

## REVIEW



# We Can Do Better Than Last Place: Improving the Health of US Women

我们能够比上次做得更好：改善美国女性的健康状况

Podemos conseguir algo mejor que el último puesto: la mejora de la salud de las mujeres estadounidenses

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**ABSTRACT**

Life expectancy for US women lags behind that for women in other countries. Factors contributing to inequitable health for women are complex and include policy, community, healthcare access, and the interaction between the patient and her healthcare provider working within the healthcare system. We propose a societal pyramid of health accounting for the effects of these different factors and their impact on prevention, screening, diagnosis, and management of disease using the examples of smoking and obesity, two of the most important yet modifiable risk factors for chronic disease and death among US women.

**摘要**

美国女性的平均寿命低于其它国家女性。造成这种不公平女性健康状况的因素很复杂，其中包括政策、社区、医疗护理获取途径以及患者与其在医疗护理系统中工作的医疗护理提供者之间的互动。我们提出了一个社会健康金字塔模型，通过列举吸烟和肥胖这两个导致美国女性罹患慢性疾病和死亡的最重要但可改变的风险因素，说明了该等差异因素的效应以及它们对疾病预防、筛选、诊断及管理的影响。

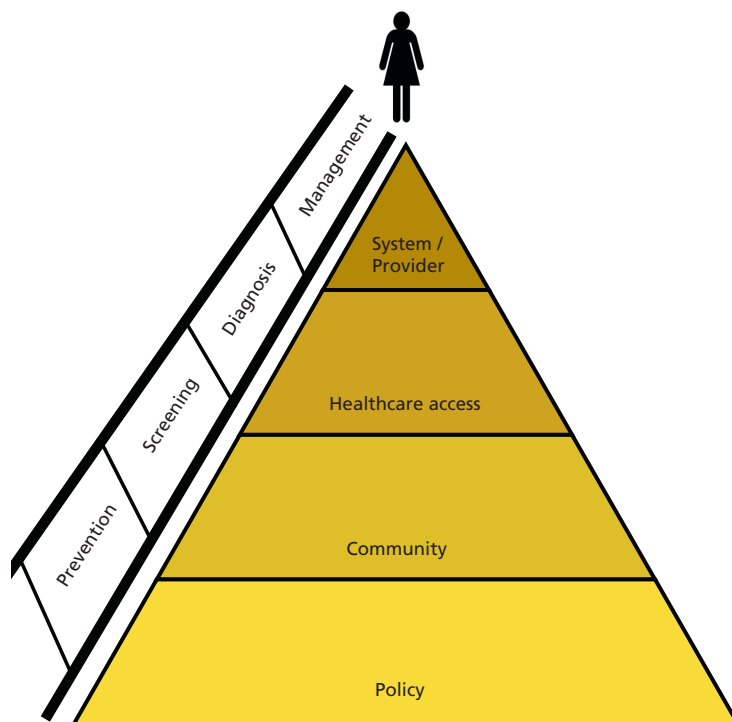
**SINOPSIS**

La esperanza de vida de las mujeres de los Estados Unidos va por detrás de la de las mujeres de otros países. Los factores que contribuyen a las desigualdades en la salud de las mujeres son complejos e incluyen la política, la comunidad, el acceso a la atención médica y la interacción entre la paciente y su médico que trabaja dentro del sistema sanitario. Proponemos una pirámide social de la salud que dé cuenta de los efectos de esos distintos factores y de su impacto sobre la prevención, detección, diagnóstico y tratamiento de la enfermedad utilizando los ejemplos del tabaquismo y la obesidad, dos de los factores de riesgo más importantes, aunque modificables, de enfermedad crónica y muerte entre las mujeres estadounidenses.

**INTRODUCTION: THE ORIGINS OF POOR WOMEN'S HEALTH**

The United States spends nearly twice as much on healthcare as other industrialized nations<sup>1</sup> yet ranks 51st among all countries in life expectancy overall<sup>2</sup> and 17th out of 18th in life expectancy for women among high-income countries.<sup>3</sup> These sobering statistics lie behind calls to reform the healthcare system and make healthcare organizations leaner and more efficient<sup>4</sup> while at the same time decreasing the number of Americans without health insurance.<sup>5</sup> Yet there is substantial evidence that the health of women in our country is profoundly impacted by other modifiable factors outside the healthcare system, including but not limited to public policies, cultural norms, poverty and income inequality, and community factors such as the cleanliness of air and water or availability of fresh food or exercise space. Thus, addressing the weaknesses in our healthcare system without addressing social and economic factors that contribute to ill health will not sufficiently address the lower life expectancy among US women.

In this review, we provide a road map to improving women's health in the 21st century with a focus on the most common modifiable factors that merit consideration and potential action. Our goal is not to provide an exhaustive review of the complex causes of ill health nor to propose a single solution to the problem of low life expectancy in the United States relative to other countries. Rather, we explore factors underlying the development and the severity of the diseases responsible for the most years of life lost by US women and identify actions that we can take, as a society, to improve women's health. We propose a societal pyramid of health that accounts for the effects of policy, community, healthcare access, and providers working within healthcare systems on the individual's ability to prevent, diagnose, and manage diseases (Figure 1). In this context, policy refers to education, legislation, and other measures emanating from government bodies for the purpose of achieving a public health goal. Community effects include those associated with an individual's membership in a group sharing certain



**Figure 1** Societal pyramid of health. Climbing the ladder to better health involves optimizing all levels of the pyramid across the continuum of care from prevention through treatment.

common characteristics that may influence health and health behaviors; the community factors discussed below include race, socioeconomic status, and geographic location, as these have been extensively studied. “Access to healthcare” is defined as having health insurance that allows the individual to seek primary care and specialty services. “System/provider” is defined as the effects of individual providers working within healthcare systems on the quality of care that is delivered. We will explore this model as it relates to the two leading modifiable contributors to mortality among US women: smoking and obesity.

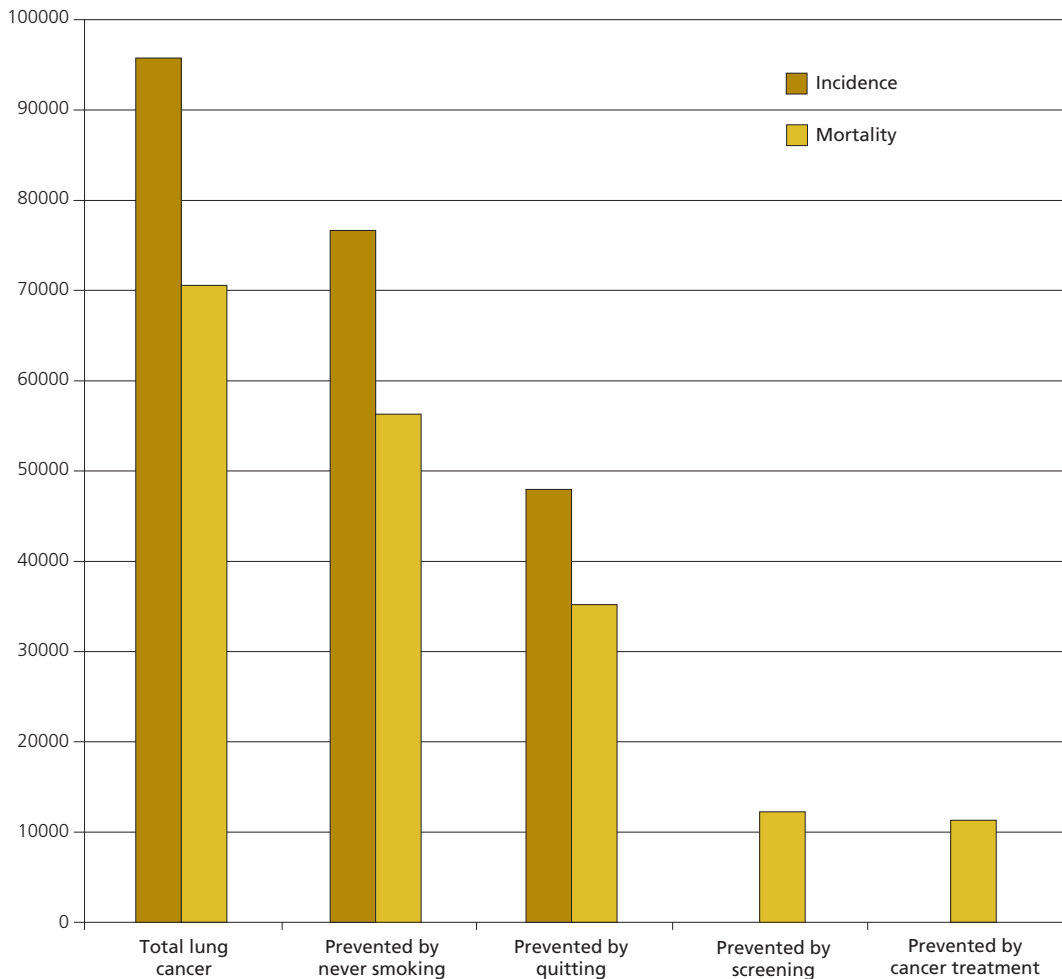
### SMOKING AMONG US WOMEN

Female smokers were rare prior to World War II, and thus women were not included in the earliest prospective epidemiologic studies linking smoking to lung cancer. After World War II, smoking patterns changed dramatically; women started smoking earlier and more heavily. A recent study of cohorts spanning a 50-year time period found both relative and absolute risks of death from lung cancer, chronic obstructive pulmonary disease (COPD), ischemic heart disease, stroke, and all causes are now nearly identical for female and male smokers. The authors concluded that “women who smoke like men, die like men.”<sup>6</sup> Smoking is believed to cause 80% of lung cancer deaths and 90% of COPD and emphysema,<sup>7</sup> and it doubles the risk of heart disease and stroke.<sup>8</sup> Current estimates suggest that smoking kills 17 394 women in the United States annually.<sup>7</sup> Figure 2 illustrates lung cancer incidence and mortality among women<sup>9</sup> and demonstrates the degree to which they can

be prevented with the following approaches: never smoking,<sup>10</sup> quitting smoking,<sup>11</sup> screening smokers for early-stage lung cancers,<sup>12</sup> and lung cancer treatment.<sup>10</sup> The cost of lung cancer treatment in the United States is \$10.3 billion annually,<sup>10</sup> and the annual overall health-care costs of smoking exceed \$96 billion dollars.<sup>13</sup>

### Policy and Smoking Prevention

Anti-smoking public policies began following the Surgeon General’s 1964 report on the harms of smoking,<sup>14</sup> and slow but steady progress continues today. Public policies<sup>15</sup> began as weakly worded warning labels on cigarette packaging (“Cigarette smoking may be hazardous to your health”). In 1971, cigarette advertising was prohibited on television and radio. Not until 1980 did the Surgeon General report on the harms of smoking among women.<sup>16</sup> Cigarettes were then exempted from additional legislation until 1984, when warning labels became more graphic (“Causes lung cancer”), and mandatory reporting and federal agencies were put in place.<sup>15</sup> Between 1987 and 1989, smoking was banned on domestic airline flights of up to 6 hours.<sup>15</sup> However, not until 1992 was a federal law in place requiring all states to adopt and enforce restrictions on tobacco sales and distribution to minors. In 1994, workplace smoking was banned. In 2009, the US Food and Drug Administration was given the authority to regulate tobacco products.<sup>15</sup> As of 2010, 25 states and the District of Columbia had implemented comprehensive smoke-free laws prohibiting smoking in indoor areas of workplaces, restaurants, and bars, and an additional 18 states had partial or some smoke-free laws.<sup>17</sup>



**Figure 2** Lung cancer incidence and mortality among women preventable by never smoking, quitting smoking, screening of smokers, and lung cancer treatment.<sup>9-12</sup>

These laws emerged out of information on the health effects of secondhand smoke exposure and a movement to protect workers in establishments allowing smoking, such as restaurants and bars. In addition, most states have cigarette excise taxes, but the amount varies widely by state, from \$0.07 per pack in South Carolina to \$3.50 in Rhode Island.<sup>18</sup>

The success of these policies is evident: during the past 50 years, smoking rates among US women dropped from 34% in 1965 (the first year for which national estimates are available) to 16.5% in 2011.<sup>14,19</sup> Studies estimate that a 10% increase in cigarette prices results in a 4% reduction in consumption, with potentially greater effects among youth and other cost-sensitive populations. According to the American Nonsmokers' Rights Foundation, 49% of Americans currently live under state or local laws that make workplaces, restaurants, and bars completely smoke-free environments.<sup>20</sup>

The US Centers for Disease Control and Prevention (CDC) estimates that if smoke-free activity is sustained nationally and intensified in certain regions, all states will be smoke free by 2020.<sup>17</sup> Because smoking takes decades to translate into lung cancer and COPD, we are only beginning to see improve-

ments in smoking-related health outcomes, with greater improvement in men than women due to the earlier smoking adoption by men.<sup>10</sup> Additional improvements from current low smoking rates are anticipated during the next several decades.

### Community and Smoking Prevention

Community factors including race, income, and geography affect smoking rates and, consequently, rates of smoking-related diseases. Hispanic women have very low rates of current smoking (8.6%) and heavy smoking (2.1%) compared to white women (18.8% current, 14% heavy smoking) and black women (15.5% current, 4.5% heavy smoking).<sup>19,21</sup> Consequently, rates of smoking-specific diseases are dramatically higher among white women compared with Hispanic women. Mortality rates from lung cancer and COPD among Hispanic women are 16/100,000 and 13.1/100,000 compared with 40/100,000 and 39.1/100,000 for white women.<sup>9,22</sup> Smoking among low-income women with low educational attainment is more common among white women than women of other races,<sup>23</sup> and some hypothesize that the differences in smoking rates contribute to the "Hispanic paradox":

Hispanic women live longer than women of other racial or ethnic groups despite higher rates of poverty and less access to healthcare.<sup>24</sup>

Geography-related cultural norms in smoking also have direct health effects and may be due to a number of factors including religion, economics, and policy. Utah consistently has the lowest smoking and lung cancer rates of all US states,<sup>10</sup> which may be partly attributable to the large population of Mormons, whose religious beliefs prohibit smoking.<sup>25</sup> In contrast, tobacco farming and production contribute substantially to the economy of several Southeastern states, which influences local attitudes and policies related to cigarette consumption. Smoking and lung cancer rates are highest in Kentucky,<sup>10</sup> the state whose economy is most dependent on tobacco.<sup>26</sup> No Southeastern states have comprehensive smoke-free laws in effect, and most Southeastern states continue to have the highest prevalence of smoking and the lowest excise tax.<sup>27</sup> Not surprisingly, the Southeastern states also have two to three times the rates of COPD<sup>28</sup> and lung cancer<sup>29</sup> than states with stronger policies and lower smoking rates. California presents the opposite picture. With a political and cultural focus on environmental and technological advances and no tobacco production, California was the first state to implement a comprehensive statewide tobacco control program and is the only state in which lung cancer incidence and death have declined in women.<sup>30</sup>

#### **Healthcare Access and Screening, Diagnosis, and Management of Smoking-related Diseases**

Access to healthcare has direct effects both on quitting smoking and on the quality of disease control among smokers with chronic diseases. Quitting smoking substantially reduces the risk of death from cardiovascular disease and stroke; the risk of re-infarction, sudden cardiac death, and total mortality decreases by 50% among smokers who quit after their first myocardial infarction compared with those who continue to smoke,<sup>31</sup> yet women are less successful at quitting than men.<sup>32</sup> Physician-based primary care interventions can result in 1-year maintained quit rates of 10% to 20% compared with 4% in the general population.<sup>31</sup> Furthermore, screening smokers for lung cancer also may reduce mortality by up to 20%, potentially averting 12 000 deaths annually.<sup>12</sup> However, early data indicate lower screening rates among women and the uninsured and higher rates of screening among blacks than other races.<sup>33</sup> These data strongly suggest that access to comprehensive primary care services can directly impact a smoker's likelihood of quitting smoking and/or enable cancer diagnosis at an earlier stage, thus improving disease incidence and mortality.

Disparities in healthcare access also affect quality of life and quality of care among those with smoking-related illness. Though Hispanics are less likely to suffer from COPD, Hispanics with COPD are twice as likely to visit the emergency room for COPD exacerbations as

whites, consistent with poor primary care access.<sup>22</sup> COPD-related mortality also was associated with poverty among those under age 65 but not in those over 65, who would be eligible for Medicare,<sup>34</sup> and racial disparities in lung cancer mortality<sup>9</sup> disappear when healthcare access is not a barrier, as seen among those in the US military<sup>35</sup> or in the context of clinical trials.<sup>36</sup>

#### **Providers/Healthcare Systems and Screening, Diagnosis, and Treatment of Smoking-related Diseases**

Access to the healthcare system does not entirely explain disparities in disease management, however. Although physician counseling is crucial to quit attempts among current smokers, fewer than half of smokers report being advised to quit by their physicians, and literature supports lingering racial and gender bias in smoking treatment among insured adults. Women are less likely to be advised to quit than men,<sup>37</sup> and blacks are less likely to be advised to quit than whites, both in the context of primary prevention and after myocardial infarction.<sup>38</sup> Physician-reported barriers to cessation counseling include beliefs that interventions will not work, that patients do not desire intervention, and time constraints with poor reimbursement,<sup>31</sup> barriers that are amenable to training and systems improvement. Black smokers also were less likely to receive influenza vaccination, and those with COPD were less likely to receive ambulatory oxygen than whites,<sup>38</sup> and physicians may underdiagnose COPD in women.<sup>39</sup> Reasons for these differential treatments require further exploration so that systems can be designed and physician training optimized to reduce these inequities.

#### **OBESITY AMONG US WOMEN**

Unlike smoking, which was recognized as a leading cause of preventable deaths in the 1960s, obesity did not emerge as an American epidemic until the early 21st century. In 1990, 12% of US women were obese<sup>40</sup> compared with 36% in 2010.<sup>41</sup> The obesity rate in the United States is 50% to 10-fold higher than in peer countries,<sup>42</sup> prompting the need for action.

Obesity contributes significantly to chronic disease morbidity and mortality.<sup>43,44</sup> Among nonsmoking women, obesity is associated with a 40-fold increased risk of diabetes and a four-fold increased risk of hypertension,<sup>45</sup> contributing to a four-fold increase in death from heart disease among obese women.<sup>45</sup> Obesity is also associated with endometrial, colon, gall bladder, prostate, kidney, and postmenopausal breast cancer, and obese women are twice as likely to die from cancer as women with a normal body mass index.<sup>45</sup> Figure 3 illustrates the risks of disease in the obese compared with the non-obese.<sup>45</sup> Obesity also increases the risk of infertility and pregnancy complications and also predisposes children to become obese themselves and die at earlier ages.<sup>46</sup> Modern medicine appears to ameliorate the effect of obesity on mortality, with larger rates of

obesity-associated mortality in earlier compared with later studies.<sup>47</sup> However, the cost of treating chronic diseases among the obese is estimated to cost \$168 billion, representing nearly 17% of US medical costs.<sup>48</sup>

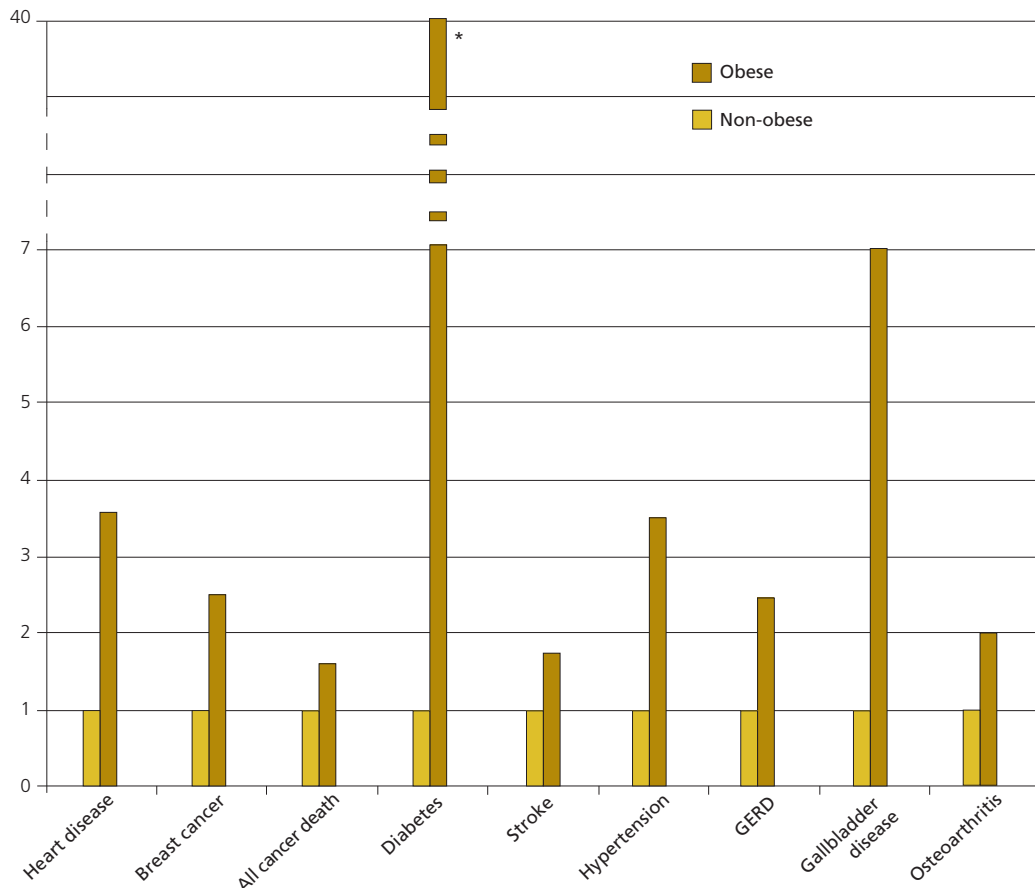
### Policy and Obesity Prevention in the United States

Only recently have public policies been directed against obesity, and their effectiveness to date has been limited. The overarching themes of public health policies aimed at reducing obesity include taxation, education, and restructuring of food and physical activity environments to favor healthy choices over unhealthy ones,<sup>49</sup> and they have been aimed primarily at children and adolescents. Laws that have been enacted include encouraging breastfeeding, changing school lunch menus, limiting access to sugary beverages for children, limiting food advertising targeting children, banning trans fats, mandating caloric labeling for restaurant chain menus, and improving nutrition labeling on packaged foods.<sup>50</sup> As the obesity epidemic has worsened, attempts at regulation have increased, with more than 1700 bills proposed throughout the states and several hundred enacted in 2009 and 2010. Though data indicate that obesity rates in US children may have stabilized, perhaps due to the effects of policies aimed at children, obesity rates among adults continue to rise.<sup>42</sup> Evidence for the effectiveness of individu-

al anti-obesity policies is modest<sup>50</sup>; however, a 2012 update from the Organization for Economic Co-operation and Development estimated that a comprehensive, policy-based obesity prevention strategy would be cost-effective.<sup>42</sup> The 2010 Affordable Care Act, which focuses on preventive measures, includes several provisions related to obesity such as insurance penalties and incentives to help overweight individuals participate in weight loss programs and community-based interventions to decrease obesity.<sup>5</sup>

### Community and Obesity Prevention

As with smoking, race, income, and geography all affect rates of obesity and obesity-related diseases. Obesity rates in the United States are increasing rapidly, with the highest rates among minority women, poor women, and those with low educational attainment. Rates of obesity and diabetes are 32% and 10% among white women, 59% and 19% among black women, and 41% and 12% among Hispanic women, respectively.<sup>51</sup> Education is associated with leanness among women of all racial/ethnic backgrounds; 23.4% of female college graduates are obese compared with 42.1% of those who have not completed high school.<sup>51</sup> However, the association of poverty with obesity is true only for white women.<sup>51</sup> Geography also contributes to the obesity picture, with higher rates in the



**Figure 3** Relative risk of comorbid disease in obese compared with normal-weight individuals.<sup>45</sup>

\*RR of diabetes in obese compared with non-obese is 40. Abbreviation: GERD, gastroesophageal reflux disease.

South and Midwest than in the Northeast and West. However, differences among racial, income, education, and geographic groups are dwarfed by the enormity of temporal trends, with a greater than 200% increase in the number of obese Americans over the past 2 decades. Explanations for the rapid rise in obesity have included social networks,<sup>52</sup> shared environments,<sup>53</sup> and genetics.<sup>54</sup> The increase in sedentary, technology-based jobs and decrease of active, manufacturing- and agriculture-based jobs may also contribute to the obesity by simultaneously lowering the cost of food while decreasing the number of calories expended by most employed Americans. In effect, where workers were once paid to exercise at physically demanding jobs, most workers now must pay to exercise through gym memberships and foregone leisure time.<sup>55</sup> As obesity has increased rapidly in all states and among all races, income levels, and both sexes, nationwide sociocultural factors related to increased caloric consumption and decreased physical activity are likely to be the primary drivers of the epidemic.

#### **Healthcare Access and Screening, Diagnosis, and Treatment of Obesity-related Diseases**

Access to healthcare is a prerequisite for screening, diagnosis, and management of obesity-related diseases such as diabetes, hypertension, and breast cancer. Healthcare access is crucial for women, who are more likely than men to suffer diabetic complications including stroke, cardiovascular disease, early onset nephropathy, and blindness<sup>56,57</sup> and are thus recommended for more aggressive treatment. Rates of un-insurance are highest among black and Hispanic women, who are also most likely to have diabetes.<sup>58</sup>

Illustrating the importance of healthcare access, black and Hispanic diabetics have a higher mortality rates than whites in the United States overall,<sup>59</sup> but among veterans cared for in the national US Department of Veterans Affairs system, where there is universal access to care, blacks and Hispanic diabetics had lower rates of cardiovascular disease and death.<sup>60</sup>

#### **Providers/Healthcare Systems and Screening, Diagnosis, and Treatment of Obesity-related Diseases**

Even among those with health insurance, racial and sex disparities exist, which may reflect provider bias or limitations in healthcare systems supporting screening for and management of chronic disease. Women with diabetes are undertreated compared to men, with lower achievement of blood pressure and lipid goals.<sup>61-63</sup> Guideline-appropriate diabetes screening in racial and ethnic minorities is not always performed, even among insured patients,<sup>64</sup> and among seriously ill type I diabetics, blacks and Hispanics are 30% less likely to be listed for kidney-pancreas transplants than whites.<sup>65</sup> To guard against biases in screening and treatment, provider training and healthcare systems must be designed to maximize equitable treatment of patients.

#### **DISCUSSION: ROAD MAP TO IMPROVE WOMEN'S HEALTH**

Much ill health among US women is attributable to smoking and obesity, risk factors that can be substantially modified by public policies and community action. Indeed, racial and income disparities in mortality rates from the leading killers of women—heart disease and cancer—stem in large part from differential distribution of these risk factors. Anti-smoking policies and legislation have successfully decreased smoking rates among US females, and studies have begun to illustrate their impact on health outcomes. The differential impact of anti-smoking policies across different communities provides a striking example of the potential that strong policy interventions have on improving the health of all women should they be implemented uniformly. If the current anti-smoking campaigns continue into the future, substantial decreases in costs and mortality from smoking-related diseases among women including heart disease, lung cancer, and COPD can be anticipated. Thus, public policy approaches form the foundation for our proposed pyramid toward better health for US women. Investing in these long-term approaches promises to reap large benefits in the future, but we must be mindful that mortality benefits will be most visible decades after successful policy implementation.

Changing American culture, policy, and legislation to successfully decrease smoking took several decades after the initial Surgeon General's report, and current anti-obesity policies are in their infancy. Controlling and decreasing obesity rates present the next great challenge of prevention. Yet as the problem is nationwide and cuts across gender, income, and racial lines, policy-based solutions are needed at the national, state, and local levels. Options include taxing sugar or fat, mandating the option of a small-sized entrée at restaurant chains, and making portion costs reflective of their sizes (ie, a 24-oz drink should cost twice as much as a 12-oz drink). Efforts to encourage physical activity should occur in parallel with efforts to curb consumption.

In recognition of the importance of the community environment to the health of US women, our pyramid includes an equally strong foundation on the role of community-focused interventions. As the distribution of smoking and obesity vary greatly by race, income, and geography, culturally appropriate interventions at the community level are likely to have substantial impacts. Culturally targeted interventions have shown improvement in smoking among high risk women.<sup>66,67</sup> The CDC recently published recommendations for community-based programs to reduce obesity, many of which also can be implemented at the state level or nationally. These include (1) increasing the availability and affordability of healthy foods and beverages, promoting healthy portion size, and decreasing the availability and affordability of unhealthy foods in public community settings such as schools; (2) increasing the number of supermarkets in underserved areas; (3) incentivizing local food provid-

ers to offer healthier food and beverage choices in underserved areas; (4) improving food distribution from local farms via farmers' markets and other community-based initiatives; (5) limiting advertising of unhealthy foods and beverages; (6) discouraging consumption of sugar-sweetened beverages; (7) supporting breastfeeding; (8) improving physical education in schools and increasing opportunities for afterschool sports; (9) improving the built environment to create safe spaces for recreation including sports, biking, and walking; and (10) creating community partnerships with groups such as faith-based organizations, youth organizations, and industries to combat obesity.<sup>68</sup>

Despite the best prevention efforts, however, women will develop acute and chronic diseases, and healthcare access is paramount to improve health and reduce gender- and income-related disparities in morbidity and mortality. The Affordable Care Act aims to reduce the number of uninsured Americans as well as to improve access to preventive care such as vaccinations and cancer screenings. Prior to passage of the Affordable Care Act, the United States was the only industrialized nation without some form of universal healthcare coverage<sup>69</sup> and women of color bore the brunt of un-insurance.<sup>58</sup> While health insurance coverage is necessary, it is not sufficient to prevent delays and disparity in the delivery of proven care for chronic disease among women in our country. Many disparate health effects of the modifiable risk factors discussed above can be attributed to inequitable healthcare access or to problems with providers and healthcare systems, which culminate in less effective treatment of women and minority patients. Fortunately, current reform efforts are equally focused on accountable care: the right care for the right person at the right time. A renewed commitment to coordinated and patient-centered primary care through Patient-Centered Medical Homes and via Meaningful Use of electronic health records holds promise to bridge the gap between scientific discovery and delivery to US women. The challenge is to ensure that systems improvements are equitably implemented with particular attention to the most vulnerable women, who may require more intense health system resources. If implementation of improved systems lags for the most at-risk populations, inequity in health outcomes for US women may be exacerbated.

### Limitations

This review focuses primarily on diseases related to obesity and smoking due to their large contributions to mortality in US women. However, US women also suffer high rates of infant mortality, HIV/AIDS and other sexually transmitted infections, teen pregnancy, and deaths from accidents and firearms, which contribute significantly to years of life lost before age 50.<sup>3</sup> Recognizing that the genesis of each healthcare problem is multifactorial, we propose a societal framework that can be applied broadly to problems threatening the health of US women.

### CONCLUSION

In the context of a societal framework, we present some of the reasons why the health and longevity of US women lags behind that of our peer countries. Exploration of two important contributors to women's poor health, smoking and obesity, indicate that a multilayered approach will be necessary to improve women's health and reduce disparities. First, we must continue to create strong and uniform public policies to reduce the commonness of modifiable risk factors and create community environments that are conducive to a healthy lifestyle for all Americans. These actions are necessary to change the risk profiles of the communities where women live to prevent the development of disease. In addition, all women must have access to primary and specialty care, a possibility that can become a reality with appropriate implementation of the Affordable Care Act. Finally, biases that create differential treatment of women and minorities by individual providers and within healthcare systems require continuous monitoring and efforts to improve education and implementation of best practices for diagnosing and managing disease. Tackling the most important threats to women's health via coordinated efforts involving public policy and legislation, community-based initiatives, and improvements in healthcare access and healthcare systems has the potential to dramatically improve the health of American women.

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