*, *temporality*, and *dose* were adapted to fit local context. The framework proved helpful in articulating which of the implementation strategies were kept constant and which were tailored to fit diverse settings, and simplified our reporting of their effects. Researchers should consider consistently reporting this information, which could be crucial to the success or failure of implementing proven interventions effectively across diverse care settings.

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Implementation science involves “methods to promote the systematic uptake of research findings and other evidence-based practices into routine practice ... to improve the quality and effectiveness of health services. It includes the study of influences on healthcare professional and organisational behaviour.”<sup>1</sup> Such inquiry can involve assessing which approaches to implementation are most effective in different settings. These approaches, often called “implementation strategies,” have been defined as “methods or techniques used to enhance the adoption, implementation, and sustainability of a clinical program or practice ... the specific means or

methods for adopting ... interventions.”<sup>2</sup> These aspects of implementation are typically underreported. This article empirically demonstrates the value of reporting on implementation strategies applied in a cross-setting implementation study, using a recently proposed reporting framework.

Reporting on implementation research commonly addresses how intervention components (intervention elements considered key to impacting outcomes in their setting of origin; eg, scripted outreach calls, automated electronic health record–based alerts, and dedicated staff time for patient follow-up) are implemented in new settings. Such reporting

illuminates how interventions can be adapted in such settings while still achieving targeted effects. However, the implementation strategies used to support adoption of the intervention components likely affect an intervention's success in new settings, but are less commonly reported, and adaptations made to such strategies are rarely mentioned.<sup>3-8</sup>

Successful cross-setting implementation of effective interventions likely requires consideration of *both* intervention components and implementation strategies,<sup>2,6</sup> so lack of reporting on how implementation strategies were reproduced or adapted in new settings creates a barrier to future implementation.<sup>7,8</sup>

One reason why intervention strategies may be underreported is that implementation science has no widely accepted taxonomy for differentiating intervention components from implementation strategies, and until recently lacked specific guidelines for reporting on implementation strategies. To address these gaps, Proctor et al<sup>2</sup> proposed standards for reporting on implementation strategies. Proctor et al's framework lists 7 reportable domains of implementation strategies: actor, action, target of the action, temporality, dose, outcomes affected, and justification (Table 1). The authors define *implementation strategies* as a distinct group of factors to be recognized and reported but note that some factors could be defined as either intervention components or implementation strategies, which complicates reporting.

We applied Proctor et al's framework to report on the strategies used to implement a diabetes quality improvement (QI) intervention, proven effective in an integrated care system, in 11 primary care community health centers (CHCs). Our goal was to demonstrate

the framework's utility for reporting practical information on factors needed to implement a proven intervention into a new setting, and provide a concrete example of such reporting. Some elements in this example could be considered either intervention components or implementation strategies, such as the automated alerts. For illustrative purposes, we define *intervention components* as the tools provided to the CHCs and *implementation strategies* as the methods used to support the uptake of these tools.

Proctor et al suggest that implementation strategies may be described at varying levels of granularity.<sup>9</sup> We demonstrate how we applied Proctor et al's framework to the overarching, multifaceted implementation strategies used in both settings; we also demonstrate use of the framework at a more granular level, by applying it to the discrete implementation elements within the overarching practice facilitation strategy used in CHCs.

#### THE INTERVENTION: KAISER PERMANENTE'S ALL INITIATIVE

The ALL initiative is a system-level QI intervention designed to increase the percentage of patients with diabetes appropriately prescribed cardioprotective medications—Aspirin, Lovastatin (any statin), and Lisinopril (any angiotensin-converting enzyme inhibitor/angiotensin receptor blocker). The ALL initiative was implemented at Kaiser Permanente (KP) on the basis of compelling evidence for these medicines' effectiveness.<sup>10-12</sup> Adult KP patients who took the ALL medications had notable reduced risks of cardiovascular disease hospitalization; overall rates of myocardial infarctions also declined substantially.<sup>13</sup> The strong underlying evidence, and considerable

TABLE 1. Proctor et al's 7 Domains of an Implementation Strategy<sup>2</sup>

Domain	Explanation	Measurement
Actor	Who delivers the strategy	Qualitative
Action	Steps to be taken to carry out the strategy	Qualitative
Target of the action	Who/what the actors are attempting to impact, based on conceptual models of implementation; multiple targets possible	Qualitative
Temporality	When does the strategy take place; What is the order of the strategies	Quantitative or qualitative
Dose	Frequency and intensity	Quantitative or qualitative
Outcomes affected	What will the strategy change	Quantitative or qualitative
Justification	Basis for the strategy in research or practice	Qualitative

impact of the ALL initiative in KP, indicated the potential benefits of attempting to implement the ALL initiative in CHCs.

Intervention components of KP were electronic health record–based tools designed to streamline identification of patients missing indicated medications and prescribing the medications (Table 2). Implementation strategies of KP (Table 3) were not reported in formal publications; our understanding of these strategies was gained through extensive communication with KP leadership. The strategies were selected because they harnessed existing infrastructure.<sup>12</sup>

### Research Into Practice: Implementing the ALL Intervention in CHCs

In Portland, Oregon, 11 CHCs participated in a randomized trial testing the feasibility of implementing the ALL intervention in the CHC setting (CTI NCT02299791; NHLBI 1R18HL095481). In Table 2, we show how the *intervention components* from KP's ALL initiative (defined as the specific intervention tools) were adapted when implemented in the CHCs.<sup>14,15</sup> In brief, both settings received electronic health record–based alerts, registries, and order sets, all of which were adapted somewhat to fit local resources. At KP, the tools supported outreach to enhance patient adherence; in the CHCs, they included patient education materials. We showed a substantial

increase in guideline-concordant prescribing in the CHCs, indicating that the intervention was successfully implemented; results are reported elsewhere.<sup>14</sup>

### USING PROCTOR ET AL'S FRAMEWORK TO REPORT ON IMPLEMENTATION STRATEGIES

Adaptations made to the *implementation strategies* as used in the CHCs are presented in Table 3. We applied Proctor et al's framework's domains to the KP and CHC implementation strategies during our study analyses to refine our understanding of how implementation strategies differed across sites, and how to report on these differences. Table 3 outlines how we applied the framework to the multifaceted, overarching implementation strategies used at KP and the CHCs, to describe the specific components within these larger approaches. Overall, KP used a *top-down strategy*; the CHCs used a *practice facilitation strategy*. The affected *target* (clinic staff) and *outcome* (prescribing rates) were the same in both settings. Differences between KP and the CHCs in resources and organizational structure, however, necessitated adaptations to the strategies' *actor*, *action*, *temporality*, and *dose*. These adaptations, and their justifications, are described below. To further demonstrate potential uses of this framework, Table 4 presents how it could be

**TABLE 2. Summary of ALL Intervention Components in KP and as Adapted for CHCs**

Component	Purpose	At KP	At CHCs
Automated EHR point-of-care alerts	Support real-time <i>identification</i> of patients indicated for but not prescribed ALL medication(s)	Added to KP tool that identifies multiple care gaps	Separate EHR alert for this "care gap" only
EHR registries	Support <i>identification</i> of patients indicated for but not prescribed ALL medication(s), to facilitate outreach	In patient panel tool that identifies ALL-indicated patients in addition to other care gaps	Stand-alone ALL-specific rosters
EHR order sets	Facilitate <i>prescribing</i> ALL medication(s)	One-click preprogrammed prescription order sets	Order sets with commonly prescribed dosages/medications
Patient education materials	Increase patient knowledge about, adherence to ALL medications	No	Examination room posters, patient handouts in 3 languages
Patient adherence tracking and outreach	Improve patient adherence to prescribed medication(s)	Reminder calls to patients, if prescriptions were not picked up	No standardized adherence tracking; outreach varied between clinics

ACE = angiotensin-converting enzyme; ALL = a system-level QI intervention designed to increase the percentage of patients with diabetes appropriately prescribed cardioprotective medications—Aspirin, Lovastatin (any statin), and Lisinopril (any ACE inhibitor/angiotensin receptor blocker); EHR = electronic health record; KP = Kaiser Permanente; QI = quality improvement.

**TABLE 3. Implementation Strategies Used, per Proctor et al's Framework<sup>a</sup>**

Proctor et al's framework domains, applied to describe the overarching strategies	In KP: Overarching strategy = Top-down	In CHCs: Overarching strategy = Practice facilitation
Actor	National/regional health plan leadership, and regional ALL "champions" identified to encourage local uptake; protected time to do so	Clinic/service organization ALL "champions" identified to encourage local uptake; site coordinators/practice facilitators; study research staff
Action	Champions receive protected time  Organizational structure supports top-down practice change directives; regional directives say such prescribing is the expected standard of care. Providers informed of new policies, expectations; oriented to ALL and its underlying evidence at department meetings, and through other existing mechanisms in place to support communication related to such directives  Adherence incentivized by linking staff incentives to performance, enabled by existing reimbursement structures; augmented with quarterly performance reports on ALL prescribing	Staff oriented to ALL/the underlying evidence at department meetings  Encourage uptake by providing intensive support. Onsite study staff provided practice facilitation; trained on intervention components, underlying evidence; implementation oversight; technical assistance; create lists of indicated patients to individual providers and monthly performance reports  Intensive staff engagement: Clinic staff asked for feedback on intervention tools and how they fit in workflows; tools adapted on the basis of feedback; monthly meetings between study team and clinic staff
Target of the action <sup>b</sup>	Change prescribing for indicated patients: providers to prescribe ALL medications for patients who meet criteria	Change prescribing for indicated patients: providers to prescribe ALL medications for patients who meet criteria
Temporality	One-time rollout; ongoing monitoring and incentivizing	3-4 y postimplementation practice facilitation, support
Dose	One-time directive	Ongoing intensive practice facilitation
Outcomes affected <sup>b</sup>	Appropriate prescribing of ALL medications to indicated patients; goal is improvement in diabetes care quality	Appropriate prescribing of ALL medications to indicated patients; goal is improvement in diabetes care quality
Justification	KP used existing communication mechanisms to encourage uptake of ALL practice changes	Practice facilitation literature supported this approach in diverse organizational settings with fewer resources

<sup>a</sup>ACE = angiotensin-converting enzyme; ALL = a system-level QI intervention designed to increase the percentage of patients with diabetes appropriately prescribed cardioprotective medications—Aspirin, Lovastatin (any statin), and Lisinopril (any ACE inhibitor/angiotensin receptor blocker); CHC = community health center; KP = Kaiser Permanente; QI = quality improvement.  
<sup>b</sup>This domain was unchanged.

applied at a more granular level, to describe the discrete elements within the CHCs' implementation strategy in more detail.

**Differences in Main Actor, Action**

In KP's *top-down strategy*, the *main actor* was regional health plan leadership and the *main action* was identifying ALL as KP's standard of care and offering provider incentives for appropriately prescribing the ALL medications; in brief, provider bonuses were tied to performance on a number of quality measures, including those targeted by ALL. In contrast, the *practice facilitation strategy* in the CHCs emphasized staff engagement, practice facilitation, and direct support. The CHCs chose current clinic employees (eg, nurses, panel managers, and QI specialists) to be practice facilitators; the study paid for their time. These

facilitators provided an on-the-ground link between clinic staff and study team, trained other staff on the evidence behind ALL and the intervention tools, tested the tools, oversaw implementation, and solicited staff feedback. Intervention components were adapted and refined throughout the first implementation year (eg, tailoring training materials) on the basis of this feedback. Thus, in the CHCs' implementation of ALL, the *main actor* was the onsite practice facilitator and the *main action* involved providing information, practical tools, encouragement, hands-on assistance, ongoing support, and actively seeking feedback. The research team's presence in the clinics (for study meetings and qualitative data collection) provided another forum for staff interaction; thus, the researchers were an additional *actor* in this implementation. In

**TABLE 4. Application of Proctor et al's Reporting Framework to the Specific Elements Within the Overarching Implementation Strategy Used in the CHCs<sup>a</sup>**

Individual elements of practice facilitation implementation strategy	Proctor et al reporting framework domains						
	Actor	Action	Target of the action	Temporality	Dose	Outcomes affected	Justification <sup>b</sup>
Engagement of clinic leadership during preimplementation planning process	Study team	Identify clinic champions—MDs interested in quality improvement, diabetes care; often in leadership role	Build ownership and acceptance of the intervention among clinic leadership; prepare site for implementation	Presubmission of proposal	One time	Improved staff trust, understanding, uptake of intervention	Structural, staff engagement, culture (CFIR)
	Study team/clinic champions/clinic leadership	Design implementation process		Preimplementation	Ongoing discussions first 9 mo of study		
	Clinic leadership	Hire practice facilitator—current clinic staff with interest in quality improvement, diabetes care (final selection—nurse, panel managers, quality improvement specialist)			One time within first 9 mo of study		Networks and communication (CFIR)
	Study team	Train clinic champions and practice facilitators			Multiple informal trainings, and information provided as requested	Enable peer-to-peer training and coaching	Knowledge and beliefs, self-efficacy (CFIR)
Communication of organizational support for the intervention	Clinic champion	Communicate expectations of behavior change related to the intervention	Build knowledge and acceptance of the intervention among clinic staff	Explicitly at start of implementation, then as needed	I-h meeting at each clinic, then informally as needed	Improved staff trust, understanding, uptake of intervention	Structural, networks and communication, culture (CFIR)
		Share evidence underlying intervention with colleagues/other clinic staff		Annually at start of implementation years 1 and 2	I-h meeting at each clinic		

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TABLE 4. Continued

Individual elements of practice facilitation implementation strategy	Proctor et al reporting framework domains						
	Actor	Action	Target of the action	Temporality	Dose	Outcomes affected	Justification <sup>b</sup>
Provision of intensive implementation support (Note: Various combinations of listed Actions applied in different sites; this was intentional, to allow for flexibility to meet the needs of each site)	Practice facilitators	Provide formal clinicwide staff training on intervention components and underlying evidence (often in conjunction with clinic champion)	Build knowledge and acceptance of the intervention among clinic staff	Annually at start of implementation years 1 and 2	1-h meeting at each clinic	Improved staff trust, understanding, uptake of intervention	Evidence strength and quality, relative advantage, staff engagement, knowledge and beliefs, self-efficacy (CFIR)
		Lead care team—based trainings with a focus on details of the intervention tools and the implications for clinic workflows	Facilitate use of the intervention tools by clinic staff within varied care team workflows	Annually at start of implementation years 1 and 2	Half hour with each team	Improved ability to use the intervention tools in existing workflows; improved staff trust and use of the tools	Structural; staff engagement; knowledge and beliefs; self-efficacy (CFIR)
		Lead clinic staff in Plan-Do-Study-Act cycles related to use of intervention tools in clinic workflow		Iteratively throughout implementation years 1-3	As needed/requested		Adaptability, trialability (CFIR)
		Be the go-to person for intervention assistance—available onsite to answer questions, provide technical assistance		As needed, 4-y postimplementation, first wave of clinics; 3 y, second wave	As needed/requested		Networks and communication, knowledge and belief (CFIR)
		Check in with clinic staff to ask about problems with, concerns about use of the intervention tools			Regularly; variability in dose by site	Individual stage of change, knowledge and beliefs, staff engagement (CFIR)	

Continued on next page

TABLE 4. Continued

Individual elements of practice facilitation implementation strategy	Proctor et al reporting framework domains						
	Actor	Action	Target of the action	Temporality	Dose	Outcomes affected	Justification <sup>b</sup>
		Share any barriers to uptake of the tools/potential fixes with study team		Monthly	I-h meeting	Improved intervention tools	
		Use reporting tools to create and provide lists of target patients to individual providers	Give clinic providers knowledge of which of their patients lacked an indicated prescription	4-y postimplementation, first wave of clinics; 3 y, second wave	Varied by site; ranged from every 6 wk to 1 time over course of study	Appropriately prescribe for identified patients	Reflecting and evaluating, executing (CFIR); audit and feedback <sup>b</sup>
		Use reporting tools to create and provide panel-level monthly performance metrics to individual providers	Give clinic providers information about care gaps on their panel			Investigate care gaps, leading to appropriate prescribing	
Ongoing engagement of clinic staff	Study team	Provide forum for clinic leadership/staff feedback on intervention tools, and their fit in workflows	Give clinic staff an opportunity to ask for any needed changes to the intervention tools	Monthly for 4-y postimplementation, first wave of clinics; 3 y, second wave	I-h meeting	Enhance staff trust in and use of the tools	Reflecting and evaluating, adaptability, engaging (CFIR)
		Iterate/update the intervention tools as requested by clinic staff, as possible	Support use of intervention tools by entire care team	Monthly throughout implementation year 1	Made several minor adaptations; one major adaptation made, end of implementation year 1	Enhance staff trust in and use of the tools	Reflecting and evaluating, intervention source, adaptability (CFIR)
		Provide clinic-level monthly performance metrics to clinic leadership	Give clinic leadership feedback on uptake/impact of the intervention	Monthly for 4-y postimplementation, first wave of clinics; 3 y, second wave	I report per clinic	Sustain organizational support for the intervention	Reflecting and evaluating, executing (CFIR); Audit and feedback <sup>b</sup>
		Share updates on intervention and relevant clinical evidence	Give clinic staff a refresher on the intervention, and adaptations made recently, and its impact	Annually, study years 2-3	I-h meeting	Improved staff trust, understanding, uptake of intervention	Knowledge, staff engagement (CFIR)

<sup>a</sup>CFIR = Consolidated Framework for Implementation Research<sup>4</sup>; CHC = community health center; MD = doctor of medicine.

<sup>b</sup>Ivers et al.<sup>16,17</sup>

some of the CHCs, these actions/actors were augmented by the concurrent introduction of changes to the clinic's diabetes standard of care—an additional *action* wherein changes targeted by the intervention were presented to staff as part of this new standard.

### Differences in Temporality, Dose

*Temporality* and *dose* differed between the 2 settings. At KP, the intervention tools were designed by KP leadership, and then broadly implemented, followed by ongoing feedback reporting and incentives. In addition to a one-time directive regarding providers' prescribing practices, each KP region identified clinician "champions" to encourage uptake of QI initiatives, including ALL, and protected champions' time for related activities. Kaiser Permanente then monitored providers' adherence to the new practices as part of its ongoing quality assessment processes.

In the CHCs, the first step involved staff engagement, followed by implementation, then ongoing follow-up and feedback reporting. The CHCs identified clinician champions at each organization, and the research grant paid for 5% of their time during the 5-year study. Unlike KP, however, the practice facilitators provided additional intensive staff engagement and support throughout the intervention's implementation and follow-up processes.

### Differences in Justification

In both settings, the overarching *justification* for the chosen implementation strategy was its fit within each organization's culture and capacity. Strategies used at KP to direct and incentivize uptake of the ALL initiative harnessed KP's resources, communication mechanisms, and leadership structures. At CHCs, local context was assessed *a priori* on the basis of insider knowledge (the study team included CHC staff) and initial findings from a qualitative process evaluation.<sup>15</sup> The CHCs' organizational structure emphasized collaborative processes and provider autonomy and they lacked the resources to provide financial incentives; thus, practice facilitation and clinic staff engagement were a better fit in the CHCs.

## DISCUSSION

This article is one of the first<sup>18</sup> to demonstrate the application of Proctor et al's framework for reporting on strategies used to implement

an intervention across care settings. This framework is the first to explicitly establish implementation strategies as a distinct group of factors to be recognized and reported. In doing so, it builds on earlier efforts to advance implementation science,<sup>5,19</sup> and on previous work to guide reporting on practice change/QI efforts, such as the Standards for QQuality Improvement Reporting Excellence guidelines<sup>20,21</sup> and the Workgroup for Intervention Development and Evaluation Research recommendations for reporting on behavior change interventions.<sup>22</sup>

Proctor et al's framework helped organize our description of how implementation strategy elements at KP were adapted in the CHCs. This helped us differentiate between the strategies and articulate which were modified, improving our understanding of their effects. For example, KP's culture and resources enabled establishing care guidelines and financially rewarding providers who met them (per Proctor et al's framework, the main *actor* and *action*). The CHCs, however, emphasized personal engagement, reflecting their collaborative approach to practice change, and more limited fiscal capabilities. Specifying the *justification* for the two different approaches, and examining our findings in light of that specification, helped us understand the characteristics of the CHC practice facilitators (*actors*) that were most effective (ie, they were trusted by clinic staff, and received dedicated time for their work in this role) and helped explain some of the diversity in results by site. Members of the researcher team, often present in the clinics, provided another opportunity for engagement (secondary *actors*). Such intensive person-to-person engagement (*action*) is likely impractical outside of a research context, particularly in underresourced settings.

We encountered some challenges in applying the framework. In some cases, we found that the implementation strategy's components did not always fit neatly within the framework's domains. For example, given the strategy's multifaceted, deliberately flexible process, it could be challenging to determine the main drivers of change (eg, if the main *actor* is the practice facilitator and how best to describe the role of research team involvement?). In addition, we used the framework to guide our description of the overarching, multifaceted implementation strategies used

at KP and the CHCs; for example, we define the “action” of the CHCs’ overarching strategy as the provision of support and resources. This demonstrated the essential cohesiveness of the overall implementation approach, and supported brevity, but meant that potentially important details were omitted. Thus, we also present [Table 4](#) to demonstrate how the framework domains (actor, action, etc) could be applied to each specific element within these implementation strategies. Future users of the framework will need to determine what level of granularity to report on, on a case-by-case basis, taking into consideration that reporting with more granularity is needed to serve the field.

Similar challenges may be faced by others attempting to report on implementation strategies, which often include multiple components within an overarching strategy. We suggest that authors explicitly state the level of granularity at which they chose to apply Proctor et al’s framework (the overarching approach, or discrete components within that approach). More granular reporting would enable justifying the choices underlying each component of a multifaceted implementation strategy, and the impact of each component on its targeted outcome. Future iterations of the framework could provide further guidance about how to clearly differentiate between intervention components and implementation strategies, and how to describe whether the framework is applied to an overarching strategy or its component elements.

### The Importance of Reporting on Implementation Strategies

Consistent reporting on implementation strategies, including details about which strategies contribute to an intervention’s success and how they can be adapted for diverse settings, should be encouraged.<sup>8</sup> Proctor et al’s framework for reporting could help ensure that interventions proven effective in controlled research settings can be successfully implemented in real-world practice. Standardized reporting may be particularly important for interventions that allow for flexibility in implementation, as is often necessary to meet local needs.<sup>23</sup> Furthermore, “real-world” clinicians seeking to replicate effective interventions need evidence about which intervention components are critical, *and* which strategies may best support effective implementation in new

settings. If specific strategies are essential to such implementation, failure to report on them means they may not be applied in future work. Restrictions on manuscript length may inhibit such reporting; journal editors could address this by requiring reporting on implementation strategies, or relaxing length restrictions for articles that include such reports.

Careful specification when reporting on implementation strategies should be encouraged to support the potential for replication of proven implementation strategies, and for building a body of research comparing the effectiveness of specific strategies, including meta-analysis. This should involve authors clearly naming the discrete or component implementation strategies that are used, ideally using established definitions such as those in Proctor et al’s framework. Although there are challenges to doing so, as noted above, such standardization would greatly serve the field of implementation science.

### CONCLUSION

An important barrier to the effective cross-setting implementation of successful interventions is a lack of knowledge about how best to conduct context-specific implementation. Proctor et al’s framework<sup>2</sup> provides guidelines that could improve how implementation strategies are documented. This, in turn, could address barriers to the dissemination of effective interventions, which could help facilitate “real-world” practices implementing effective interventions. This article illustrates the value of this framework in reporting on context-specific adaptations made to implementation strategies.

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**Abbreviations and Acronyms:** **ALL** = a system-level QI intervention designed to increase the percentage of patients with diabetes appropriately prescribed cardioprotective medications—**A**spirin, **L**ovastatin (any statin), and **L**isinopril (any angiotensin-converting enzyme inhibitor/angiotensin receptor blocker); **CHC** = community health center; **KP** = Kaiser Permanente; **QI** = quality improvement

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