

# WOMEN'S HEART ALLIANCE

## The Facts on Women and Cardiovascular Disease (CVD)

### Burden of CVD and CVD Risk Factors

- ♥ Heart disease and stroke is the #1 killer of women in the U.S., killing more women than all cancers combined.<sup>1</sup>
- ♥ Heart disease and stroke claim nearly 400,000 women's lives each year. That's nearly one death every 80 seconds.<sup>2</sup>
- ♥ 1 in 38 women die of breast cancer;<sup>3</sup> 1 in 3 women die of heart disease and stroke.<sup>4</sup>
- ♥ A recent study by the National Center for Health Statistics indicates that, for the first time in more than two decades, life expectancy for Americans is declining - with CVD topping the 10 leading causes of death. White women are among the demographic sub-groups with rising death rates, particularly those in middle age or younger.<sup>5</sup>
- ♥ According to the CDC's Division for Heart Disease and Stroke Prevention, cardiovascular disease (CVD) costs the United States \$320 billion in annual health care costs and lost productivity.<sup>6</sup>
- ♥ By 2030, more than 4 in 10 Americans are projected to have CVD, with total costs expected to triple to more than a trillion dollars.<sup>7</sup>
- ♥ Compared with other risk factors, high blood pressure is the leading contributor to deaths from CVD and ischemic heart disease in women.<sup>8</sup>
- ♥ National Health Interview Survey data from 2015 show that only 47% of women met the current guidelines for weekly aerobic physical activity.<sup>9</sup>
- ♥ Data from the National Health Interview Survey 2014 show that cigarette smoking in women declined between 2005 and 2014. In 2014, about 15 percent of women smoked cigarettes.<sup>10</sup>
- ♥ Data from the National Health and Nutrition Survey (NHANES) 2007-2012 show that nearly one-third (29.74%) of women are overweight and more than one-third (36.84%) are obese.<sup>11</sup> 2013-2014 NHANES data indicates that now 40.4% of women are overweight and 9.9% exhibit class 3 obesity (extreme obesity; BMI of 40 or over).<sup>12</sup>
- ♥ Data from NHANES 2007 to 2008 and 2011 to 2012 show that only 24.1% of women 20 and older and only 47.2% of girls 12-19 met at least five of the seven criteria for ideal cardiovascular health (AHA's 2020 goals). Compared to white females, fewer black and Hispanic adult women and girls met five of the seven criteria.<sup>13</sup>
- ♥ NHANES data also shows a downward trend in coronary heart disease (CHD) (a type of CVD) among women 40 and older, from 8.5% prevalence in 2001-2002 to 6.2% in 2011-2012. However, this decreased CHD prevalence was only shown in adults living without major CVD risk factors such as high cholesterol, high blood pressure, diabetes, and smoking.<sup>14</sup>

### Sex Issues and Disparities In CVD

*Note: Data from 2013 (published in 2015) show it is no longer true that more women than men die from heart disease and stroke.*

- ♥ Although slightly more men (406,470) than women (396,757) died from major cardiovascular diseases in 2014 (the most recent year for which data are available),<sup>15</sup> women fare worse than men in a number of critical ways. For example:
  - Women are 50% more likely to be given a wrong diagnosis after a heart attack.<sup>16</sup>
  - Women are at greater risk of dying in the year following a heart attack than are men. Indeed, 1 in 4 women will die within one year of their heart attack, compared to 1 in 5 men.<sup>17</sup>
  - Women are more likely than men to die while waiting for a heart transplant.<sup>18, 19</sup>
- ♥ In nearly half of all heart attacks among women, typical male symptoms are not present.<sup>20</sup>
- ♥ Women's hearts are physiologically different from men's hearts in important ways. They are two-thirds the size of men's and most often have smaller arteries, and faster heart rates.<sup>21,22</sup>

# WOMEN'S HEART ALLIANCE

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- ♥ Women's symptoms of heart attack often are different and more subtle, than men's; women's first signs of a heart attack may be nausea, backache, jaw pain, extreme fatigue or shortness of breath, instead of crushing chest pain.<sup>23, 24</sup>
- ♥ Sixty-four percent of women who die suddenly of coronary heart disease have no prior symptoms.<sup>25</sup>
- ♥ A recent European study found that women experiencing heart attacks were more likely than men to delay treatment-seeking. Additionally, they were less likely than men to receive care within the benchmark time for reperfusion therapy. They were also more likely than men to die in the hospital.<sup>26</sup>
- ♥ Certain conditions specific to or more common among women appear to increase risk of CVD. These conditions include: Pre-eclampsia and eclampsia, gestational diabetes, early onset menopause, migraines with aura, and autoimmune diseases such as lupus and rheumatoid arthritis. These conditions are specific to women or are more common in women than in men.<sup>27, 28, 29, 30</sup>

## CVD and Pregnancy

- ♥ Despite global efforts to reduce maternal deaths, the maternal mortality rate in the U.S. more than doubled between 2000 and 2014 and is higher than in any other developed country.<sup>31, 32</sup> Chronic disease in new mothers is driving the increase in maternal mortality, with cardiovascular diseases currently the second leading cause of pregnancy-related deaths in the U.S., accounting for 14.7% of maternal mortality.<sup>33</sup>
- ♥ Four pregnancy outcomes are associated with increased CVD in later life and should be considered as indicators of cardiovascular risk:
  1. Gestational diabetes<sup>34</sup>
  2. Hypertensive disorders of pregnancy (HDP), including gestational hypertension, pre-eclampsia (PE), chronic hypertension, and chronic hypertension with superimposed PE<sup>35</sup>
  3. Pre-term births (PTB)/ pre-term labor<sup>36</sup> and
  4. Growth-restricted infants / intrauterine growth restriction and placental complications (such as placental abruption).<sup>37</sup>
- ♥ A recent study in the UK found that heart disease is the now that country's leading cause of maternal death during or up to six weeks after the end of pregnancy.<sup>38</sup>
- ♥ Pregnancy can serve as a "stress test," illuminating early paths leading to CVD later in life.<sup>39</sup> High blood pressure is a clear indicator of CVD risk and is sustained in women with HDP 3 and 12 months after delivery.<sup>40</sup>

## Burden of Disease and Risk Factors in Young Women

- ♥ Obesity, diabetes, high blood pressure, stress, lack of exercise, and other factors put young women at risk of dying from heart disease. Recent data show that CVD rates and the prevalence of CVD risk factors are increasing among young women.<sup>41, 42, 43, 44</sup>
- ♥ Women today are becoming obese at younger ages than in the past. At least 20% of women born between 1976-1985 are obese in their 20s, yet in previous generations, this level of obesity wasn't reached until women were in their 30s and 40s.<sup>45</sup>
- ♥ When we look at diabetes, we see major increases in prevalence and incidence in adults of all ages, starting in 1990. Recent data show that this increase is slowing or leveling off in most age groups. But, in young adults 20-44 years of age, prevalence is continuing to increase at higher rates compared to their older counterparts.<sup>46</sup>
- ♥ Smoking rates are declining in the United States. But, "casual" or "light" smoking is on the rise in young women.<sup>47</sup> Data show that the risk of dying from cardiovascular disease among "casual" or "light" smokers is nearly the same as for heavy smokers.<sup>48,49,50</sup>

# WOMEN'S HEART ALLIANCE

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- ♥ Women in their 20s (20-29) with high levels of LDL cholesterol (190mg/dL or higher) are 7.8 time more likely to have a nonfatal or heart attack or die of heart disease than those with lower levels of cholesterol.<sup>51</sup>
- ♥ Data from the 1988-1994 and 1999-2004 National Health and Nutrition Examination Surveys (NHANES) (cross-sectional, nationally representative surveys) show that myocardial infarction (MI) prevalence increased among midlife women, while declining among similarly aged men.<sup>52</sup>

## Racial, Ethnic, and Geographic Issues and Disparities in CVD

*Note: Sections 1, 5, and 6 also contain data on disparities.*

- ♥ African American women face even higher risks of cardiovascular disease with high rates of high blood pressure, obesity, and diabetes in these groups.<sup>53,54</sup>
- ♥ Blacks develop high blood pressure more often, and at an earlier age, than whites and Hispanics. More black women than men have high blood pressure.<sup>55</sup>
- ♥ Among African American women ages 20 and older, nearly half (48.3%) have CVD.<sup>56</sup>
- ♥ African American adults have among the highest prevalence of hypertension in the world. Between 2009-2012, among non-Hispanic black women, the age-adjusted prevalence of hypertension was 46.1%, compared to 30.1% among white women, and 29.9% among Hispanic women.<sup>57</sup>
- ♥ In a recent study of 70,000 people in the 12 southeastern states, 64% of black women had high blood pressure, compared to 52% of white women and 51% of black and white men. Compared to whites, blacks were twice as likely to have uncontrolled blood pressure. Additionally, 28% of black women (compared to 17% of white women) were not aware they had high blood pressure.<sup>58</sup>
- ♥ Additionally, older data from NHANES (2001-2006) show that blacks had a 90% higher odds of poorly controlled blood pressure, compared to whites. And, among those with high blood pressure, blacks and Mexican Americans had a 40% increased odds of uncontrolled blood pressure compared to non-Hispanic whites.<sup>59</sup>

## Access to Care, Quality of Care, and Missed Opportunities

- ♥ In 2012, more than 86 percent of US women reported that they met with a health care provider at least once in the past year. However, racial differences in engagement with health providers exist. About one fifth (21%) of Hispanic women did not visit a doctor or other health professional in the past 12 months compared with 13% of non-Hispanic black women and 11% of non-Hispanic white women.<sup>60</sup>
- ♥ These data were collected before the passage of the Affordable Care Act. With that act, 55 million women now have insurance guaranteeing access to free services.<sup>61</sup>
- ♥ Data from the 2012 American Heart Association (AHA) National Survey show that most women (72-87%, depending on ethnicity) agree with the statement, "I trust my healthcare provider so much that I always try to follow his/her advice."<sup>62</sup>
- ♥ The data on use of health care services and trust in health providers show that opportunities exist to inform and counsel women regarding their heart disease risk and ways to reduce it. Yet, in 2012, an AHA national survey found that only 21 percent of women surveyed on line reported that their doctor had ever discussed their risk for heart disease when discussing their health. Among Hispanics, only 12% reported having such discussions with their doctor.<sup>63</sup>
- ♥ Only 6% of women 25-34 surveyed on-line reported that their doctor had ever discussed their risk of heart disease when discussing their health.<sup>64</sup>
- ♥ Many health professionals do not recognize differences in men's and women's hearts. One Edge Research survey of 199 primary care physicians and 100 cardiologists found that 51% of primary care physicians and 48% of cardiologists disagree that women's hearts differ from men's.<sup>65</sup>

# WOMEN'S HEART ALLIANCE

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- ♥ Female and black stroke patients are less likely than others to receive preventive care for subsequent strokes. Data from a 2008 study of patients hospitalized for stroke showed that 66 percent of women and 77 percent of black patients received incomplete evaluations, compared with 54 percent of men and 54 percent of whites. Also, women were more likely than men to receive incomplete discharge regimens (anticoagulants and other stroke prevention medications and outpatient follow-up).<sup>66</sup>
- ♥ A study of adults at high risk of CVD showed that blacks are less likely than whites to use statins (38 percent vs. 50 percent, respectively) or aspirin (29 percent vs. 44 percent) to prevent CVD. This may contribute to the racial disparities in CVD outcomes.<sup>67</sup>

### Knowledge and Awareness

- ♥ A Women's Heart Alliance national survey of 1,011 women ages 25-60 showed only 27% of respondents could name a woman in their lives with heart disease and only 11% could name a woman who has died from it. Three-quarters (75%) of women who said they know another woman with heart disease reported concern about their own risk and 58% reported asking their doctor about heart health. Among women who said they did not know another woman with heart disease, only 50% expressed concern and only 39% said they raised the issue with their doctor.<sup>68,69</sup>
- ♥ In another national survey in 2010, only 54% of women surveyed by telephone were aware that CVD is their leading cause of death.<sup>70</sup>
- ♥ Among older women, knowledge of stroke warning signs is low. A 2014 national AHA Survey showed that among women 75 years of age and older, only 23% identified severe headache, 20% identified dizziness, and 18% identified vision loss/changes as warning signs of stroke.<sup>71</sup>
- ♥ Despite the fact that heart disease is women's number one killer, one on-line survey of 1,011 women ages 25-60 found that few (27%) could name a woman in their lives with heart disease. Even fewer (11%) could name a woman who has died from it. Seventy-six percent said they rarely talk about heart disease among family and friends.<sup>72</sup>
- ♥ When asked what they would do first if experiencing heart attack symptoms, more women in 2012 (65%) compared to 2009 (53%) said they would call 9-1-1. However, this figure remains too low.<sup>73</sup>

### Investment in, Spending and Research on Women's CVD

- ♥ Per capita spending on CVD in the U.S. has risen to \$767 in 2012 (up from \$554 per capita in 2000). People with CVD diagnoses spend more per capita on health in general, and higher average out-of-pocket costs.<sup>74</sup>
- ♥ Spending on CVD accounts for 13% of disease-based health expenditures and ranks third (at 8.6%) of the overall growth in medical services spending growth.<sup>75</sup>
- ♥ Despite sex differences in physiology and in the manifestation of CVD, as recently as 2007, women comprised only 35% of participants in all heart-related studies.<sup>76</sup>
- ♥ Although heart disease kills one in three women,<sup>77</sup> in 2011, only a small fraction (\$246 million) of the National Institutes of Health budget was spent on women's heart disease research. In comparison, that same year, \$959 million was spent on women's cancer research (breast, ovarian, cervical, endometrial and uterine).<sup>78</sup>
- ♥ A 2010 landmark study showed that between 1970 and 2006, women's CVD treatment largely drew from medical research on men. By 2006, in CVD-related studies that enrolled both men and women, only 34% of participants were women.<sup>79</sup> Looking at CVD-related studies overall (including single-sex studies), women made up 41% of participants.
- ♥ WISEWOMAN, The Center for Disease Control's flagship program offering chronic disease risk factor screening and support to low-income women, received \$17.3 million in funding in 2014.<sup>80</sup>

# WOMEN'S HEART ALLIANCE

## The Facts on Women and Cardiovascular Disease (CVD)

- 1 Kochanek KD, Murphy SL, Xu J, and Tejada-Vera B, "Deaths: Final Data for 2014," National Vital Statistics Reports, Hyattsville, MD: CDC, National Center for Health Statistics. 2016;65(4). Available from: [http://www.cdc.gov/nchs/data/nvsr/nvsr65/nvsr65\\_04.pdf](http://www.cdc.gov/nchs/data/nvsr/nvsr65/nvsr65_04.pdf).
- 2 Mozaffarian D, Benjamin EJ, Go AS, Arnett DK, Blaha MJ, Cushman M, et al.; on behalf of the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Heart disease and stroke statistics—2016 update: a report from the American Heart Association. *Circulation*. 2016;133:e148. Available from: <http://circ.ahajournals.org/content/early/2015/12/16/CIR.0000000000000350.full.pdf>
- 3 American Cancer Society, Key Statistics for Breast Cancer, accessed Oct. 11, 2018. Available from: <https://www.cancer.org/cancer/breast-cancer/about/how-common-is-breast-cancer.html>.
- 4 Mozaffarian D, Benjamin EJ, Go AS, Arnett DK, Blaha MJ, Cushman M, et al.; on behalf of the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Heart disease and stroke statistics—2016 update: a report from the American Heart Association. *Circulation*. 2016;133:e148.
- 5 Xu JQ, Murphy SL, Kochanek KD, Arias E. Mortality in the United States, 2015. NCHS data brief, no 267. Hyattsville, MD: National Center for Health Statistics. 2016. Available from <https://www.cdc.gov/nchs/products/databriefs/db267.htm>.
- 6 Business Pulse [Internet]. Atlanta: CDC Foundation; c2015 [cited 22 Dec 2015]. Available from: <http://www.cdcfoundation.org/businesspulse/heart-health-infographic>.
- 7 Heidenreich PA, Trogdon JG, Khavjou OA, Butler J, Dracup K, Ezekowitz MD, et al. Forecasting the future of cardiovascular disease in the United States: a policy statement from the American Heart Association. *Circulation*. 2011;123(8):933–44.
- 8 Danaei G, Ding EL, Mozaffarian D, Taylor B, Rehm J, Murray CJ, Ezzati M. The preventable causes of death in the United States: comparative risk assessment of dietary, lifestyle, and metabolic risk factors [published correction appears in *PLoS Med*. 2011;8. doi: 10.1371/annotation/0ef47acd-9dcc-4296-a897-872d182cde57]. *PLoS Med*. 2009;6:e1000058.
- 9 National Health Interview Survey, January–June 2015, Sample Adult Core component. Atlanta: CDC/NCHS; 2015. Available from: <http://www.cdc.gov/nchs/data/nhis/earlyrelease/earlyrelease201511.pdf>.
- 10 Ahmed J, Homa DM, O'Connor E, et al. Current Cigarette Smoking Among Adults — United States, 2005–2014. *MMWR Morb Mortal Wkly Rep* 2015;64(44):1233–1240.
- 11 Yang L, Colditz GA. Prevalence of Overweight and Obesity in the United States, 2007–2012. *JAMA Intern Med*. 2015;175(8):1412–1413. doi:10.1001/jamainternmed.2015.2405.
- 12 Flegal KM, Kruszon-Moran D, Carroll MD, Fryar CD, Ogden CL. Trends in Obesity Among Adults in the United States, 2005 to 2014. *JAMA*. 2016;315(21):2284–2291. doi:10.1001/jama.2016.6458.
- 13 Mozaffarian D, Benjamin EJ, Go AS, Arnett DK, Blaha MJ, Cushman M, et al.; on behalf of the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Heart disease and stroke statistics—2016 update: a report from the American Heart Association. *Circulation*. 2016;133:e22–e23.
- 14 Yoon SS, Dillon CF, Illoh K, Carroll M. Trends in the Prevalence of Coronary Heart Disease in the U.S.; National Health and Nutrition Examination Survey, 2001–2012. *American Journal of Preventative Medicine*. 2016. In press. Available from: <http://dx.doi.org/10.1016/j.amepre.2016.02.023>.
- 15 Kochanek KD, Murphy SL, Xu J, and Tejada-Vera B, "Deaths: Final Data for 2014," National Vital Statistics Reports, Hyattsville, MD: CDC, National Center for Health Statistics. 2016;65(4). Available from: [http://www.cdc.gov/nchs/data/nvsr/nvsr65/nvsr65\\_04.pdf](http://www.cdc.gov/nchs/data/nvsr/nvsr65/nvsr65_04.pdf).
- 16 Wu J, Gale CP, Hall M, Dondo TB, Metcalfe E, Oliver G, Batin PD, Hemingway H, Timmis A, West RM. Impact of initial hospital diagnosis on mortality for acute myocardial infarction: A national cohort study. *Eur Heart J Acute Cardiovasc Care*. 2016; in press. Available from: <http://acc.sagepub.com/content/early/2016/08/29/2048872616661693>.
- 17 CDC Feature: Women and Heart Disease [Internet]. Atlanta: CDC; c2015. [Updated: 2 February 2015; cited: 31 August 2015]. Available from <http://www.cdc.gov/features/wearred/index.html>.
- 18 Health Resources and Services Administration. Scientific Registry of Transplant Recipients, Table 11.3 Reported Deaths and Annual Death Rates Per 1,000 Patient-Years at Risk, 2000 to 2009 Heart Waiting List [Internet]. Rockville: HRSA; c2010 [cited July 5, 2016]. Available from [http://srtr.transplant.hrsa.gov/annual\\_reports/2010/1103\\_can-gender\\_hr.htm](http://srtr.transplant.hrsa.gov/annual_reports/2010/1103_can-gender_hr.htm).
- 19 Hsieh EM, Starling RC, Blackstone EH, Singh TP, Young JB, Gorodeski EZ, Taylor DO, Schold JD. Does the UNOS Heart Transplant Allocation System Favor Men Over Women? *JCHF*. 2014;2(4):347–355. doi:10.1016/j.jchf.2014.03.008.
- 20 Mehta LS, Beckie TM, DeVon HA, Grines CL, Krumholz HM, Johnson MN, et al.; on behalf of the American Heart Association Cardiovascular Disease in Women and Special Populations Committee of the Council on Clinical Cardiology, Council on Epidemiology and Prevention, Council on Cardiovascular and Stroke Nursing, and Council on Quality of Care and Outcomes Research. Acute Myocardial Infarction in Women—A Scientific Statement From the American Heart Association. *Circulation*. 2016;133:00-00. DOI: 10.1161/CIR.0000000000000351.
- 21 Legato, MJ. Gender and the heart: sex-specific differences in normal anatomy and physiology. *J Gend Specif Med*. 2000 Oct;3(7):15–8. Available from: [http://www.researchgate.net/publication/12079451\\_Gender\\_and\\_the\\_heart\\_sex-specific\\_differences\\_in\\_normal\\_anatomy\\_and\\_physiology](http://www.researchgate.net/publication/12079451_Gender_and_the_heart_sex-specific_differences_in_normal_anatomy_and_physiology).
- 22 Miller VM. Why are sex and gender important to basic physiology and translational and individualized medicine? Sex and Gender Differences in Cardiovascular Physiology—Back to the Basics. *Am J Physiol Heart Circ Physiol*. 2014 Mar 15;306(6):H781–H788. Published online 2014 Jan 10. DOI: 10.1152/ajpheart.00994.2013. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3949049/>
- 23 Gulati M, Shaw LJ, & Bairey Merz CN. Myocardial Ischemia in Women - Lessons from the NHLBI WISE Study. *Clinical Cardiology*. 2012;35(3):141–148. Available from: <http://doi.org/10.1002/clc.21966>.
- 24 Heart Attack Symptoms in Women [Internet]. Dallas: AHA; c2015 [Updated July 2015; cited 2 Sept 2015]. Available from: [http://www.heart.org/HEARTORG/Conditions/HeartAttack/WarningSignsofHeartAttack/Heart-Attack-Symptoms-in-Women\\_UCM\\_436448\\_Article.jsp](http://www.heart.org/HEARTORG/Conditions/HeartAttack/WarningSignsofHeartAttack/Heart-Attack-Symptoms-in-Women_UCM_436448_Article.jsp).
- 25 Roger VL, Go AS, Lloyd-Jones DM, Benjamin EJ, Berry JD, Borden WB, et al. Heart disease and stroke statistics—2012 update: a report from the American Heart Association. *Circulation*. 2012;125(1):e2–220.
- 26 Bugiardini R, Ricci B, et al. Sex-related Differences in Acute Coronary Care among Patients with Myocardial Infarction: The Role of Pre-hospital Delay. *J. Am Coll Cardiol*. 2015;65(10\_S).
- 27 Rich-Edwards, et al. Pregnancy Characteristics and Women's Future Cardiovascular Health: An Underused Opportunity to Improve Women's Health? *Epidemiol Rev* 2014;36:57–70.
- 28 Park K, Wei J, Minissian M, Bairey Merz CN, Pepine CJ. Adverse Pregnancy Conditions, Infertility, and Future Cardiovascular Risk: Implications for Mother and Child. *Cardiovasc Drugs Ther*. 2015 Jun 3.
- 29 Schoenfeld SR, Kasturi S, Costenbader KH. The epidemiology of atherosclerotic cardiovascular disease among patients with SLE: a systematic review. *Semin Arthritis Rheum*. 2013 Aug;43(1):77–95. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/23422269>.
- 30 Gudmundsson LS, et al. Migraine with aura and risk of cardiovascular and all cause mortality in men and women: prospective cohort study. *BMJ*. 2010;341:c3966. Available from: <http://www.bmj.com/content/341/bmj.c3966.full>.
- 31 MacDorman, Marian F. PhD; Declercq, Eugene PhD; Cabral, Howard PhD; Morton, Christine PhD. Recent Increases in the U.S. Maternal Mortality Rate: Disentangling Trends From Measurement Issues. *Obstetrics & Gynecology*, August 2016 DOI: 10.1097/AOG.0000000000001556. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/27500333>
- 32 Hogan, Margaret C et al, "Maternal mortality for 181 countries, 1980–2008: a systematic analysis of progress towards Millennium Development Goal 5," *The Lancet*, Volume 375, Issue 9726, 1609 – 162. Available from: [http://dx.doi.org/10.1016/S0140-6736\(10\)60518-1](http://dx.doi.org/10.1016/S0140-6736(10)60518-1)
- 33 CDC, Reproductive Health, Pregnancy Mortality Surveillance System, Jan 2016. Available at: <http://www.cdc.gov/reproductivehealth/maternalinfanthealth/pms.html> .
- 34 Bohrer, Justin et al., "Other adverse pregnancy outcomes and future chronic disease," *Seminars in Perinatology*, Volume 39, Issue 4, 259 – 263. DOI: <http://dx.doi.org/10.1053/j.semperi.2015.05.003>.
- 35 Ibid.
- 36 Robbins CL, Hutchings Y, Dietz PM, Kuklina EV, and Callaghan WM, "History of preterm birth and subsequent cardiovascular disease: a systematic review," *Am J Obstet Gynecol.*, 2014 Apr;210(4):285–97. doi: 10.1016/j.ajog.2013.09.020. Epub 2013 Sep 18.
- 37 DeRoo, L., Skjærven, R., Wilcox, A. et al, "Placental abruption and long-term maternal cardiovascular disease mortality: a population-based registry study in Norway and Sweden," *Eur J Epidemiol* (2016) 31: 501. doi:10.1007/s10654-015-0067-9.
- 38 Knight M, Nair M, Tuffnell D, Kenyon S, Shakespeare J, Brocklehurst P, Kurinczuk JJ (Eds.) on behalf of MBRRACE-UK. Saving Lives, Improving Mothers' Care - Surveillance of maternal deaths in the UK 2012–14 and lessons learned to inform maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2009–14. Oxford: National Perinatal Epidemiology Unit, University of Oxford 2016.
- 39 Rich-Edwards JW<sup>1</sup>, Fraser A, Lawlor DA, Catov JM., "Pregnancy characteristics and women's future cardiovascular health: an underused opportunity to improve women's health?," *Epidemiol Rev* (2014) 36 (1): 57–70. <http://epirev.oxfordjournals.org/content/36/1/57.long>
- 40 Ehrenthal Deborah B., Rogers Stephanie, Goldstein Neal D., Edwards David G., and Weintraub William S. "Cardiovascular Risk Factors One Year After a Hypertensive Disorder of Pregnancy," *Journal of Women's Health*. January 2015, 24(1): 23–29. doi:10.1089/jwh.2014.4811.
- 41 Lee JM, Pili S, Gebremariam A, et al. Getting heavier, younger: trajectories of obesity over the life course. *International Journal of Obesity*. 2010;34:614–623. doi:10.1038/ijo.2009.235

# WOMEN'S HEART ALLIANCE

## The Facts on Women and Cardiovascular Disease (CVD)

- <sup>42</sup> Flegal KM, Kruszon-Moran D, Carroll MD, Fryar CD, Ogden CL. Trends in Obesity Among Adults in the United States, 2005 to 2014. *JAMA*. 2016;315(21):2284-2291. doi:10.1001/jama.2016.6458.
- <sup>43</sup> Geiss LS; Wang J; Cheng YJ, et al. Prevalence and Incidence Trends for Diagnosed Diabetes Among Adults Aged 20 to 79 Years, United States, 1980-2012. *JAMA*. 2014;312(12):1218-1226. doi:10.1001/jama.2014.11494.
- <sup>44</sup> Pope CA III, Burnett RT, Krewski D, et al. Cardiovascular mortality and exposure to airborne fine particulate matter and cigarette smoke: shape of the exposure-response relationship. *Circulation*. 2009;120:941-948.
- <sup>45</sup> Lee JM, Pilli S, Gebremariam A, et al. Getting heavier, younger: trajectories of obesity over the life course. *International Journal of Obesity*. 2010;34:614-623. doi:10.1038/ijo.2009.235
- <sup>46</sup> Geiss LS; Wang J; Cheng YJ, et al. Prevalence and Incidence Trends for Diagnosed Diabetes Among Adults Aged 20 to 79 Years, United States, 1980-2012. *JAMA*. 2014;312(12):1218-1226. doi:10.1001/jama.2014.11494.
- <sup>47</sup> Li X, Holahan CK, Holahan CJ. Sociodemographic and psychological characteristics of very light smoking among women in emerging adulthood, National Survey of Drug Use and Health, 2011. *Preventing Chronic Disease*. 2015;12.
- <sup>48</sup> Pope CA III, Burnett RT, Krewski D, et al. Cardiovascular mortality and exposure to airborne fine particulate matter and cigarette smoke: shape of the exposure-response relationship. *Circulation*. 2009;120:941-948.
- <sup>49</sup> Schane RE, Ling PM, Glantz SA. Health effects of light and intermittent smoking: a review. *Circulation* 2010;121(13):1518-22.
- <sup>50</sup> Bjartveit K, Tverdal A. Health consequences of smoking 1-4 cigarettes per day. *Tob Control*. 2005;14:315-320. doi:10.1136/tc.2005.01193
- <sup>51</sup> Perak AM, Ning H, de Ferranti SD, Gooding HC, Wilkins JT, and Lloyd-Jones DM. Long-Term Risk of Atherosclerotic Cardiovascular Disease in US Adults With the Familial Hypercholesterolemia Phenotype. *Circulation*. 2016;134:9-19, published online before print June 29, 2016. DOI: <http://dx.doi.org/10.1161/CIRCULATIONAHA.116.022335>.
- <sup>52</sup> Towfighi A, Zheng L, Ovbiagele B. Sex-specific trends in midlife coronary heart disease risk and prevalence. *Arch Intern Med*. 2009;169:1762-1766.
- <sup>53</sup> Hispanics and Heart Disease, Stroke [Internet]. Dallas: American Heart Association; c2015 [updated 13 Aug 2015; cited 22 Dec 2015]. Available from: [http://www.heart.org/HEARTORG/Conditions/More/MyHeartandStrokeNews/Hispanics-and-Heart-Disease-Stroke\\_UCM\\_444864\\_Article.jsp](http://www.heart.org/HEARTORG/Conditions/More/MyHeartandStrokeNews/Hispanics-and-Heart-Disease-Stroke_UCM_444864_Article.jsp).
- <sup>54</sup> African-Americans and Heart Disease, Stroke [Internet]. Dallas American Heart Association; c2015 [updated 16 Sept 2015; cited 22 Dec 2015]. Available from: [http://www.heart.org/HEARTORG/Conditions/More/MyHeartandStrokeNews/African-Americans-and-Heart-Disease\\_UCM\\_444863\\_Article.jsp](http://www.heart.org/HEARTORG/Conditions/More/MyHeartandStrokeNews/African-Americans-and-Heart-Disease_UCM_444863_Article.jsp).
- <sup>55</sup> Mozaffarian D, Benjamin EJ, Go AS, Arnett DK, Blaha MJ, Cushman M, et al.; on behalf of the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Heart disease and stroke statistics—2015 update: a report from the American Heart Association. *Circulation*. 2015;131:e98-e110.
- <sup>56</sup> Mozaffarian D, Benjamin EJ, Go AS, Arnett DK, Blaha MJ, Cushman M, et al.; on behalf of the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Heart disease and stroke statistics—2016 update: a report from the American Heart Association. *Circulation*. 2016;133:e151.
- <sup>57</sup> Mozaffarian D, Benjamin EJ, Go AS, Arnett DK, Blaha MJ, Cushman M, et al.; on behalf of the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Heart disease and stroke statistics—2016 update: a report from the American Heart Association. *Circulation*. 2016;133:e98.
- <sup>58</sup> Sampson UKA, Edwards TL, Jahangir E, et al. Factors Associated With the Prevalence of Hypertension in the Southeastern United States: Insights From 69,211 Blacks and Whites in the Southern Community Cohort Study. *Circulation: Cardiovascular Quality and Outcomes*. 2014;7:33-54. Available at: <http://circoutcomes.ahajournals.org/content/7/1/33.full?sid=6e46791e-058e-4542-b9ee-e5fd95ebdb7f>
- <sup>59</sup> Redmond N, Baer HJ, Hicks LS. Health behaviors and racial disparity in blood pressure control in the National Health and Nutrition Examination Survey. *Hypertension*. 2011;57:383-389.
- <sup>60</sup> Blackwell DL, Lucas JW, Clarke TC. Summary health statistics for U.S. adults: National Health Interview Survey, 2012. *National Center for Health Statistics. Vital Health Stat*. 2014;10(260).
- <sup>61</sup> The Affordable Care Act is Improving Access to Preventive Services for Millions of Americans. ASPE Data Point. Washington: Department of Health and Human Services; 2015 May. Available from: <https://aspe.hhs.gov/sites/default/files/pdf/139221/The%20Affordable%20Care%20Act%20is%20Improving%20Access%20to%20Preventive%20Services%20for%20Millions%20of%20African-Americans.pdf>.
- <sup>62</sup> Mosca L, Hammond G, Mochari-Greenberger H, Towfighi A, Albert MA; on behalf of the American Heart Association Cardiovascular Disease and Stroke in Women and Special Populations Committee of the Council on Clinical Cardiology, Council on Cardiovascular Nursing, Council on High Blood Pressure Research, and Council on Nutrition, Physical Activity and Metabolism. Fifteen-year trends in awareness of heart disease in women: results of a 2012 American Heart Association national survey. *Circulation*. 2013;127:1254-1263. Available from: <http://circ.ahajournals.org/content/127/11/1254.long>.
- <sup>63</sup> Ibid.
- <sup>64</sup> Ibid.
- <sup>65</sup> Heart Health Physicians Survey: Survey conducted with 199 primary care physicians (including internists, family physicians, general practitioners and OB/GYNs) and 100 cardiologists. Arlington (VA): Edge Research; 2004 May.
- <sup>66</sup> Tuhim S, Cooperman A, Rojas M, et al. The association of race and sex with the underuse of stroke prevention measures. *J Stroke Cerebrovasc Dis*. 2008;17:226-234.
- <sup>67</sup> Qato DM, Lindau ST, Conti RM, Schumm LP, Alexander GC. Racial and ethnic disparities in cardiovascular medication use among older adults in the United States. *Pharmacoepidemiol Drug Saf*. 2010;19:834-842.
- <sup>68</sup> Bairley Merz CN, Andersen H, Keida M, Sprague E, Walsh MN, Greenberger P, et al. Women Speak up About Heart Health Action: A Women's Heart Alliance Research Report. *Circulation*. Forthcoming 2016.
- <sup>69</sup> Bairley Merz C, Andersen HS, Shufelt CL. Gender, Cardiovascular Disease, and the Sexism of Obesity\*. *J Am Coll Cardiol*. 2015;66(18):1958-1960. doi:10.1016/j.jacc.2015.08.860.
- <sup>70</sup> Mosca L, Mochari-Greenberger H, Dolor RJ, Newby LK, Robb KJ. Twelve-year follow-up of American women's awareness of cardiovascular disease risk and barriers to heart health. *Circulation: Cardiovascular Quality Outcomes*. 2010;3:120-7.
- <sup>71</sup> Mochari-Greenberger H, Towfighi A, Mosca L. National women's knowledge of stroke warning signs, overall and by race/ethnic group. *Stroke*. 2014;45:1180-1182.
- <sup>72</sup> Women's Survey: Survey conducted with 1,011 U.S. women ages 25-60. Washington: GfK Research; 2014 September.
- <sup>73</sup> Mosca L, Hammond G, Mochari-Greenberger H, Towfighi A, Albert MA; on behalf of the American Heart Association Cardiovascular Disease and Stroke in Women and Special Populations Committee of the Council on Clinical Cardiology, Council on Cardiovascular Nursing, Council on High Blood Pressure Research, and Council on Nutrition, Physical Activity and Metabolism. Fifteen-year trends in awareness of heart disease in women: results of a 2012 American Heart Association national survey. *Circulation*. 2013;127:1254-1263.
- <sup>74</sup> Kaiser Family Foundation, Peterson-Kaiser Health System Tracker, "What do We Know About Cardiovascular Disease Spending and Outcomes in the U.S.?", (2016). Available from: <http://www.healthsystemtracker.org/chart-collection/what-do-we-know-about-cardiovascular-disease-spending-and-outcomes-in-the-united-states/>.
- <sup>75</sup> Ibid.
- <sup>76</sup> Melloni C, Mark DB, Douglas PS, et al. Representation of Women in Randomized Clinical Trials of Cardiovascular Disease Prevention. *Circulation: Cardiovascular Quality and Outcomes*. 2010;3:135-142. Available at: <http://circoutcomes.ahajournals.org/content/3/2/135.long>.
- <sup>77</sup> Kochanek KD, Murphy SL, Xu J, and Tejada-Vera B, "Deaths: Final Data for 2014," National Vital Statistics Reports, Hyattsville, MD: CDC, National Center for Health Statistics. 2016;65(4). Available from: [http://www.cdc.gov/nchs/data/nvsr/nvsr65/nvsr65\\_04.pdf](http://www.cdc.gov/nchs/data/nvsr/nvsr65/nvsr65_04.pdf).
- <sup>78</sup> Estimates of Funding for Various Research, Condition, and Disease Categories (RCDC) [Internet]. Bethesda (MD): National Institutes of Health; c2015 [updated: 8 Jul 2015; cited 22 Dec 2015]. Available from: [https://report.nih.gov/categorical\\_spending.aspx](https://report.nih.gov/categorical_spending.aspx).
- <sup>79</sup> Melloni C, Mark DB, Douglas PS, et al. Representation of Women in Randomized Clinical Trials of Cardiovascular Disease Prevention. *Circulation: Cardiovascular Quality and Outcomes*. 2010;3:135-142. Available at: <http://circoutcomes.ahajournals.org/content/3/2/135.long>.
- <sup>80</sup> WISEWOMAN Program Locations Funding FY2014 [Internet]. Atlanta: Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Division for Heart Disease and Stroke Prevention; c2014 [updated 2014 Oct 15; cited 2015 Dec 22]. Available from: <http://www.cdc.gov/wisewoman/funding.htm>.