Published in final edited form as:

Med Care. 2010 August ; 48(8): 668–675. doi:10.1097/MLR.0b013e3181e3585c.

Quality Improvement Implementation and Disparities: The Case of the Health Disparities Collaboratives

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Abstract

Background—The Health Disparities Collaboratives (HDC), a quality improvement collaborative incorporating rapid quality improvement (QI), a chronic care model, and learning sessions, have been implemented in over 900 community health centers across the country.

Objectives—To determine the HDC's effect on clinical processes and outcomes, their financial impact, and factors important for successful implementation.

Research Design—Systematic review of the literature.

Results—The HDC improve clinical processes of care over short-term 1–2 year periods, and clinical processes and outcomes over longer 2–4 year periods. Most participants perceive that the HDC are successful and worth the effort. Analysis of the Diabetes Collaborative reveals that it is societally cost-effective with an incremental cost-effectiveness ratio of \$33,386/quality-adjusted life year (QALY), but that consistent revenue streams for the initiative do not exist. Common barriers to improvement include lack of resources, time, and staff burnout. Highest ranked priorities for more funding are money for direct patient services, data entry, and staff time for QI. Other common requests for more assistance are help with patient self-management, information systems, and getting providers to follow guidelines. Relatively low-cost ways to increase staff morale and prevent burnout include personal recognition, skills development opportunities, and fair distribution of work.

Conclusions—The HDC have successfully improved quality of care and the Diabetes Collaborative is societally cost-effective, but policy reforms are necessary to create a sustainable business case for these health centers that serve many uninsured and underinsured populations.

Keywords

quality improvement; community health center; health disparities; cost; diabetes

Quality improvement implementation is challenging under the best of circumstances, and efforts to reduce racial and socioeconomic disparities in health care with QI techniques have additional barriers to hurdle. Many minority patients and patients of lower socioeconomic status receive their care in settings that have limited resources. In addition, vulnerable populations have a variety of economic, educational, and social difficulties that make it harder for them to improve self-management of chronic illnesses. While equity is one of the six fundamental domains of the Institute of Medicine's definition of quality,¹ it has

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generally received less attention compared with other elements such as effectiveness.² Moreover, in the health disparities field,³ most of the existing literature documents disparities but a much smaller body of work seeks to develop and evaluate interventions to reduce these disparities.⁴

Community health centers (HCs) are vanguard providers of health care for vulnerable populations,^{5, 6} serving 16 million Americans in 5000 sites.⁷ Forty percent of HC patients are uninsured, 36% have Medicaid coverage, over 60% are racial or ethnic minorities, and 71% are at or below the federal poverty line.⁸ Nationally, HCs serve 1 out of every 4 people in poverty, 1 out of 10 minorities, and 1 out of 9 rural Americans. HCs are truly a critical provider of health care to underserved populations and a vital part of efforts to reduce national disparities in care.

Therefore, the Health Disparities Collaboratives,⁹ a massive state-of-the-art effort by the Health Resources and Services Administration's Bureau of Primary Health Care (HRSA's BPHC) to improve the quality of care in community health centers across the country, are an important case example to study for using quality improvement techniques to decrease disparities. As of December 2007, 915 HCs have participated in the HDC [personal communication: Charles Daly, Health Resources and Services Administration, December 10, 2007]. In this paper, I describe the HDC and then review the evidence for their impact on quality of care, the financial ramifications for society and the individual HC, and factors important for organizational change at the HCs. I end with summary conclusions and recommendations for future research questions.

The Health Disparities Collaboratives

In the 1990s, it became known that the quality of care in health centers for conditions such as diabetes was similar to other settings such as private doctors' offices, academic medical centers, and managed care organizations but still needed to be improved.^{10, 11} In addition, wide variation in the quality of care was apparent across centers, with some centers performing extremely well and some poorly.¹⁰ The 1990s also saw the rise of the MacColl Chronic Care Model as one of the most popular paradigms for approaching chronic disease management,¹² and increasing interest in quality improvement collaboratives to improve care across multiple organizations.^{13, 14} In the QI collaborative model, different organizations learn QI techniques in joint learning sessions, and then share best practices over the ensuing year or longer to leverage and multiply the learning.¹⁵ Before-after studies of the QI collaborative model were promising although a controlled trial of HIV care was largely negative.^{16, 17} HRSA's BPHC decided to adopt and implement the QI collaborative model in 1998 in an initiative they called the HDC. The HDC have three main components that have been described in more detail elsewhere: Model for Improvement, MacColl Chronic Care Model, Learning Sessions / Support.^{18, 19}

Each HC creates a HDC team that works to improve the quality of care of the target condition with the support of senior administrative leadership. A critical component is the creation of a patient registry to help track clinical care. Initially a difficult task for many HCs, the BPHC eventually offered standard patient registry software. A Model for Improvement developed by Associates in Learning based upon the Plan, Do, Study, Act (PDSA) cycle was introduced into each HC.²⁰ This Model takes the standard PDSA cycle from continuous quality improvement and emphasizes the goal of rapid cycle improvement – testing an intervention on a small group of patients to allow assessment and then revision of the intervention.

The HDC use the MacColl Chronic Care Model, which aims to create practical, supportive interactions between an informed, activated patient and a proactive, prepared clinical

team.¹² The Chronic Care Model's domains become the targets for the rapid PDSA cycles: patient self-management, delivery system redesign, decision support, clinical information systems, leadership and health system organization, and community outreach.

The Model for Improvement and Chronic Care Model are embedded within regional and national support structures provided by the BPHC. At learning sessions, team members and administrators from groups of 15–20 health centers learn QI techniques and share lessons among themselves, hence the collaborative nature of this QI process. Regional cluster coordinators provide additional assistance through telephone conference calls, a computer listserv, feedback on required monthly progress reports, patient registry and information systems support, and regional meetings. The first year of a given Collaborative involves four regional or national meetings and monthly followup. Subsequent years of participation generally include one regional meeting and quarterly reports to the BPHC. The BPHC paid travel expenses of participants attending the learning sessions. BPHC is currently transitioning HDC infrastructural support from the regions to state Primary Care Associations.

Methods

The author systematically reviewed PubMed for articles on the HDC using the key words “Health Disparities Collaborative”, “quality improvement”, “disparities”, and “collaboratives”. He also searched the reference lists of the websites of the Health Disparities Collaboratives and National Association of Community Health Centers (NACHC), and spoke to key informants at BPHC, NACHC, and the research community to ensure that the search was complete.

Description of the HDC

HC personnel spent considerable time working on the HDC. Team leaders worked nearly 11 hours per week on the HDC, team members 8 hours, chief executive officers 3 hours, and physicians 5 hours.²¹ Most participants found the Chronic Care Model and PDSA system to be useful, although many used the PDSA system qualitatively rather than quantitatively.¹⁸ They would try an intervention in a small number of patients and get a sense of whether it was working or not rather than performing a formal quantitative analysis of the intervention. On average, teams implemented 44 QI activities between 2000–2002. The most common areas of interventions were patient registries and community linkages for patients.²² Implementation of the elements of the Chronic Care Model was reasonably good as measured by the Assessment of Chronic Illness Care (ACIC) survey.²³ ACIC scores ranged from 6.7 to 8.1 for target areas in the Chronic Care Model, where 0 is worst and 11 is best.¹⁹

HDC Participants' Perceptions of Outcomes

Survey and interview studies indicate that HDC participants generally perceive that the HDC have improved outcomes.¹⁸ Over 90% of surveyed Diabetes Collaborative participants believe that the collaborative has been a success and worth the effort.¹⁸ Qualitative interviews of team leaders and team members are consistent with these survey results; most interviewees were very proud of their accomplishments.¹⁸

Clinical Processes of Care and Outcomes

Two general types of studies are in the literature: evaluations using the existing patient registry data and those employing chart review of randomly selected patients. Most studies assess short-term (1–2 years) processes and outcomes while fewer examine long-term (4-year) results. Patient registry studies highlight the de facto “population of focus.” HDC participants are taught to initially focus on a small group of patients (e.g. – patients of one

provider) rather than the entire center's patients. After initial experience with the population of focus, the center is supposed to spread the initiative to other patients and providers in the center. The major criticisms of patient registry studies are that who is in the registry and when they enter the registry are not random processes and possibly biases towards positive results. In addition, over time the ultimate goal of the HDC is to improve the care of all patients in the center. Therefore, several recent studies utilize random chart reviews as their assessment tool.^{18, 19, 24}

Patient Registry Studies—Registry studies of the Diabetes Collaborative in the early 2000s show absolute reductions in hemoglobin A1c values ranging from 0.8% to 4.2% (Table 1).^{25, 26}

Short-term Chart Review Studies—A pre-post study of the first year of the Diabetes Collaborative in the Midwest region showed improvements in seven processes of care but no intermediary processes.¹⁸ For example, rates of performing the hemoglobin A1c test increased but actual hemoglobin A1c value did not improve. A controlled pre-post (1 year pre and 1 year post) national study of the Asthma, Diabetes, and Hypertension Collaboratives showed improvements in processes of care for asthma and diabetes, but no improvements in intermediary outcome measures.²⁴

Long-term Chart Review Studies—A four year pre-post study of the Diabetes Collaborative in Midwestern and West Central states showed improvement in 11 processes of care and lowering of hemoglobin A1c and LDL cholesterol values.¹⁹ A randomized controlled trial comparing the standard HDC to the HDC plus additional organizational support, training of providers in communication and facilitation of patient behavioral change, and videos and brochures that empowered patients to become more actively involved in their care showed marginal benefit to the more intensive intervention, but the standard HDC appeared to account for the majority of the improvements in quality of care seen over time.¹⁹

Cost

Societal cost-effectiveness analysis of the Diabetes Collaborative using a NIH computer simulation model and outcomes data from the HDC showed that the Diabetes Collaborative is societally cost-effective with an incremental cost-effectiveness ratio (ICER) of \$33,386/quality-adjusted life year (QALY), with ICERs remaining below \$100,000/QALY across a variety of sensitivity analyses regarding secular trends, clinical outcomes, and program costs (Table 2).²⁷ The NIH simulation model incorporates epidemiological data from population-based studies and clinical trials and calculates the health effects and costs of interventions to improve risk factor control and the quality of diabetes care.^{28, 29} Increased use of angiotensin-converting enzyme inhibitors was the most powerful driver of the cost-effectiveness (\$23,653/QALY), with glucose control (\$104,811/QALY), aspirin use (\$151,767/QALY), and cholesterol control (\$416,850/QALY) contributing less strongly.

The business case financial analysis from the perspective of the CEO was investigated in a case study of five Midwestern health centers examining administrative and clinical costs, as well as changes in payor mix.^{30, 31} HDC administrative costs/year ranged from \$6.41-\$21.93 per patient. The balance of diabetes clinical costs and revenues was variable; the balance of costs and revenues did not clearly improve. In addition, the payor mix of diabetes patients, that is the relative proportions of uninsured, poorly insured, and well insured patients, did not improve either. Overall the HDC introduced new costs without new revenues. However, the HDC program for this Diabetes Collaborative example was a small percentage of the overall HC budget, ranging from 1.9% to 8.2%

In a survey of 74 CEOs participating in the Diabetes Collaborative, most thought that the HDC increased patient costs and overall health center costs without changing reimbursement or government or private foundation funding.³⁰ A related analysis of 100 CEOs engaging in any Health Disparities Collaborative found that one-third, especially those leading centers with a higher proportion of uninsured patients, believed that the HDC had a negative financial impact on their health center.³²

Organizational Change and Implementation

In a detailed analysis of interventions recorded in monthly reports, Grossman et al. were unable to determine which interventions within the Chronic Care Model are correlated with improvements in quality of care and outcomes.²² Common barriers to improvement included lack of resources, time, and staff burnout.^{21, 33} When asked to rank their number priority for more funding, HDC participants listed money for direct patient resources (44%), data entry (34%), and staff time for QI (26%). They also requested more assistance with patient self-management (73%), information systems (77%), and getting providers to follow guidelines (64%).²¹ Insurance type was associated with the quality of diabetes care within health centers. Patients with no insurance or Medicaid insurance tended to have lower quality of care than patients with private insurance.³⁴ In a case study of six health centers in North Carolina participating in the Diabetes Collaborative, staff indicated that shared problem solving and peer learning among HDC teams greatly aided implementation of patient registries.³³

Graber et al. examined predictors of staff morale and burnout.³⁵ Some of the predictors were relatively low-cost and modifiable such as receiving personal recognition, career promotion, skills development opportunities, fair distribution of work, effective training of new hires, and regular provider participation. More expensive predictors included sufficient funding and personal.

Summary Conclusions

The Health Disparities Collaboratives provide an important case example for efforts to use quality improvement techniques to reduce racial, ethnic, and socioeconomic disparities in care. HCs serve predominantly vulnerable patients, and thus the primary focus of the HDC has been improving the quality of care and outcomes of all patients they serve rather than reducing intra-center variation in care across different subgroups. In addition, most HDC studies do not use controls external to the health center setting because it is frequently difficult to find a feasible comparison group comparable to federally qualified health centers. Several conclusions can be drawn from this systematic review of the literature:

1. *The HDC improve clinical processes of care over short-term 1–2 year time periods and improve both processes of care and outcomes over longer 2–4 year periods.* Processes of care such as measuring hemoglobin A1c are easier to increase than intermediary outcome measures such as improving actual hemoglobin A1c values. The former may respond to relatively straightforward system interventions such as improved tracking of diagnostic test ordering whereas outcomes improvement frequently requires behavioral change on the part of patients and providers. One of the key factors contributing to the success of the HDC is that the BPHC remained committed to the initiative over a 10 year period and provided a variety of support such as the cluster coordinators and information technology assistance.
2. *The Diabetes Collaborative is societally cost-effective, but no consistent financial streams exist for individual health centers, raising concerns about whether there is a business case for CEOs to adopt and sustain the HDC over the longterm.* The cost of a particular HDC is a relatively small part of a HC's total budget. However, over

time the goal is to move from a QI approach targeting a single disease to spread of the overall methodology to multiple diseases, conditions, and processes. If spread is successful, then a more substantial percentage of a HC's total budget would be involved. Without changes in the fundamental reimbursement schemes and incentive systems, HCs that tend to serve many uninsured and underinsured patients may lose money by providing high-quality care. While health centers have a mission to care for the underserved, ultimately they need to stay within budget and thus financial considerations are an important part of their strategic planning.

3. *Some methods to enhance implementation of the HDC are low-cost and feasible.* For example, Graber et al. note a number of factors to increase staff morale and prevent burnout such as receiving personal recognition, skills development opportunities, fair distribution of work, and effective training of all newly hired employees.³⁵
4. *Some methods to enhance implementation of the HDC will require more resources and work.* The highest priority requests for more resources were to fund direct patient care services and time for data entry and QI work. Given the high numbers of uninsured patients cared for at HCs and that high quality evidence-based care often means the provision of more diagnostic tests and treatments, only so much QI can be done before HCs will need more funding to survive. Other complex requests for assistance from HCs include facilitating patient behavioral change, getting provider buy-in for HDC efforts, and encouraging providers to follow practice guidelines.

Several important research questions remain and include:

1. How to tailor implementation of the HDC to different HCs that may be at different stages of organizational readiness to change and that may have different strengths, weaknesses, organizational contexts, and patient populations?³⁶
2. How to create a viable long-term business case for the HDC to complement the analysis demonstrating that the Diabetes Collaborative is societally cost-effective?
3. How to successfully spread the HDC across multiple diseases, conditions, and processes? How can information systems adapt from being stand-alone disease specific patient registries to data and tracking systems relevant for the totality of a patient's health? What kinds of infrastructure are necessary to support spread of the HDC as the BPHC transitions responsibility from the regions to the state primary care associations? For example, a demonstration project improved cancer screening practices in four health centers by combining elements of the basic HDC model with local and regional communities of practice.³⁷ These networks mobilized community resources and also led to the sharing of best practices.
4. How to sustain the HDC over time? What types of booster shots, incentives, and assistance are necessary to allow the HDC to succeed over the longterm?
5. How to integrate the general QI process of the HDC with menus of specific model programs to help with difficult challenges such as facilitating patient behavioral change? The HDC combine the rapid cycle quality improvement process, MacColl Institute Chronic Care Model, and learning sessions. However, they do not dictate the use of specific interventions. While health centers like the flexibility of the process, they also appreciate seeing best practices and model programs they can consider adapting to their settings. For example, what are ways to improve patient self-management, how can a center use group cluster visits successfully, and what are the best ways to organize and run community health worker programs?

The HDC are one of the boldest efforts to improve quality of care and reduce disparities for vulnerable populations. The HDC are also the largest example of implementation of the QI collaborative approach. The HDC demonstrate that such approaches can be successful, but that thoughtful policy and managerial initiatives will be necessary to complement clinical leadership for longterm viability.³⁸

Acknowledgments

Grant Support: This project was supported by the National Institute of Diabetes and Digestive and Kidney Diseases Diabetes Research and Training Center (P60 DK20595). Dr. Chin is supported by a Midcareer Investigator Award in Patient-Oriented Research from the National Institute of Diabetes and Digestive and Kidney Diseases (K24 DK071933).

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Table 1

Clinical Process and Outcomes Studies *

	Chin et al. 2004 ¹⁸	Smith and Money 2004 ²⁵	Wang et al. 2004 ²⁶	Landon et al. 2007 ²⁴	Chin et al. 2007 ¹⁹	Chin et al. 2007 ¹⁹
Study Design	Pre-Post	Case Studies	Case Studies	Controlled Pre-Post	Pre-Post	Randomized controlled trial
Data Source	Chart review	Patient Registries	Patient Registries	Chart review	Chart review	Chart review
Years	1998–1999	Early 2000s–2004	1998–2002	1999–2003 (1 yr pre, 1 yr post)	1998–2002	2000–2002
Subjects	19 HCs, 1628 patients	5 HCs, Unknown patients	2 HCs, Unknown patients	64 HCs, 9658 patients	16 HCs, 3408 patients	31 HCs, 6993 patients
Diseases	Diabetes	Diabetes, Cardiovascular	Diabetes	Asthma, Diabetes, Hypertension	Diabetes	Diabetes
Processes/Outcomes	HbA1c measurement OR 2.43	HC 1: HbA1c 12% to 7.8%	HbA1c 9.7% to 7.9%	Improvement vs. controls:	HbA1c measurement OR 4.78	Standard HDC vs. High
	2 HbA1c 3 months apart OR 1.90	Blood pressure 140/110 to 120/70s–80s		Asthma	2 HbA1c 3 months apart OR 4.45	Intensity Intervention (HDC plus 4 learning sessions, provider communication and behavioral change training, patient empowerment)
	Eye exam referral OR 1.55	HC 2: HbA1c 9.5% to 8.3%		Assessment of severity 19%	Eye exam referral OR 2.37	
	Dietary counseling/referral OR 1.42	HC 3: HbA1c 9.1% to 7.9%		Treatment with anti-inflammatory medication 14%	Foot exam OR 3.71	
	Foot exam OR 2.70	HC 4: 50% of CVD patients had BP < 140/90			Dental referral OR 6.46	
	Dental referral OR 2.94	HC 5: HbA1c 9.0% to 8.2%		Assessment of exposure to smoke or other triggers 14%	Lipid assessment OR 2.13	
	Lipid assessment OR 1.62			Use of management plan 16%	Urine microalbumin OR 4.42	Favors high intensity:
	Urine microalbumin OR 2.47			Diabetes	ACE inhibitor OR 2.53	Microalbumin OR 2.03 (1.01, 4.05)
	No improvement intermediary outcomes				Aspirin OR 2.94	
				Foot examination 21%	Home glucose monitoring OR 2.06	ACE inhibitor 1.47 (1.07, 2.01)
				Dental examination 10%	Exercise counseling OR 3.68	
				HbA1c measurement 16%	HbA1c –10.45% (–0.72, –0.17)	Aspirin 2.20 (1.28, 3.76)

Chin et al. 2004 ¹⁸	Smith and Money 2004 ²⁵	Wang et al. 2004 ²⁶	Landon et al. 2007 ²⁴	Chin et al. 2007 ¹⁹	Chin et al. 2007 ¹⁹
			Aspirin (age 40 yr) 10%	LDL cholesterol 19.7 (-25.8, -13.6)	Favors standard HDC:
			No improvement intermediary outcomes		Dietary counseling 0.24 (0.08, 0.68)
					Exercise counseling 0.34 (0.15, 0.75)
					Diabetes education 0.16 (0.06, 0.44)

* ACE = angiotensin converting enzyme, BP = blood pressure, CVD = cardiovascular disease, HC = health center, HDC = Health Disparities Collaboratives, OR = odds ratio

Table 2

Cost and Resource Studies*

	Huang et al. 2007 ²⁷	Huang et al. 2008 ³⁰	Huang et al. 2008 ³⁰	Cheung et al. 2008 ³²
Study Design	Societal cost-effectiveness analysis	Case Studies	Survey	Survey and Uniform Data Set
Subjects	Computer simulation model	5 Health Centers	74 chief executive officers	100 chief executive officers
Disease	Diabetes	Diabetes	Diabetes	Any HDC disease
Outcomes	Incremental cost-effectiveness ratio	HDC administrative costs/year:	Increased patient costs (72%)	Increased patient care costs (73%)
	\$33,386/QALY	range \$6.41–\$21.93/patient	Increased overall HC costs (73%)	Increased health center operating costs (75%)
	Reduction in lifetime probability of:	Balance of clinical costs and revenues was variable	No change in reimbursement (75%)	No change in reimbursement (79%)
	Blindness 2%		No change in government funding (73%)	No change in government funding (76%)
	End-stage renal disease 3%	Payor mix did not clearly improve	No change in private foundation grants (75%)	No change in private foundation grants (77%)
	Coronary heart disease 4%	HDC program as percent of overall		
	Increase in quality-adjusted life year 0.35	HC budget: range 1.9%–8.2%		
	Incremental cost-effectiveness ratio (\$/QALY) of individual improvements in care:		Perception of impact of HDC on finances:	Overall financial impact
	Glucose control and testing \$104,811		38% worsen	37% harmful
	Cholesterol control \$416,850		48% no change	51% no change
	ACE inhibitor \$23,653		15% improve	12% beneficial
	Aspirin \$151,767			Higher uninsured payor mix and rural location associated with harmful perception

* ACE = angiotensin-converting enzyme, HC = health center, HDC = Health Disparities Collaboratives, QALY = quality-adjusted life year