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GENDER DISPARITIES IN CARDIOVASCULAR DISEASE CARE AMONG COMMERCIAL AND MEDICARE MANAGED CARE PLANS

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Background. **Gender disparities in cardiovascular care have been documented in studies of patients, but little is known about whether these disparities persist among managed health care plans. This study examined 1) the feasibility of gender-stratified quality of care reporting by commercial and Medicare health plans; 2) possible gender differences in performance on prevention and treatment of cardiovascular disease in US health plans; and 3) factors that may contribute to disparities as well as potential opportunities for closing the disparity gap.**

Methods. **We evaluated plan-level performance on Healthcare Effectiveness Data and Information Set (HEDIS®) measures using a national sample of commercial health plans that voluntarily reported gender-stratified data and for all Medicare plans with valid member-level data that allowed the computation of gender-stratified performance data. Key informant interviews were conducted with a subset of commercial plans. Participating commercial plans in this study tended to be larger and higher performing than other plans who routinely report on HEDIS performance.**

Results. **Nearly all Medicare and commercial plans had sufficient numbers of eligible members to allow for stable reporting of gender-stratified performance rates for diabetes and hypertension, but fewer commercial plans were able to report gender-stratified data on measures where eligibility was based on recent cardiac events. Over half of participating commercial plans showed a disparity of ≥5% in favor of men for cholesterol control measures among persons with diabetes and persons with a recent cardiovascular procedure or heart attack, whereas no commercial plans showed such disparities in favor of women. These gender differences favoring men were even larger for Medicare plans, and disparities were not linked to health plan performance or region.**

Conclusions and Discussion. **Eliminating gender disparities in selected cardiovascular disease preventive quality of care measures has the potential to reduce major cardiac events including death by 4,785–10,170 per year among persons enrolled in US health plans. Health plans should be encouraged to collect and monitor quality of care data for cardiovascular disease for men and women separately as a focus for quality improvement.**

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Cardiovascular disease (CVD) is the leading cause of death in the United States for both men and women (American Heart Association, 2004), but women are more likely to suffer CVD-related morbidity and mortality than men (Hollenbeak, Weisman, Rossi, & Ettinger, 2006; Schulman et al., 1999; Sheifer, Escarce, & Schulman, 2000). There is a substantial literature documenting gender disparities in guideline-indicated services for the management of CVD. Many studies have reported that women receive fewer preventive as well as treatment services than men (Correa-de-Araujo et al., 2006; Garg et al., 2002; "Missed opportunities in preventive counseling," 1998). Poor quality and disparities in receipt of recommended care for women and other vulnerable groups have been attributed to differential barriers to care, in particular health insurance status (Lurie & Dubowitz, 2006). However, even among insured populations, recent studies have shown the persistence of gender disparities which suggests that disparities may be influenced by the delivery of clinical care. Mosca et al. (2005) found in their recent investigation of a single large managed care plan that only 7% of high-risk women attained optimal combined lipid levels initially, and 12% had done so after 36 months; only one third of women received recommended drug therapy.

Because a substantial portion of the US population receives care through managed health care plans, it is important to document possible gender disparities and their magnitude for managed care populations. However, there has been very little research that captures this information at the health plan level. In a RAND report, Fremont (2002) documented disparities in some but not all CVD-related measures. This study was limited to 1 large managed care plan and the lack of consistency between this work and previous research suggests a need to examine gender disparities in a more representative sample of health plans.

The lack of information on gender disparities in the managed care population may be largely attributed to challenges related to data collection and analyses. Currently, nearly 300 commercial health plans representing >90% of Americans enrolled in managed care annually report their performance on a set of quality indicators from the Healthcare Effectiveness Data and Information Set (HEDIS® [HEDIS is a registered trademark of the National Committee for Quality Assurance]). Nevertheless, there remains no mechanism for national reporting of potential disparities in the quality of care received by enrollees, and therefore no mechanism for targeting quality improvement opportunities to reduce potential disparities. It may be costly and burdensome for health plans to report gender-stratified quality data and debates surrounding the best methodologic approaches that would make these analyses useful for managed care plans persist (Bird, Fremont, Wickstrom, Bierman, & McGlynn, 2003).

To that end, our objectives for this study are to 1) assess the feasibility of gender-stratified reporting by commercial and Medicare health plans as a part of national reporting on quality performance in CVD; 2) examine potential gender disparities in performance on prevention and treatment of CVD in US commercial and Medicare health plans; and 3) identify factors that may contribute to disparities as well as potential opportunities for closing the disparity gap.

In this study, we distinguish between the terms "differences" and "disparities" in care. According to the Institute of Medicine (2003), *differences* occur when populations have different underlying needs or risks; a *disparity* occurs when individuals with same risks/needs do not receive equal treatment. The HEDIS measures identify all enrollees for whom a specific CVD service is recommended in the measure denominator, regardless of gender or other patient characteristics (National Committee for Quality Assurance [NCQA], 2005a). For our study, the term *disparity* is more appropriate; we believe that the likelihood of women receiving services in the managed care setting should be comparable to that of their male counterparts.

Methods

Data Sources and Data Collection

We evaluated health plan performance using HEDIS, which is a comprehensive performance measurement program administered by the NCQA. The datasets included commercial health plans that voluntarily reported gender-stratified data, in addition to their usual HEDIS reporting of overall plan aggregate data, and all Medicare plans with valid member-level data that allowed the computation of gender-stratified performance data at the plan level.

Commercial Plan Data. The NCQA invited all commercial health plans reporting HEDIS in 2005 to submit gender-stratified data on measures related to CVD care. In all, 46 of 290 (16%) plans reported gender-stratified data on HEDIS quality of care measures as separate submissions during the usual HEDIS reporting cycle. Each health plan received an honorarium to defray expenses associated with additional data management activities to provide gender-stratified data. To prepare for data submission, health plans used administrative claims to identify patients who met eligibility criteria, and for most of the measures included in this study, selected a random sample of eligible patients for chart reviews to determine whether patients met the criteria for inclusion in the denominator (based on conditions found in the med-

ical chart or claims) and numerator (whether the quality indicator was met).

Medicare Plan Data. We calculated gender-stratified performance data for all Medicare managed health care plans with valid member-level data for HEDIS 2004. The Centers for Medicare and Medicaid Services (CMS) requires all Medicare Advantage managed care plans to report member-level demographic profile and HEDIS data. We linked these HEDIS data submitted by 160 Medicare plans with the CMS enrollment files, which contained information on ZIP codes. ZIP codes were extracted to match the average household income derived from the census data for persons in the sample. Before merging HEDIS member-level data and CMS enrollment files, we validated the HEDIS member-level data against those from the HEDIS health plan summary data, excluding plans that had inconsistent or missing data (1.3%). Plans whose member-level data submissions had incongruent performance rates and plans that showed a 5% differential in denominator sizes between member- and plan-level HEDIS data were not included in the final dataset. We again validated the merged data against the HEDIS health plan summary data and excluded plans that had overall linkage rates between HEDIS data and CMS enrollment files <90%. The final dataset for analysis yielded 148 health plans.

For all of the study plans, we obtained data on organizational characteristics from health plan information reported to NCQA. Health plan model was categorized as staff or group model (where care is provided by ≥1 physician group practices that are not owned by the health maintenance organization [HMO], but that operate as independent partnerships or professional corporations), independent practice association (IPA) or network model (where plans contract with large numbers of individual private practice physicians who are paid either a fee or a fixed amount per patient to take care of the IPA's members), or mixed model (which have ≥1 form of HMO within a single plan, such as a staff model HMO that also contracts with independent physician groups or with individual private practice physicians). We also captured tax status (for-profit versus not-for-profit), enrollment size, and region, as determined by the location of the plans' headquarters. Regions represent geographical areas defined by the US census: the Midwest region includes states in the East North Central and West North Central regions; the Northeast region includes states in the New England and Middle Atlantic regions; the Southern region includes states in the South Atlantic and South Central regions; and the Western region includes states in the Mountain and Pacific regions.

Main Outcome Measures

Table 1 provides details on 7 HEDIS quality indicators used for this study to evaluate quality of CVD care among enrollees. One measure captured blood pressure control for persons with diagnosed hypertension, 2 measures addressed the use of β-blockers after a heart attack, and 4 addressed cholesterol screening and control among 2 groups of patients: those with diabetes mellitus and those with a recent cardiac event (NCQA, 2005a). The indicator on the persistence of β-blocker treatment was not available for Medicare because it was not included in HEDIS 2004.

Analyses

We compiled frequency statistics to describe participating health plans. To assess sample representativeness for commercial plans, we compared plan characteristics and performance on the HEDIS indicators for health plans that participated in the study with all others that reported HEDIS indicators but did not participate in this study.

To assess the feasibility of reporting gender-stratified data, we determined whether plans had ≥30 eligible men and ≥30 eligible women under the usual random sampling and exclusion criteria for each measure analyzed. For public reporting of a health plan performance rate, NCQA requires that the plan has a minimum of 30 eligible members for the measure (based on general statistical theory).

To identify possible gender disparities by measure, we first calculated the distribution and means of the overall, male, and female performance rates across plans. We conducted paired *t*-tests to compare performance rates for men versus those of women by health plan. To ensure that the overall probability of falsely identifying a significant difference does not exceed .05, we used a Bonferroni adjustment to set the per-comparison alpha at .007 for commercial plans and .008 for Medicare plans.

To understand the magnitude of these disparities, we computed a disparity score for each indicator, defined as the rate for men minus that for women. We examined the means and distribution across health plans and by type of health plan. We also determined the number of health plans in the sample that exhibited a disparity score of ≥5% in favor of either gender to estimate the prevalence of this problem. All statistical analyses were conducted using SAS software v9.1 (SAS Institute, Cary, NC).

Key Informant Interviews

Eight of the 46 commercial health plans participating in the study subsequently participated in key informant interviews, for which we interviewed HEDIS managers and/or medical directors to solicit additional qualitative information to complement findings from the quantitative analyses. Interviews focused on

Table 1. HEDIS 2005 Cardiovascular Disease Measures

	Measure	Numerator (eligible members who meet quality indicator)	Denominator (eligible population)
1.	β-Blocker treatment after a heart attack	An ambulatory prescription for β-blockers rendered within 7 days (inclusive) after discharge.	Members who are ≥35 years of age as of December 31 of the measurement year and discharged alive from an inpatient setting with an AMI from January 1–December 24 of the measurement year.
2.	Persistence of β-blocker treatment after a heart attack	A 180-day course of treatment with β-blockers	Members who are ≥35 years of age as of December 31 of the measurement year and discharged alive from an acute inpatient setting with an AMI between July 1 of the year prior to the measurement year through June 30 of the measurement year.
3.	Controlling high blood pressure	Both the systolic and diastolic blood pressure are ≤140/90 for adequate control	Members who are 46–85 years of age, hypertensive, and continuously enrolled in the managed care plan as of December 31 of the measurement year.
4 & 5.	Cholesterol management after acute cardiovascular events (AMI, CABG, PTCA)	• *Screening:* A cholesterol-C screening performed on or between 60 and 365 days after discharge for an acute CV event • *Lipid control* (cholesterol-C) <100 mg/dL: Any cholesterol-C level of <100 mg/dL on or between 60 and 365 days after discharge for an acute CV event	Members who are 18–75 years of age as of December 31 of the measurement year and continuously enrolled in the managed care plan for 365 days after the member has been discharged alive for an AMI, CABG, or PTCA.
6 & 7.	Comprehensive diabetes care	• *Screening:* A cholesterol-C test done during the measurement year or prior year as determined by claim/encounter or automated laboratory data or medical record review • *Lipid control* (cholesterol-C) <100 mg/dL: The most recent cholesterol-C level performed during the measurement year or prior year is 100 mg/dL.	Members who are 18–75 years of age and continuously enrolled in the managed care plan as of December 31 of the measurement year.

Abbreviations: AMI, acute myocardial infarction; CABG, coronary artery bypass graft; PTCA, percutaneous transluminal coronary angioplasty.

plans' awareness of disparities, plans for using disparities data, possible factors contributing to disparities, and potential strategies for reducing disparities in care. We purposively selected health plans based on the presence of gender disparities as well as plan characteristics including profit status, plan model type, and region.

Results

Among commercial plans in the sample and Medicare plans, for-profit plans and IPA/network models were the most common, and plans were well-distributed across the country. Most of the Medicare plans had smaller enrollments with to commercial plans, with 83% having an enrollment size of <50,000 members (Table 2).

Organizational characteristics of the commercial plans participating in the study are similar to other HEDIS-reporting plans, except that participating plans had larger enrollment, with 65.2% of the participating plans from a national carrier that had an enrollment size >100,000 members. This may be because larger plans have the resources and higher number of enrollees to analyze gender-stratified data. Furthermore, the mean performance of commercial plans in the sample exceeded those that did not participate in the study on 5 of the 7 measures, with the differences ranging from 1.7%–3.3%, with the exception of persistence in β-blockers and cholesterol control at <100 mg/dL for patients with diabetes (Table 3).

Feasibility of Reporting Gender-Stratified Data

Table 4 presents the number of plans that were able to report HEDIS performance rates for ≥30 females and ≥30 males. All or nearly all commercial and Medicare plans were able to report gender-stratified rates for diabetes care and controlling high blood pressure measures. About 80% of plans were able to report measures on cholesterol management: 36 (81.8%) commercial plans and 99 (79.2%) Medicare plans. How-

Table 2. Characteristics of Medicare Plans, Participating Commercial Plans, and All Other Commercial Plans Reporting HEDIS Data

			Commercial Health Plans					
	Medicare Plans (n = 148)**		Health Plans in Gender Study (n = 46)**		All plans not in Gender Study Reporting HEDIS (n = 244)		>t Statistics*	
Characteristics	n	Mean	n	Mean	n	Mean	t Value	P value
Profit status								
Not for profit	53	35.8	12	26.7	65	27.8	0.02	0.88
For profit	95	64.2	33	73.3	169	72.2		
Health plan model								
Staff/group model	63	42.6	2	4.4	10	4.1	0.93	0.63
IPA/network	79	53.4	25	54.4	119	49.0		
Mixed model	6	4.1	19	41.3	114	46.9		
Regions of plan location								
Midwest	40	27.2	13	28.3	69	38.3	1.28	0.73
Northeast	38	25.9	11	23.9	21	11.8		
South	33	22.4	15	32.6	64	35.6		
West	37	25.0	7	15.2	26	14.4		
Enrollment size								
<50,000 members	122	83.0	5	10.9	100	41.2	16.6	0.0003
50,000–99,999 members	16	10.9	11	23.9	50	20.6		
≥100,000 members	9	6.1	30	65.2	93	38.3		
Members' income level ($)								
<30,000	47	31.8						
30,000–$35,000	67	45.3						
>35,000	34	22.9						

Abbreviation: IPA, independent practice association; see text for explanations of region and model type.
*t-Test statistics performed comparing commercial plans in the study and all other health plans reporting HEDIS data.
**The column sum may not add to the n indicated for Medicare or commercial plans due to missing values.

ever, fewer than half of commercial plans, compared with 80% of Medicare plans, were able to report gender-stratified data on either measure related to β-blocker treatment. The difference in the ability to report gender-stratified data between commercial and Medicare plans may be because cardiac events are less common among younger women compared with men, and the commercial population tends to be younger.

Performance Rates

Gender-stratified health plan performance rates show that performance for males compared with females in

Table 3. Comparison of Plan Performance Among Medicare, Participating Commercial, and All Other HEDIS-Reporting Commercial Plans

	Performance Rates							
			Commercial Health Plans					
	Medicare Plans		Health Plans Reporting Gender Stratified Data		Health plans that did not report Gender-Stratified data		t Statistics*	
Measure	n	Mean	n	Mean	n	Mean	t Value	P Value
β-Blocker after heart attack	103	92.7	44	97.4	169	95.8	−2.08	.0389
Persistence of β-blocker	NA†	NA†	37	69.0	136	67.0	−0.95	.3443
Controlling high blood pressure	141	61.1	46	69.2	221	66.3	−2.42	.0161
Comprehensive diabetes care – cholesterol C screening	148	91.1	46	92.4	235	90.7	−2.38	.0181
Comprehensive diabetes care – cholesterol-C <100 mg/dL	147	41.1	46	41.9	233	39.9	−1.78	.0755
Cholesterol management - cholesterol-C screening	125	80.4	44	83.7	209	81.3	−2.53	.0122
Cholesterol management - cholesterol-C <100 mg/dL	119	48.2	44	53.7	209	50.4	−2.02	.0440

*T-test statistics performed comparing commercial plans in the study and all other health plans reporting HEDIS data.
†Not applicable; persistence of β-blocker therapy is a measure adopted for 2005. Because Medicare plan data were collected in 2004, this measure was not reported for these plans.

Table 4. Reportability of Performance Data: Number of Study Plans Able to Report by Gender*

Measure Name	Commercial Plans in Gender Study			Medicare Plans		
	Overall *N*	Male *n* (%)	Female *n* (%)	Overall *N*	Male *n* (%)	Female *n* (%)
β-Blocker after heart attack	44	19 (43.2)	17 (38.6)	103	92 (89.3)	84 (81.6)
Persistence of β-blocker†	37	13 (35.1)	13 (35.1)	NA	NA	NA
Controlling high blood pressure	46	45 (97.8)	45 (97.8)	141	140 (99.3)	141 (100)
Comprehensive diabetes care						
Lipid screening	46	46 (100)	46 (100)	148	147 (99.3)	148 (100)
Cholesterol-C <100 mg/dL	46	46 (100)	46 (100)	147	146 (99.3)	147 (100)
Cholesterol management						
Lipid screening	44	36 (81.8)	36 (81.8)	125	114 (91.2)	99 (79.2)
Cholesterol-C <100 mg/dL	44	35 (79.5)	35 (79.5)	119	109 (91.6)	94 (79.0)

*This table reports the number of health plans that met the N=30 denominator criterion, by gender and measure. Reportability is determined by the plan's ability to report HEDIS performance rates for at least 30 females and 30 males. Therefore, plans that can report on rates for either males or females but not both were excluded from the sample for subsequent analyses.
†Persistence of β-blocker therapy is a measure adopted for 2005. Because Medicare plan data were collected in 2004, this measure was not reported for these plans and therefore they are marked not applicable (NA).

the same plan was statistically significantly different for 2 measures among commercial plans and for 5 measures among Medicare plans based on the paired *t*-tests (Table 5). Differences for cholesterol control were the largest. For the cholesterol control at <100 mg/dL measure, the mean health plan performance rate for men exceeded that for women by 5.6% in the commercially insured population with diabetes (44.4% for men vs. 38.8% for women). This disparity in cholesterol control is even greater for those with recent acute cardiac events, where performance was better for men than for women on average by 9.3%. Among Medicare plans, the mean differences in performance rates for men on the cholesterol control measure were 6.4% among diabetics and 8.5% among those with a recent cardiac event.

To examine the range of disparities, we calculated disparity scores by subtracting the performance rates for women from those for men within each health plan. There was a large range of disparities within our sample of commercial and Medicare plans. For example, in the commercial plan sample, the disparity scores ranged from 3.4% in favor of women to 31.8% favoring men for the cholesterol control at <100 mg/dL control measure among those who had a recent acute cardiac event. We tabulated the number of health plans that had a disparity ≥5% favoring either men or women, because scores above the ≥5% threshold are less likely to be attributed to noise and may also translate into a large number of covered lives for these plans. In Table 6, we found that only a few plans had a disparity ≥5% in either direction for

Table 5. Gender Stratified Performance Rates for CVD for Commercial and Medicare Plans

	Commercial Plans in Gender Study						Medicare Plans					
	Performance Rates			Test of Difference Between Male and Female Rate			Performance Rates			Test of Difference Between Male and Female Rate		
	N	Overall (%)	Male (%)	Female (%)	*t*	Pr > |*t*|	N	Overall (%)	Male (%)	Female (%)	*t*	Pr > |*t*|
β-Blocker after heart attack	17	97.4	95.4	93.1	1.79	0.0916	84	92.4	92.5	92.4	0.23	0.8185
Persistence of β-blocker*	13	69.0	70.8	70.1	0.33	0.7496	NA	NA	NA	NA	NA	NA
Controlling high blood pressure	45	69.2	69.0	69.2	-0.28	0.7814	140	61.1	63.2	59.7	7.68	<.0001
Comprehensive diabetes care - cholesterol-C screening	46	92.4	92.9	91.7	2.70	0.7496	147	91.4	90.9	91.8	-2.72	0.0072
Comprehensive diabetes care - cholesterol-C <100 mg/dL	46	41.9	44.4	38.8	8.14	<.0001	146	41.2	44.4	38.0	13.22	<.0001
Cholesterol management - cholesterol-C screening	36	83.7	84.2	81.6	2.82	0.0079	99	80.5	81.1	79.5	3.03	0.0032
Cholesterol management - cholesterol-C <100 mg/dL	35	53.7	56.4	47.1	6.38	<.0001	94	49.1	52.1	43.6	11.77	<.0001

*Persistence of β-blocker therapy is a measure adopted for 2005. Because Medicare plan data were collected in 2004, this measure was not reported for these plans and therefore they are marked not applicable (NA).

Table 6. Gender Differences in Cardiovascular Disease Care in Commercial and Medicare Plans

	Commercial Plans			Medicare Plans		
		No. of Plans With Difference in Performance at ±5%, *n* (%)			No. of Plans With Difference in Performance at ±5%, *n* (%)	
Measures	No. of Plans	In Favor of Women*	In Favor of Men†	No. of Plans	In Favor of Women*	In Favor of Men†
β-Blocker after heart attack	17	0 (0)	4 (23.5)	84	8 (9.5)	9 (10.7)
Persistence of β-blocker‡	13	2 (15.4)	4 (30.8)	NA	NA	NA
Controlling high blood pressure	45	9 (20.0)	8 (17.8)	140	7 (5.0)	54 (38.6)
Comprehensive diabetes care - cholesterol-C screening	46	1 (2.2)	2 (4.3)	147	23 (15.6)	5 (3.4)
Comprehensive diabetes care - cholesterol-C <100 mg/dL	46	0 (0)	25 (54.3)	146	3 (2.1)	89 (61.0)
Cholesterol management - cholesterol-C screening	36	3 (8.3)	9 (25.0)	99	10 (10.2)	22 (22.2)
Cholesterol management - cholesterol-C <100 mg/dL	35	0 (0)	22 (62.9)	94	3 (3.2)	68 (72.3)

*Disparity in favor of women with a difference in score ≤−5%.
†Disparity in favor of men with a difference in score ≥5%.
‡Persistence of β-blocker therapy is a measure adopted for 2005. Because Medicare plan data were collected in 2004, this measure was not reported for these plans and therefore they are marked not applicable (NA).

β-blocker treatment measures for both commercial and Medicare plans. Again, the greatest disparities were observed in the cholesterol control at <100 mg/dL measures in both commercial and Medicare plans. In commercial plans, more than half of the plans reporting gender-stratified cholesterol control measures for members with diabetes (54.3%) and recent acute cardiac events (62.9%) showed a disparity of ≥5% in favor of men whereas no plan showed such a disparity in favor of women. Among Medicare plans, 61% exhibited a disparity of ≥5% in cholesterol control favoring men for those with diabetes, and 72.3% of the plans showed the same disparity favoring men for those with a recent acute cardiac event.

Although not presented in these tables, gender disparities in care did not appear to vary by plan characteristics such as region, model type, profit status, or HEDIS performance. For example, the number of Medicare plans showing a 5% difference for cholesterol control favoring men with recent acute cardiac events was comparable across regions, ranging from 64% in the Midwest and West to 73% in the Northeast, to 84.6% in the South. Finally, the amount of gender disparity was not consistently related to overall (aggregate) health plan performance on the CVD-related HEDIS measures.

Health Plan Key Informant Interviews

Plans that participated in key informant interviews included those with and without gender disparities in cholesterol management (as well as other CVD indicators) and represented diverse model types and regions (Table 7). All had ongoing disease management programs focused on diabetes and heart disease.

We found generally low awareness of gender disparities among health plan representatives who were responsible for reporting HEDIS data and coordinating quality improvement activities. Disparities were perceived to be predominantly an issue for racial/ethnic minority populations, not a gender issue. Despite knowledge among some health plan representatives of the literature on gender disparities, only 1 health plan interviewed had implemented quality improvement activities to educate women about heart disease risk factors and disseminate information to providers who manage women with CVD (this plan did not have a disparity in cholesterol control).

Health plan staff suggested several organizational factors that might contribute to the presence/absence of gender disparities in CVD care: 1) the presence of either a physician champion who focused on the management of all persons with chronic conditions or a female physician champion who directed organizational and providers' attention on women with CVD; 2) a systematic and institutionalized quality reporting processes; and 3) the implementation of provider pay-for-performance incentives and reporting, especially with measures and incentives for cardiovascular care and control. Health plans commonly offered providers performance feedback and patient panel lists, and 3 plans have adopted or planned to provide financial incentives to providers for meeting cardiovascular care quality performance measures. Key informants from plans reported that providers appeared to be more attentive to performance feedback reports because of the planned implementation of pay-for-performance incentives, rather than the amount of actual payouts. Nevertheless, they felt it was difficult

Table 7. Description of Plans Participating in Key Informant Interviews

	Plans Participating in Informant Interviews (n = 8)	
	n	%
Descriptive characteristics		
Profit Status		
Not for profit	6	75.0
For profit	2	25.0
Health plan model		
Staff/group model	3	37.5
IPA/network	3	37.5
Mixed model	2	25.0
Regions of plan location		
Midwest	3	37.5
Northeast	1	12.5
South	2	25.0
West	2	25.0
CVD care gender disparities performance		
Gender disparities of ≥5% in cholesterol control measures		
Persons with diabetes	4	50.0
Persons with acute cardiac events	4	50.0
Efforts in improving CVD care		
Disease management program (in-house or through vendor)		
CVD	8	100.0
Diabetes	8	100.0
Gender-focused quality improvement or disease management		
CVD	1	12.5
Diabetes	0	0.0
Programs to improve provider performance		
Physician profiling	6	75.0
Feedback (i.e., noncompliant patient lists)	7	87.5
Financial performance incentives	3	37.5

Abbreviations: CVD, cardiovascular disease; IPA, independent practice association (see text for explanations of region and model type).

to tell whether these events had an impact on performance during the period of the study.

None of the health plans interviewed systematically reviews or monitors quality indicators by gender. Key informants indicated they have limited interest in incorporating gender-focused activities and analyses into internal reporting mechanisms. Among the 8 plans, 2 showed no interest in future gender analyses because of the lack of disparities found among the plan's enrollee population. Other plans indicated the need to conserve resources for improving the plan's overall HEDIS performance. Two plans expressed interest in repeating the gender analyses with more recent data, but also were not committed to routine reporting by gender. All of the plans appeared reluctant to adopt internal reporting of quality indicators by patient characteristics such as gender or race/ethnicity, indicating this may lead to "information overload" within the organization; they already compile extensive reports focusing on providers and markets. If required, plans indicated a preference for periodic reports in lieu of annual gender analyses, which may be more informative for identifying potential areas with disparities. At the time of the interviews, only 1 plan representative shared the results with senior leadership, but 6 plan representatives expressed willingness to share findings with the plan's quality improvement team and providers for interpretation and potential action.

Discussion

Gender-stratified reporting of HEDIS CVD performance measures demonstrates that there are substantive disparities in care, in favor of men, within both commercial and Medicare managed care health plans. Moreover, the presence of gender disparities in both commercial and Medicare samples underscores the fact that disparities were observed regardless of age of enrollees in managed care. These findings support the case for gender-stratified reporting of CVD-related quality measures that may provide an opportunity for targeting quality improvement.

In our analysis, the largest disparities were found in cholesterol control, both for patients who had recent acute cardiac events and diabetes mellitus, whereas most process-of-care measures such as screening rates showed small or no gender disparities at the health plan level. Among those with recent cardiac events, 63% of commercial plans and 72% of Medicare plans had a disparity ≥5% in favor of men, with 1 commercial plan showing a 32% disparity in cholesterol control between men and women. These results are consistent with previous studies that demonstrated gender disparities in cardiovascular care based on patient-level analyses controlling for age, gender, race/ethnicity, socioeconomic status, and the clustering of patients within health plans (Chou et al., 2007; Mosca et al., 2005). Even so, these findings are particularly troubling as the overall plan rates for cholesterol control—an intermediate outcome for CVD—were generally low among all commercial and Medicare plan enrollees, in addition to the large gender disparities.

Eliminating gender disparities in selected CVD quality of care measures has the potential to improve the lives of patients enrolled in managed care plans across the United States. Based on the quality gap calculation methodology from NCQA's *State of Health Care* (2005b) report, we estimated that by improving

the performance on cholesterol control measures for women with diabetes enrolled in commercial and Medicare plans by the extent of the gender disparities observed in this study (5.6% and 6.4%, respectively), a total of 1,197–5,811 lives could be saved by preventing morbidity and mortality from cardiovascular-related conditions (LaRosa, He, & Vuppurturi, 1999; NCQA, 2005b). Furthermore, by ameliorating these gender quality gaps, 4,785–10,170 major cardiac events including death may be avoided, achieving an estimated savings of $78,033,458 in sick days and productivity costs. Actual improvement of outcomes and costs may be even greater, as the quality gap analyses are conservative estimates that do not account for other comorbidities (NCQA, 2005b).

This study also demonstrated that most health plans are able to report gender-stratified CVD performance data under the current HEDIS sampling procedures. Gender-stratified reporting for β-blocker measures is understandably limited because eligibility is focused on patients who had a heart attack during the measurement period. About one half of commercial plans did not have the minimum of 30 eligible females required under NCQA's rules for reporting a valid measure rate. About one fifth of commercial plans were unable to obtain stable estimates for gender-stratified rates for the cholesterol management population; however, this problem should be reduced by new specifications that expand the eligible population from persons with a recent cardiac event to persons with a history of any CVD diagnosis including stroke.

This study is important because it represents one of the first opportunities to use national data on commercial and Medicare plans to examine gender disparities at the health plan level. We not only focused on whether disparities existed at the plan level among insured persons, but also explored the extent to which gender disparities in quality of CVD care varied across health plans. However, several limitations should be noted. Although the results are consistent with research conducted at the patient level (which controlled for patient-level characteristics, such as age, race/ethnicity, and other factors), we present only unadjusted rates at the health plan level. Our study did not control for age, in part because the separate reporting of Medicare and commercial data takes age into account (on average, $<$10% of commercial enrollees were $\geq$65 years of age, whereas on average $>$88% of Medicare enrollees were $\geq$65 years old). Performance data stratified by age and gender were not sought from commercial plans because of the additional burden it would have created for health plans participating in the study. Only about 20% of commercial plans participated, and these plans tended to be larger and higher performing than nonparticipants, although performance does not appear to be related to disparities. Nevertheless, the commercial plan results were consistent with those from Medicare, which included all Medicare plans with valid data. We also had limited data for the key informant interviews. Only 8 health plans participated in the key informant interviews; although these plans may not be representative of all plans, they do represent a diversity of regions, plan characteristics, and experience with disparities. Moreover, HEDIS indicators do not have gender-specific components in its measurement, where the goal is to measure quality for all eligible individuals and therefore not specifically designed to address gender disparities. The lack of provider- or patient-level data on utilization also meant that we were unable to differentiate between clinical inertia and patient adherence in rendering a more complete explanation of the observed disparities in quality.

The lack of association between higher overall performance and the absence of gender disparities in care suggests that general efforts to improve the quality of care without attention to gender issues are likely to be insufficient in eliminating the observed disparities. Reducing gender disparities in CVD will require multilevel interventions, involving patients, providers, and health plans. Awareness of CVD-related gender disparities in care could be promoted among various groups of patients. Educating women about appropriate CVD care is needed to empower women to be informed and proactive patients in seeking care. For physicians, it is important to provide the evidence, raise awareness of the gender disparity issue, and seek their active involvement in eliminating the gender gap at the practice level. We need to understand what accounts for differences at the provider level (e.g., biases, specialty differences, referral patterns) and how providers may benefit from more training to further reduce gender disparities in practice. Health plans can use gender-stratified data to target interventions and share results with providers and patients/enrollees. They may use this information to elicit suggestions to improve clinical management or barriers to accessing care, including medications or other support, and increase the potential for gender-tailored interventions that encourage women to seek CVD care appropriately. Furthermore, at the plan management level, the lack of awareness of gender disparities as an issue in quality of care speaks to the need for targeted efforts to raise awareness among administrators and clinicians as well as patients.

Monitoring gender disparities may offer an avenue for targeting populations and identifying optimal strategies to deliver quality care to both women and men. However, health plan staff who participated in our key informant interviews indicated that it is unlikely that their organization will voluntarily adopt the practice of gender-stratified data reporting in the near future, given competing organizational demands and interests. Purchasers, federal

and state governments, and accrediting organizations should consider providing incentives to health plans to achieve high performance on HEDIS measures or to monitor quality measures stratified by gender. Public reporting of HEDIS measures by gender may draw public attention, and therefore organizational attention to gender disparities in quality. This may be coupled with information to support the business imperative to increase a plan's overall HEDIS performance, such as demonstrating how reducing disparities impacts the overall measure performance for the plan. To do so, health plans will need support related to methodologies for reporting and subanalyses that are consistent with operational reporting needs.

These steps will help to raise public awareness of the importance of effectively managing heart disease in women and of differences in the quality of care received by insured women and men within the same health plans. Additional and continued research is needed to identify best practices in health plans, health care delivery, and clinical management that are effective in reducing or preventing gender disparities, including how to achieve national engagement of patients and communities in raising awareness of women's risk for heart disease.

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