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IMPROVING WOMEN'S QUALITY OF CARE FOR CARDIOVASCULAR DISEASE AND DIABETES: THE FEASIBILITY AND DESIRABILITY OF STRATIFIED REPORTING OF OBJECTIVE PERFORMANCE MEASURES

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Despite growing recognition of significant morbidity and mortality among women from cardiovascular disease, management of primary and secondary cardiac risk factors continues to be suboptimal for many women. Although there is a good deal of room to improve the care for cardiovascular disease and diabetes in men, existing gender differences in performance suggest much can be gained by specifically assessing and monitoring quality of care for these conditions in women. In this paper, we describe recent work showing gender differences in quality of ambulatory care in managed care plans with some plans having substantial gender differences on widely used measures of the quality of primary and secondary prevention of cardiac disease. We then discuss potential benefits of and barriers to routine reporting of objective measures of the quality of care, such as Health Plan Employer Data and Information Set (HEDIS) measures, by health plans.

Keywords: **Cardiovascular disease, Gender, Hedis, Managed care, Quality of care, Primary care**

Introduction

Cardiovascular disease (CVD) is the leading cause of death and a major cause of disability for women. In 2000, CVD was responsible for more than 500,000 deaths among American women.[1] Moreover among individuals with cardiovascular disease, women have higher rates of mortality than do men.[2] Gender differences in care appear to play a role. Numerous studies have shown that women are less likely to undergo diagnostic and therapeutic cardiac procedures.[3,4] Growing awareness of gender differences in the risk factors, age at onset, and health outcomes for CVD may have narrowed the gender gap in quality of care for the diagnosis and management of acute myocardial infarction in acute care settings, and resulted in improved outcomes.[4,5] However, relatively little is known about gender differences in management of primary and secondary cardiovascular risk factors. Several studies have shown that underuse of effective primary and secondary prevention interventions in women that can reduce both morbidity and mortality is a significant quality problem.[6–8] For example, one recent study found that after an acute cardiac event, only 33% of women who required beta-blockers and 50% who required lipid-lowering medications were using them.[7]

Further reduction of morbidity and mortality from cardiovascular disease in women depends upon improved quality of care for management of CVD and its risk factors in ambulatory practice. For example, hypertension and diabetes, two important risk factors for CVD are often suboptimally managed in practice.[9–12] Because the prevalence of hypertension increases with age and women live longer than men, hypertension is

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Table 1. HEDIS measures

	Summary Definition of Compliance[a]
Beta-blocker after myocardial infarction	Ambulatory prescription for a beta-blocker within 7 days of hospital discharge for acute myocardial infarction.
Low-density lipids screening after cardiac event	Check of low-density lipids within 60 to 365 days after hospital discharge for the following acute cardiovascular events: acute myocardial infarction, percutaneous transluminal coronary angioplasty, or coronary artery bypass graft.
Hemoglobin A1c check in diabetics	One or more glycosolated hemoglobin (hemoglobin A1c) test conducted during year for continuously enrolled diabetics.
Low-density lipids screening in diabetics	At least one low-density lipids test done during the measurement year or the year prior for all continuously enrolled diabetics.
Eye examination in diabetics	Eye screening examination for diabetic retinal disease during year for continuously enrolled diabetics.
Nephropathy check in diabetics	A documented test screening for nephropathy during the measurement year for all continuously enrolled diabetics.
Low-density lipids controlled after cardiac event	A low-density lipids level of <130 mg/dL on or between 60 and 365 days after hospital discharge for an acute cardiovascular event.
Blood pressure controlled in hypertensives	Systolic blood pressure <140 mm Hg *and* diastolic blood pressure <90 mm Hg for enrollees with documented hypertension in first half of the measurement year.
Hemoglobin A1c controlled in diabetics	The most recent documented hemoglobin A1c level less than 9.5% during year for continuously enrolled diabetics.
Lipids controlled in diabetics	The most recent check for low-density lipids taken during measurement year or the year prior is less than 130 mg/dL for continuously enrolled diabetics.

[a]Contraindications not shown. For full details on specifications, see NCQA HEDIS 2000 Technical Specifications Report.[9]

more common in women.[13] In addition, women are more likely than men to have diabetes and the impact of diabetes on the risk of coronary death is greater for women.[14–16]

Measurement, reporting, and benchmarking of quality measures are crucial to improving quality of care in general and reducing gender differences in care in particular. Although such quality measures are widely used in health plans, few plans currently stratify such measures by gender.[17,18]

In this paper, we examine evidence that supports stratifying measures of management of primary and secondary cardiovascular risk factors by gender and discuss potential uses of this stratified data. We also describe challenges to stratifying existing quality measures by gender. Throughout the paper, we place particular emphasis on stratifying measures of cardiovascular quality used as part of the National Committee for Quality Assurance (NCQA) Health Plan Employer Data and Information Set (HEDIS) because these measure are well validated and widely used by health plans. Ten measures relate to cardiovascular disease and diabetes. Participation in the program is voluntary, consequently not all managed care plans are involved, though most of the larger plans participate. We conclude with a discussion of emerging leadership among health plans on this issue.

Gender Differences in the Management of Primary and Secondary Cardiac Risk Factors

Although a number of studies have shown that primary and secondary prevention of CVD in women is often suboptimal,[7,19,20] most of these studies focus exclusively on women rather than directly comparing men's and women's care. A few studies, such as the Corpus Christi Heart Project did compare men's and women's care and have shown that women are less likely to receive critical drugs after myocardial infarction than men.[6] However, to our knowledge, there are few studies[8,21] that have directly examined gender differences in performance on a variety of objective quality measures, such as those included in HEDIS.

In our recent work, we assessed gender differences in rates of performance on 10 HEDIS measures related to cardiovascular disease and diabetes for enrollees in 10 commercial and 9 Medicare plans, representing approximately 2.1 million commercially insured and 200,000 Medicare enrollees.[8,21] As shown in Table 1, the HEDIS measures we considered included screening measures such as lipid checks after an acute cardiac event and eye examinations in diabetics, medical treatment such as beta-blockers after an acute myocardial infarction, and intermediate outcomes such as blood pressure control in hypertensive patients or blood sugar control in diabetics.[9]

The NCQA provides plans with detailed specifications on how performance is calculated and which enrollees are eligible to be considered for specific measures. The performance rate is the percentage of eligible enrollees for whom the performance standard was met. For instance, if 200 of the 400 eligible enrollees in a plan were prescribed a beta-blocker after having had a myocardial infarction during the year considered, the performance rate would be 50% for that measure. For some measures, plans can exclude

enrollees with a specific contraindication when calculating performance rates.

We found small to moderate average gender differences for a number of quality indicators for cardiovascular disease and diabetes among both commercial and Medicare health plan enrollees across the plans studied. For some measures, such as those related to diabetes care, we had sufficient cases to determine whether these gender differences were limited to a few plans or were consistent across all plans. In general, when we identified gender differences in pooled data, the majority of plans also had gender differences in performance. However, for some measures, such as low-density lipoprotein check after an acute cardiac event, plans differed widely in the size and direction of the gender difference in treatment with several plans showing better care for men and others showing better care for women. The net effect was no overall gender difference in the unadjusted pooled analyses. Thus, even for measures on which women were not on average receiving poorer care, some plans provided poorer care for women than for men whereas others provided poorer care for men. Our study did not examine explanations for these differences; however, these differences were not explained by age, race/ethnicity, or socioeconomic status.

Uses of Objective Quality Measures Stratified by Gender

Quality measurement and benchmarking

An important national strategy for improving quality of care has been collecting appropriate data and promoting accountability for quality.[22,23] Measurement, feedback, and reporting are essential components of this strategy. The widely quoted adage, "what gets measured, gets done" is apt here. Measuring and monitoring quality of care by gender can uncover important differences in quality that are masked when only averages are examined. Once observed, such differences can stimulate targeted efforts to improve quality. If these improvements reduce costs associated with preventable events, this can potentially be cost-effective, offsetting the costs of data collection.[24,25]

Better understanding the underlying causes of gender differences in care and what to do about them

Routinely reporting quality measures by gender would not only help identify and monitor differences in care but could also help plans and researchers disentangle factors underlying gender differences in care. For example, differences in care may reflect provider attitudes, gender differences in patient preferences, or unique barriers to certain aspects of care faced by each gender. By more closely comparing the characteristics and practices of enrollees, health care providers, and health plan policies with little or no differences to those with substantial differences, or those in which women appear to receive better care, a great deal could be learned about factors that reduce or promote gender differences across systems of care.

Similarly, instances in which outcomes differ by gender but processes of care appear to be equivalent may reflect important gender differences in behavior or possibly physiology. Because causal factors and effective interventions may vary across settings, the availability of such data will also be crucial to allowing quality improvement teams to identify the specific factors underlying gender differences in health outcomes and plan performance and to initiate appropriate interventions within their respective organizations. Sharing knowledge between provider organizations about best practices for improving quality of care for women can help accelerate progress.

While improvements in quality of cardiovascular care for both men and women are needed, priorities for intervention may vary based on gender differences in quality. Because women have different experiences with care and interactions with the health system, improvement interventions may have variable effectiveness by gender. Stratifying quality indicators by gender would allow plans to specifically evaluate the effectiveness of improvement interventions among women and men.

Stimulating value-based purchasing and informed consumer choice

As reflected in the forthcoming National Quality Report, many policymakers believe that encouraging consumer and employer purchasing on the basis of quality of care will ultimately lead to better quality and lower costs.[24,26] Such information is thought to be most useful to consumers when the information pertains to care received by people like themselves. Thus, reporting measures of care by gender can strengthen both men's and women's ability to rationally choose health care providers. In addition, gender-stratified quality measures can provide important information to inform discussions between consumers groups, providers, health departments, and elected officials to promote accountability for performance and to develop additional programs and policies to improve quality of care and to address existing gender inequalities in health care quality. Similarly, employers and other purchasers can use gender-stratified data to evaluate the quality of care received in return for their premiums.

Challenges to Stratified Reporting of Quality Measures by Gender

When the Jacobs Institute originally commissioned this paper, one of our tasks was to assess the extent to

which health plans were using objective cardiovascular measures, such as HEDIS measures, stratified by gender to improve quality of care for women. Despite contacting a range of key informants including representatives of large managed care plans and industry and academic experts on the use of quality measures, we found no plans that were directly comparing measures of the quality of cardiovascular risk factors management by gender. Interestingly, several plans had considered such stratification but decided not to do so or delayed plans to do so. In this section we consider some of the reasons why plans have not felt it necessary to examine and report quality measures by gender and other challenges to stratified reporting.

Confusion about whether there are meaningful gender disparities

Although few would oppose reducing gender differences in care, per se, there is less consensus that gender differences in quality of care reflect significant disparities, and if so, on the best way to achieve parity, particularly in managed care settings. Monitoring performance on key quality indicators by gender may make sense if disparities: 1) represent "true" disparities rather than artifacts of the way data are collected or analyzed, and 2) are sufficiently large to be clinically meaningful and warrant intervention.

In the case of racial/ethnic disparities, there is some concern that differences in performance may reflect variations across sites in their record keeping rather than variations in the care delivered. However, poorer record keeping is also a quality of care issue. Furthermore, although racial/ethnic groups are often differentially distributed across managed care clinics due to the location of clinics and the level of segregation of neighborhoods, men and women tend to live in the same neighborhoods and be seen at the same clinics. Thus, the common explanations of differential data quality across clinics do not appear likely to explain gender differences in performance.

A central concern is whether gender differences in quality of care in managed care settings are of sufficient magnitude to warrant more extensive assessments of those differences and their underlying causes. The conventional wisdom is that gender differences are unlikely to be large enough to affect clinical outcomes or cost. However, in contrast to research on cardiovascular procedures and outcomes, there is relatively little published research on gender differences in ambulatory cardiovascular care.

Precisely what constitutes a disparity of sufficient magnitude is not entirely clear, nor easily defined. For example, for some performance measures with large denominators, a disparity of two percentage points may be statistically significant, but may not be clinically significant. That is, the impact of this size disparity on outcomes of care may be negligible, and arguably, could easily be attributed to variation in factors that may not have to do with unequal care, per se. HEDIS quality indicators measure the proportion of enrollees who received indicated care.

In recent years, the NCQA has recognized that relatively small improvements in average performance can have an important impact on outcomes in enrolled populations. They argue that small differences in performance extrapolated across all enrollees in a given plan or sponsored by a given employer may translate into hundreds or even thousands more enrollees receiving indicated care.[17] Thus, they contend that such improvements would not only save employers money (e.g., because of decreased disability days or utilization) but also lead to better clinical outcomes (e.g., less morbidity and mortality). For example, an improvement of about four percentage points in average performance rates among plans participating in the NCQA HEDIS program for prescribing beta-blockers after a myocardial infarction translates to 2,000 additional people receiving a beta-blocker. Similarly, an eight percentage point improvement in the cholesterol control measure for cardiac patients translates into an additional 7,200 additional people having their cholesterol effectively controlled and an estimated 250 lives saved.[17]

Methodological considerations

NCQA's HEDIS measures are widely used and well-accepted measures of quality in managed care settings. They are designed and used to assess overall performance within and between health plans to target and monitor areas of improvement. A key criterion the NCQA uses when choosing measures to be included in HEDIS is whether there are likely to be sufficient cases meeting inclusion/exclusion criteria within the average sized health plan to detect a 10 percentage point difference between plans with 80% power. Plans must use data on all eligible enrollees when calculating quality measure based on administrative data. However, to minimize burden on plans, for some measures the NCQA only requires participating plans to collect a data from a sample (411 cases) of eligible enrollees. Though this sample size was selected to allow comparisons of performance rates between plans, the number of cases does not provide sufficient statistical power to compare performance between subgroups, such as men and women. The small denominator problem is not limited to HEDIS measures that combine administrative and chart data (i.e., "hybrid measures") but also can occur for measures that plans can compute solely from administrative data. For example, though there were nearly 200,000 enrollees in the nine Medicare plans we considered in our study,[8,21] when we applied HEDIS specifications, we found that a total of only 179 men and 118 women were eligible for the beta-blocker after

myocardial infarction measure because of low prevalence and exclusions. In contrast, in the same population over 7,000 men and 8,000 women were eligible for diabetes screening measures (e.g., annual hemoglobin A1c check). Thus, even if health plans are committed to stratifying quality measures by gender, they will need to be selective in which measures to stratify for plan-level comparisons.

A related consideration is at which level—individual plan vs. across all plans in a managed care organization—should quality measures be stratified. In general, given small denominator sizes on many current HEDIS cardiovascular quality measures, pooling data from multiple plans may be the most practical way to assess whether gender differences are present or not. Nevertheless, there are inherent limitations in the pooled approach that need to be acknowledged.

The average difference estimated across plans may obscure considerable variation in performance between plans.[21] For example, among commercial enrollees an average of 73.6% of men and 63.8% of women without a contraindication were prescribed a beta-blocker after having had a myocardial infarction, a 9.7 percentage point difference.[22] However, among the three plans with statistically significant gender differences, all favored men (ranging from an advantage of 23.4 to 40.0 percentage points).

That said, for many measures smaller gender differences were significant and consistent across plans. For example, among commercial enrollees with diabetes, on average 63.2% of men and 58.8% of women received a lipid profile, for an average gender difference of 4.3 percentage points. Within plans, the differences ranged from no significant difference in four plans up to a 6.2 percentage point difference favoring men.

Only in the case of an annual eye exam among diabetics did the performance for women in some plans significantly exceed that for men. Among commercial enrollees on average 33.7% of men and 38.8% of women with diabetes received eye exams. Among the eight plans with a statistically significant difference, all favored women; the largest difference was 8.3 percentage points. It is worth noting that this represents relatively poor performance for both men and women. That performance on some measures or in some plans would favor men is not surprising given that most studies have found that women have more frequent primary care visits than men and consequently more opportunities for primary and secondary prevention. Thus, one might expect higher performance scores for women than men to be a more common finding.

Unless pooled estimates take individual plans' performance levels into account, such as through adjusting for plan effects, overall gender differences might be attributable to a disproportionate share of women receiving their care from plans with particularly poor overall performance. However, this explanation was not supported in our adjusted pooled or unadjusted within-plan and between-plan analyses.

A final consideration has to do with the usefulness of documenting gender differences at a pooled or plan level for efforts to reduce such differences in quality of care. Although pooling data across plans allows for more reliable estimates of gender differences and can help provide evidence that disparities exist within a given system of care, it is not at all clear that differences observed at that level would provide health care providers or health plans with sufficient information to identify and implement effective interventions to reduce differences. Consequently, within-plan gender comparisons may be more compelling and useful to plans. However, most plans are made up of many separate clinics and provider groups and even plan-level data may be at too high a level for the purposes of monitoring quality and quality improvement. Indeed, it is these sorts of dilemmas that are leading the NCQA to consider gender and race/ethnicity stratified reporting of data pooled across plans and to place greater emphases on quality reporting at the provider group level.

Potential burden on plans

In contrast to the formidable issues facing plans considering stratifying quality measure by race/ethnicity, the potential burdens created by stratifying performance measures by gender seem relatively minor. Consider, for example, that unlike the situation with gender, few plans currently maintain information on enrollee race/ethnicity as there are significant concerns about violation of patient privacy and misuse of racial/ethnic data by plans, and the number of enrollees in a given minority subgroup is generally far fewer than the number of women in a given plan. Nevertheless, reporting quality measures by gender can still impose some burdens on plans.

Perhaps the main potential burden is cost due to the increased sample size required. Even though data on enrollee gender is readily available, there can be significant additional costs associated with collecting, analyzing, and reporting measures of cardiac care and performance stratified by gender, particularly when measures requiring abstraction of chart data are examined. Given that most health plans are already investing substantial time and resources to configuring their data systems to meet NCQA and now Health Insurance Portability and Accountability Act (HIPAA) requirements, plans will want to assess the business case for stratifying quality measures by gender. Another concern plans face is what to do if gender differences are observed. From the plans' perspective, the old adage "if it ain't broke, don't fix it" may be appropriate here if they attribute observed differences to factors that may not reflect inappropriate differ-

ences in care. However, this is hard to argue for widely accepted, well-validated performance measures such as HEDIS. Finally, plans may be understandably cautious about how performance measures reported separately by gender will be interpreted and used by patients, payers, and even policymakers. A related concern is that documenting differences may place plans at risk for litigation in cases where outcomes are poor.

NCQA Perspective

Currently, the NCQA neither encourages nor requires plans to stratify HEDIS performance measures like the cardiovascular measures by gender. A recent NCQA initiative intended to promote quality improvement efforts by showcasing examples of innovative quality improvement efforts is illustrative of current policy.[27] The cases include examples of initiatives to improve care for chronic illness, none of which target gender, racial, socioeconomic, or other subgroups. All of the examples of initiatives to improve care of women's health care focus on illnesses or conditions that are either exclusively or predominantly applicable to women such as pregnancy management, and cervical and breast cancer screening.

More recently, however, the NCQA Women's Health Measurement Advisory Panel raised the issue and called for research comparing men's and women's care on HEDIS measures regarding conditions highly prevalent in both genders to determine whether women are in fact receiving differential or suboptimal care and to assess the need for gender-stratified reporting.[28] How this recommendation will reflect on future measure development is not yet apparent.

Innovative Examples

We identified examples of innovative use of quality of care data to improve women's health care by contacting a range of key informants, including representatives of large managed care plans and industry and academic experts on the use of quality measures. Although we did not find any plans that were directly comparing objective quality measures by gender, several plans are working on addressing this issue and we did find a couple of examples worth noting. PacifiCare, based in California, recently began calculating performance on various quality measures, including several related to cardiovascular care, separately by gender. However, the data were used to prepare gender-specific reports of quality of care, rather than to compare men's and women's quality of care or to develop a quality improvement program aimed at women's care. In other words, the report on the quality of women's health only included performance scores for women enrollees in each plan. The other intriguing example comes from Cigna, which rather than stratifying existing quality measures has hired an expert consultant to develop gender-specific quality measures possibly with different parameters for men and women. Their intent is to ensure that quality measures are meaningful and reflect appropriate care for men and women and are based on the latest evidence showing differences in risk factors and physiology by gender.

Conclusion

Monitoring and reporting of objective measures of the quality of management of primary and secondary cardiac risk factors is essential to further reducing morbidity and mortality due to cardiovascular disease. Use of such measures, including HEDIS measures, has shown that though primary and secondary care of cardiovascular disease in managed care is often suboptimal, performance generally improves with continued monitoring and reporting. Health plans currently monitor overall performance for men and women combined but do not stratify performance measures by gender.

Recent research suggests that this type of unstratified reporting may obscure important differences in the quality of primary and secondary prevention of cardiovascular disease for men and women. In our own work, for example, we found significant gender differences, typically favoring men, on a variety of measures. Though these differences were not as large as those typically seen when average racial/ethnic or socioeconomic status (SES) disparities across plans are considered, their potential impact was still substantial given the larger number of women affected overall. In addition, for some measures there was considerable variation between plans in the size of gender differences and in some cases the gender difference was substantial. Such differences not only represent important targets for quality improvement efforts in general but also could provide insight into the factors that reduce or promote gender differences within and across plans. This information is needed to develop effective interventions to improve women's quality of care, and the findings may be useful to improving care in other subgroups.

Despite the potential insights and benefits that can be derived from stratifying quality measures by gender, our inquiries suggest that few if any plans currently stratify measures of management of cardiovascular risk factors. Although plan burden for stratifying administrative measures is minimal, there are a variety of concerns regarding routinely stratifying HEDIS, or other similar measures by gender that need to be acknowledged and addressed. These include lack of

sufficient evidence regarding the extent and magnitude of gender difference in care, methodological limitations of current HEDIS measures that make stratifying some measures by gender impractical due to small sample sizes, and potential costs associated with analyzing, reporting, and acting on identified differences in a time of scare resources and increasing demands on plans for accountability in many aspects of care.

Though hardly insurmountable, these challenges can best be addressed through a concerted effort. For example, it would be reasonable to encourage stratified reporting of selected measures such as a lipid check among diabetics which can be calculated solely from administrative data and generally have sufficient cases for subgroup comparisons. Furthermore, if the differences in measures requiring hybrid data are large enough, those comparisons should be made as well. Guidance from the NCQA about appropriate levels of analyses or possible ways to increase sample size for the purposes of analyzing performance between gender subgroups would also be helpful. Employers and consumers can also exert considerable influence by insisting that they be provided with quality reports that allow them to compare care on key measures for men and women whenever possible, and in turn rewarding plans that provide such data and demonstrate good quality with their business. Policymakers can fund additional research both to expand the body of evidence on gender differences in primary and secondary prevention of cardiovascular disease and also to identify underlying causes and effective interventions. Along these lines, more work is needed to assess the contribution of race/ethnicity and SES to observe differences, because the impact of these factors may vary by gender and a focus on gender alone will not fully address the factors that lead to suboptimal care for poor and minority women and men. Finally, plans can begin to examine selected cardiovascular quality measures by gender and begin targeting quality improvement efforts accordingly. The insights gained from such efforts can not only serve to identify best practices to guide efforts of other plans, but also help inform activities by accrediting bodies, providers, purchasers, and policymakers.

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References

[1] American Heart Association. Heart disease and stroke statistics–2003 update. Dallas: American Heart Association; 2002.

[2] Rogers V, Jacobsen SJ, Pellikka PA, Miller TD, Bailey KR, Gersh BJ. Gender differences in use of stress testing and coronary heart disease mortality: a population-based study in Olmsted County, Minnesota. J Am Coll Cardiol 1998;32:345–352.

[3] Rathore SS, Berger AK, Weinfurt KP, et al. Race, sex, poverty, and the medical treatment of acute myocardial infarction in the elderly. Circulation 2000;102:642–648.

[4] Canto JG, Allison JJ, Kiefe CI, et al. Relation of race and sex to the use of reperfusion therapy in Medicare beneficiaries with acute myocardial infarction. N Engl J Med 2000;342:1095–1100.

[5] Gan SC, Beaver SK, Houck PM, MacLehose RF, Lawson HW, Chan L. Treatment of acute myocardial infarction and 30-day mortality among women and men. N Engl J Med 2000;343:8–15.

[6] Herholz H, Goff DC, Ramsey DJ, et al. Women and Mexican-Americans receive fewer cardiovascular drugs following myocardial infarction than men and non-Hispanic whites: the Corpus Christi Heart Project, 1988–1990. J Clin Epidemiol 1996;49:279–287.

[7] Vittinogh E, Shlipak MG, Varosy PD, et al, for the Heart and Estrogen/progestin Replacement Study Research Group. Risk factors and secondary prevention in women with heart disease: the Heart and Estrogen/progestin Replacement Study. Ann Intern Med 2003;138:81–89.

[8] Bird CE, Fremont AM, Bierman AS et al. Gender differences in the quality of care for cardiovascular disease and diabetes in managed care. Submitted.

[9] HEDIS (Health Plan Employer Data and Information Set). National Committee for Quality Assurance (NCQA). Measuring the quality of America's Health Care, Item # 10235-100-00, HEDIS 2000: Technical Specifications, Washington, DC; 1999.

[10] Berlowitz DR, Ash AS, Hickey EC, et al. Inadequate management of blood pressure in a hypertensive population. N Engl J Med 1998;339:1957–1963.

[11] Hyman DJ, Pavlik VN. Characteristics of patients with uncontrolled hypertension in the United States. N Engl J Med 2001;345:479–486.

[12] Committee on Quality of Health Care in America, Institute of Medicine. Crossing the quality chasm: a new health system for the 21st century. Washington, DC: National Academy Press; 2001.

[13] Komaroff A, Robb-Nicholson C, Woo B. Women's health. In: Fauci AS, Braunwald E, Isselbacher KJ, et al, editors. Harrison's principles of internal medicine. New York: McGraw-Hill; 1998: 21–24.

[14] Lee WL, Cheung AM, Cape D, Zinman B. Impact of diabetes on coronary artery disease in women and men: a meta-analysis of prospective studies. Diabetes Care 2000;23:962–968.

[15] Liao Y, Cooper RS, Ghali JK, Lansky D, Cao G, Lee J. Sex differences in the impact of coexistent diabetes on survival in patients with coronary heart disease. Diabetes Care 1993;16: 708–713.

[16] Mosca L, Manson JE, Sutherland SE, Langer RD, Manolio T, Barrett-Connor E. Cardiovascular disease in women: a statement for healthcare professionals from the American Heart Association. Circulation 1997;96:2468–2482.

[17] National Committee for Quality Assurance (NCQA). State of managed care quality report. Washington, DC: NCQA; 2001.

[18] Kiefe CI, Allison JJ, Williams OD, Person SD, Weaver MT, Weissman NW. Improving quality improvement using achievable benchmarks for physician feedback: a randomized controlled trial. JAMA 2001;285:2871–2879.

[19] Schrott HG, Bittner V, Vittinghoff E, Herrington DM, Hulley S. Adherence to National Cholesterol Education Program treat-

ment goals in postmenopausal women with heart disease: the Heart and Estrogen/progestin Replacement Study (HERS). The HERS Research Group. JAMA 1997;277:1281–1286.

[20] Herrington DM, Fong J, Sempos CT, et al. Comparison of the Heart and Estrogen/progestin Replacement Study (HERS) cohort with women with coronary disease from the National Health and Nutrition Examination Survey III (NHANES III). Am Heart J 1998;136:115–124.

[21] Fremont AM, Wickstrom S, Bird CE, et al. Socioeconomic, racial/ethnic, and gender differences in quality and outcomes of care as it relates to cardiovascular disease. Santa Monica: RAND; 2002.

[22] Institute of Medicine. Crossing the quality chasm: a new health system for the 21st century/Committee on Quality Health Care in America. Washington, DC: National Academy Press for Institute of Medicine; 2001.

[23] Berwick D. 2020 visions: Knowledge always on call. Modern Healthcare 1999;29(Suppl 39):2–4.

[24] Institute of Medicine. Envisioning the National Health Care Quality Report. Washington, DC: National Academy Press; 2001.

[25] Fiscella K, Franks P, Gold MR, Clancy CM. Inequality in quality: addressing socioeconomic, racial, and ethnic disparities in healthcare. JAMA 2000;283:2579–2584.

[26] Galvin RS, McGlynn EA. Using performance measurement to drive improvement: a roadmap for change. Medical Care 2003;41(Suppl):148–160.

[27] National Commission of Quality Assurance (NCQA). Quality profiles: in pursuit of excellence in quality of care. Washington, DC: NCQA; 1999.

[28] McKinley E, Thompson JW, Briefer-French J, Wilcox LS, Weisman CS, Andrews WC. Performance indicators in women's health: incorporating women's health in the Health Plan Employer Data and Information Set (HEDIS). Women's Health Issues 2002;12:46–58.