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REPORT

# Mapping Gender Differences in Cardiovascular Disease and Diabetes Care

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A Pilot Assessment of LDL Cholesterol Testing Rates in a California Health Plan

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Sponsored by the Barbra Streisand Women's Heart Center at Cedars Sinai Heart Institute



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## Summary

### Why Examine Gender Differences in Routine Care for Cardiovascular Disease and Diabetes?

Cardiovascular disease (CVD) and diabetes contribute significantly to the burden of disease among U.S. women and men. CVD includes both heart disease and other vascular diseases, such as those involving blockages of blood vessels outside the heart. CVD is the leading cause of death for women, as well as for men. When heart disease and stroke are counted separately, heart disease remains the leading cause of death among women, cancer is second, and stroke is third (Centers for Disease Control and Prevention, 2010). More than one in three adult women has some form of CVD (American Heart Association and American Stroke Association, 2013), and, despite typically having later onset of CVD, women spend more years living with CVD than do men (American Heart Association Statistics Committee and Stroke Statistics, 2012). Since 1984, more U.S. women than men have died of CVD (American Heart Association and American Stroke Association, 2013); 26 percent of women over age 45 die within a year of having a recognized heart attack, compared with 19 percent of men (American Heart Association Statistics Committee and Stroke Statistics, 2012). Diabetes is a major cardiovascular risk factor, and it increases risk of CVD more so in women than in men (Roche and Wang, 2013). Thus, high-quality routine care for both CVD and diabetes is at least as relevant to women's health and survival as it is to men's.

Improvements in women's CVD treatment could help to improve women's health outcomes, but a better understanding is needed of how CVD affects women and how CVD care for women could be improved. Although the American Heart Association's "Go Red for Women" campaign (Go Red for Women, 2013) and efforts by Sister-to-Sister and WomenHeart have done much to raise awareness among both women and their clinicians about CVD, there is still too little attention devoted to preventing heart disease in women and improving the quality and outcomes of their care (Henry J. Kaiser Family Foundation, 2013). Despite improvements over recent decades in care for CVD and diabetes, which is a major CVD risk factor, evidence suggests that the care women receive—and their health outcomes—continue to lag behind those of men, even for routine care such as monitoring and control of cholesterol (Veterans Health Administration, 2012; Bird et al., 2007; Chou et al., 2007a; Chou et al., 2007b; Chou et al., 2007c).

Awareness of and action to address deficiencies in the quality of women's CVD care are limited, in part, because quality of care is not routinely measured and reported by gender. Conventional methods of measuring quality of care focus on average "quality performance scores" across the overall population that a plan serves in different markets or regions; separate assessments and reporting by gender or local area are rare. Without routine tracking and reporting of quality of care by gender, the care received by women is generally assumed to be equal to that received by men. As a result, the quality gap in CVD and diabetes care remains largely invisible to individual women, providers, payers and policymakers, even among those seeking to improve women's health and health care. In cases where gender gaps in care have been monitored and targeted, such as in recent initiatives by the Veterans Health Administration,

marked reductions in gender disparities in CVD and other types of care have been achieved, though some gaps persist (Veterans Health Administration, 2012).

Our study aims to identify gender gaps in care in California and, where they are found, to increase awareness of potential gender disparities and begin to inform approaches to address gaps in care. In this study, we focus on adults who have been diagnosed with CVD and the much larger population of adults diagnosed with a major cardiovascular risk factor, namely diabetes. We use conventional statistical approaches to compare quality of care among men and women and spatial mapping to demonstrate the pattern of gender gaps across the state—focusing on a key measure of CVD and diabetes care for which frequent gender gaps have been observed: annual low-density lipoprotein (LDL) cholesterol testing for CVD and diabetes patients. There is broad agreement among clinicians that all patients with a diagnosis of ischemic heart disease or diabetes should receive annual screenings, for example, for high LDL cholesterol. By focusing on insured patients who already have a diagnosis, insurance, and access to care, we can move beyond the known gender differences in symptoms, presentation, and diagnosis, as well as those in insurance coverage and access to care.

We focus on LDL screening because screening is the first step in assessing quality of care. Testing of LDL levels is a necessary step to initiating or adjusting treatments, such as prescribing lipid-lowering drugs when LDL levels are high. Thus, lack of screening may point to other gaps in the quality of care, including intermediate outcomes, such as whether or not a patient's LDL cholesterol level is adequately controlled to reduce risks associated with CVD and diabetes. Indeed, research on disparities in care often finds that gaps in screening are associated with larger gaps in treatment and poorer intermediate outcomes (Fremont, Correa-de-Araujo, and Hayes, 2007).

## Study Approach

This study is designed to assess gender differences in one key aspect of routine CVD care and related prevention among patients with diabetes: LDL screening. By mapping the gaps in LDL screening by gender using data from a major California health plan, the study takes an initial step toward making gender disparities in routine care both visible and actionable in order to motivate systematic efforts to improve women's quality of care. The plan includes patients with several major types of insurance, including commercial health maintenance organization (HMO),<sup>1</sup> commercial preferred provider organization (PPO),<sup>2</sup> Medicaid, and Medicare. Because the study includes a wide range of patients, the results will reflect gaps that may impact many Californians in managed care.

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<sup>1</sup> HMO plans are not health insurance plans per se, but rather managed care networks that health insurers contract with to help coordinate high-quality care and control health care costs. Health insurance plan members with commercial HMO insurance typically obtain their insurance through their employer and are required to get all their care within a network of HMO providers, including a primary care physician who is responsible for managing and coordinating the patient's care. HMOs are currently more closely regulated and monitored than PPOs and tend to have more systems and incentives in place to ensure that quality guidelines, such as annual screenings, are followed.

<sup>2</sup> PPO plans also are a network of providers with which the insurer contracts to coordinate high-quality care and control costs. However, in contrast with HMOs, PPO members are generally not required to have a primary care physician (PCP) and can seek care from other providers without clearance by their PCP. Because of different incentives and regulations, systems to support coordination of care and monitor and improve performance on quality measures, such as LDL screening, have tended to be less well developed in PPO networks, though this may be changing in response to recent health reforms.

Our analyses examine two populations: (1) individuals who have ischemic vascular disease (IVD) or who have experienced a cardiovascular event (including acute myocardial infarction, percutaneous transluminal coronary angioplasty, or coronary artery bypass graft) (approximately 30,000 patients); and (2) individuals with a diagnosis of diabetes (approximately 155,000 patients). IVD involves narrowing of blood vessels that can deprive different parts of the body of nutrients and oxygen. Severe narrowing of the vessels, such as that due to atherosclerosis (i.e., plaque buildup of fats in the vessel wall), can cause insufficient blood supply (known as ischemia), which can damage the affected part of the body, including the heart and brain. Coronary artery disease is a kind of IVD affecting the heart and can cause such symptoms as angina or result in an acute myocardial infarction, or, in nonmedical terms, a heart attack. For quality measures, the broader category of IVD is increasingly used instead of CVD because atherosclerotic disease in vessels in one part of the body, such as peripheral vascular disease in the legs, is associated with vascular disease and risks to the heart vessels and those supplying the brain. In both IVD and CVD, treatment to lower LDL cholesterol is a key component of treatment.

To ensure that we have data on the full assessment period, we focus only on CVD and diabetic patients who were continuously enrolled in the insurance plan during the study period. These two populations shed light on key issues in cardiovascular care, including secondary prevention among those with CVD and prevention among those with an easily established and well-documented cardiovascular risk factor. Secondary prevention refers to efforts to improve outcomes and reduce the risk of additional cardiovascular events among those with CVD and the risk of initial CVD events, among those with diabetes.

We first examined the overall gender differences in LDL screening and then examined whether and how other factors are associated with quality of care for these measures and whether rates differ by gender. Next, we tested whether gender differences may be explained by other factors, such as age and insurance type. Finally, we mapped men's and women's quality of care by region, county, and zip code. Mapping differences by geographic level allowed us to identify disparities at the local level, as evidenced by differences between counties or individual zip code areas.

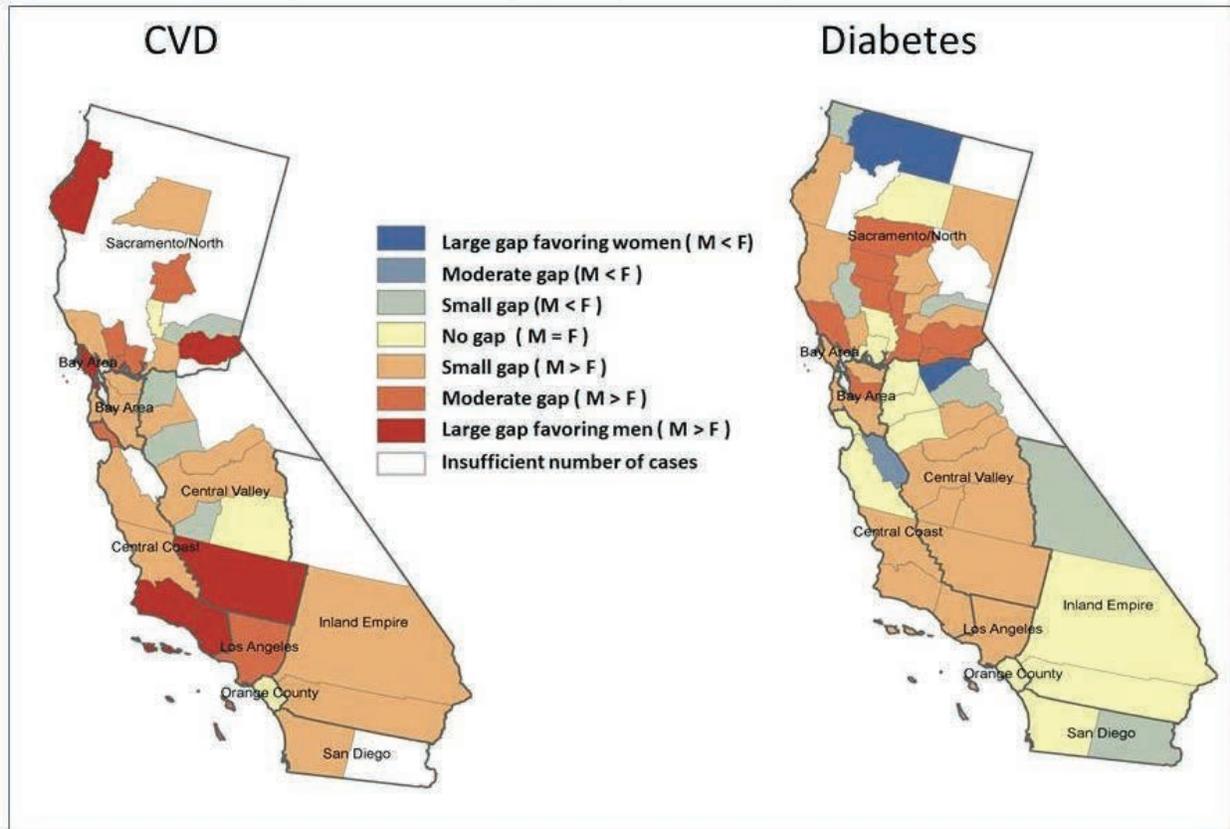
## Key Findings

- **Men had higher rates of LDL screening than did women in both the CVD and diabetes populations.** Among adults with CVD, men were more likely than women to receive LDL screening, with 78 percent of men and 73 percent of women receiving the indicated screening. The difference is statistically significant. Although the gender gap of about 5 percentage points in rates of LDL testing points may not appear large, it translates into a relatively large number of women not tested among the 30,000 CVD patients in this one plan who might have been tested if they had been men. For the 155,000 patients with diabetes, the average gender difference in screening was smaller, with 76 percent of the men and 74 percent of the women screened. This difference is also statistically significant.

- **Gender gaps varied by age.** Gender gaps were considerably larger for younger adults than for middle and older age groups. Across genders, CVD patients in the youngest age group (21 to 44) had considerably lower rates of LDL testing (average of 65 percent) relative to middle and older age groups, which averaged 83 and 71 percent, respectively. However, the disadvantage was larger for younger women (15 percentage points lower for women compared with 10 for men). Among diabetes patients, there was little gender difference among those ages 45 to 64. But among those ages 21 to 44, there was a gap of 7 percentage points in rates of testing in men and women (68 percent of men compared with 61 percent of women).
- **Gender gaps differ by insurance type.** The size and pattern of gender gaps varied depending on the type of insurance. For example, on average, we found no significant gender gaps in LDL testing for patients with either CVD or diabetes among those with commercial HMO insurance. However, gender gaps were present for commercial PPO populations. The gender differences among adults in commercial PPO plans remained even after taking into account other factors, such as age, region, and area income. Overall, rates of LDL testing were higher among those with commercial HMO insurance than those with commercial PPO insurance.
- **Gender gaps occurred across regions, counties, and zip codes.** Though average gender gaps were generally small when examined at regional levels, larger and more prevalent gaps were observed as the view shifted to smaller county and zip code levels, respectively. For example, three of eight Integrated Healthcare Association (IHA) regions (38 percent) showed moderate (5 to less than 10 percentage points) gender gaps for LDL screening rates among CVD patients, and all such gaps favored men. None of the regions showed large (10 or more percentage points) gender gaps. Similarly, 35 percent of counties in California had moderate or large gaps favoring men among CVD patients. In contrast, none had large gaps favoring women, and only 12 percent had moderate gaps favoring women. Because of the smaller sample of CVD patients, there were insufficient numbers of cases for us to estimate gender gaps within most zip codes. Among patients with diabetes, no region had moderate or large gender gaps. However, 17 percent of counties had moderate gender gaps among diabetics favoring men. In contrast, 4 percent of counties had large gaps favoring women, and 2 percent had moderate gaps favoring women. More locally, 33 percent of the 725 zip codes with a sufficient number of cases to examine had moderate to large gaps favoring men among diabetics. Only 18 percent of the zip codes had larger or moderate gaps favoring women.
- **Gender gaps favored women in some areas, but they more often favored men.** At the county level, gender gaps tended to favor men, as reflected in Figure S.1. However, we found numerous local areas in which the pattern was reversed, though the gaps favoring women tended to be smaller and less prevalent. For example, among CVD patients, there were gaps favoring men in 79 percent of counties. In 35 percent of counties, those gaps were moderate or large. But there were no moderate or large gaps favoring women at the county level, although in 12 percent of the counties there were small gaps favoring women. Among patients with diabetes, there were moderate gaps favoring men in 17 percent of counties and small gaps favoring men in another 40 percent of counties. In contrast, there were large gaps favoring women in 4 percent of counties, moderate gaps in 2 percent, and small gaps favoring women in another 12 percent of counties. At the zip code level, disparities were

more prevalent and more large disparities were observed, and the disparities continued to favor men more often than women. For example, in 14 percent of zip codes there was a large gap favoring men, and in 7 percent there was a large gap favoring women.

Figure S.1. Gender Gaps in LDL Testing by California County



NOTE: In mapping the data, we show the gender differences only in areas for which there are at least 30 men and 30 women in the eligible population (i.e., health plan members with CVD or diabetes, respectively). We consider gender differences in LDL testing rates of 10 or more percentage points as a large gap, 5 to less than 10 percentage points a moderate gap, 1 to less than 5 percentage points as a small gap, and less than 1 percentage point as no gap.

- Maps shed light on the patterns of gender disparities across the state.** As illustrated by Figure S.1, maps provide additional information on the distribution of gender disparities in care across the state. The figure shows gender gaps in LDL testing by county. The size of the gender gap differs for counties across the state. Some gaps are larger or smaller than others, while some favor men and others favor women. For example, the map on the right for diabetic care shows several counties in the Northern part of the state with moderate gender gaps (i.e., men’s LDL testing rate was 5 to less than 10 percentage points higher than the rate for women), indicated by the dark orange shading. In contrast, in the Southern portion of the state, there are several areas with no apparent gender gaps, indicated by the light yellow shading. There is also a county in the North with large gender gaps favoring women (women’s LDL testing rate was 10 or more percentage points higher than the rate for men) shaded with dark blue. Variation in gender differences in care across the state suggests that lessons could be learned both from areas with the highest quality of care and from areas with the fewest gender disparities. One issue is whether disparities are more prevalent when

overall quality of care on LDL screening is high or when it is low.

Maps also provide additional insight into the differences in gaps for patients with CVD compared to those with diabetes. For example, maps allow us to focus on the areas of interest to specific stakeholders or the care of residents of a particular area. The geographic comparisons can themselves motivate efforts to improve care and reduce disparities. For example, mapping quality of care at specific geographic levels can be useful for considering the health care resources available and the neighborhood context when tackling differences, as well as public health and health care planning opportunities (Brownlee and Hurley, 2013; Lurie and Fremont, 2009; Williams et al., 2011). Thus, maps may prove to be essential in mobilizing local and regional stakeholders to tackle disparities efficiently and meaningfully.

- **Gender gaps in care appear to be actionable.** Adults with commercial HMO insurance received higher quality of care based on LDL screening for those with CVD and for those with diabetes, and the gender differences in care were smaller than among adults with commercial PPO insurance. Moreover the absence of gender differences among those with HMO insurance after adjustment for age, region, and area income suggests that gender gaps in care are actionable. The greater oversight and use of quality improvement efforts in HMOs are likely responsible for both the higher quality of care overall and the smaller gender differences compared with PPOs.

## Next Steps

- **Gender-stratified reporting of quality of care is needed.** Without data, gender gaps in quality of care are invisible and intractable. Thus, gender-stratified reporting is essential if health plans, health care organizations, and policymakers are to ensure that overall improvements in care narrow rather than increase gender gaps. Moreover, women need to know where there are gaps in care in order to seek higher quality of care and to attain better outcomes. Similarly, providers need to know of gaps, particularly if they are serving women from areas with notable gender gaps.
- **Mapping of quality of care and disparities in care can improve understanding of data.** Quality maps are easy to read and readily understandable by diverse audiences, including women patients and their providers, as well as decisionmakers and other stakeholders. Maps also provide additional insight into variation in overall quality and in disparities in care beyond what is observed in conventional statistical models. Such comparative data are particularly relevant to those accountable for each region, county, and neighborhood and can be scaled to other geographic levels of interest.
- **Mapping of quality of care can make gaps actionable.** Gender gaps in quality vary by region and county in California. The patterns suggest the need to act locally to improve quality of care for women and for patients overall.
- **Geographic variation in quality of care and disparities suggest the need to map care in other California health plans.** Additional insights and opportunities for improving women's cardiovascular care are possible by examining and mapping quality of care across health plans, in order to see whether and how quality varies within and across geographic areas.

Analyses of gender gaps within individual health plans can provide additional plan-specific insights. Moreover, analyses of pooled data from multiple health plans are needed to assess gender disparities in care for CVD and diabetes for managed care patients and determine whether the size and patterns of disparities differ across plans.

Health plans can use the kind of analysis and mapping presented in this report to assess gender differences in quality of care and to motivate improvements in quality of care and in related treatment and outcome measures. Moreover, attention to the gaps in quality of care can inform a broader discussion of the prevalence and burden of CVD in women and the need for improvements in prevention and diagnosis, as well as treatment. By assessing and mapping gender differences in CVD care, this study aims to make disparities in care more visible and actionable than has been previously possible.

While mapping has been used to assess variations in health conditions and medical procedures (Goodman et al., 2010; Goodney et al., 2010), it has been far less commonly applied to assessing disparities in common ambulatory quality measures. To our knowledge, mapping has not been used to assess gender gaps in care. However, this approach can stimulate demand for gender-stratified reporting of quality of care and, in turn, for higher quality of cardiovascular care for women who experience lower quality of care and gender gaps. Understanding the patterns of gender disparities in quality of care and sharing this information with women, their clinicians, other stakeholders, and policymakers can facilitate and accelerate improvement in women's quality of care and outcomes for CVD.