Improving the Health of Women in the United States: Workshop Summary

DETAILS

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Thomas J. Plewes, *Rapporteur*

Committee on Population
Division of Behavioral and Social Sciences and Education

and

Board on Population Health and Public Health Practice
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The National Academies of
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Acknowledgments

This document summarizes the discussions and presentations of a workshop on subject of the health of women in the United States. The workshop was convened under the direction of the Committee on Population and the Board on Population Health and Public Health Practice of the National Academies of Sciences, Engineering, and Medicine. The workshop was sponsored by the Office of Research on Women's Health at the National Institutes of Health.

We thank the experts on women's health and demography who served on the steering committee for this workshop. They provided invaluable guidance in developing the workshop, securing expert presentations, conducting the workshop, and serving as presenters as well. Although the steering committee played a central role in designing and conducting the workshop, it did not actively participate in the writing of this workshop summary.

The presentations in the workshop were organized into four topical sessions, each designed to shed light on important determinants, consequences, effects, and issues attending the relative disadvantage of women in the United States in comparison with women in other economically advanced nations. In all, 12 presenters contributed presentations in the 1-day workshop held in Washington, D.C., September 25, 2015. The presentations provoked an extraordinarily rich discussion among the participants, and this summary attempts to capture both the formal presentations and the ensuing discussion.

The excellent work of the staff of the Committee on Population and the Board on Population Health and Public Health Practice in developing, organizing, and supporting the workshop is very much appreciated. Thomas J. Plewes, the co-study director, and Mary Ghitelman, the project assistant, devoted long hours to ensure a successful event. Plewes also served as rapporteur, distilling the gist of the presentations and the essence of the discussions for this summary.

This workshop summary has been reviewed in draft form by individuals chosen for their diverse perspectives and technical expertise, in accordance with procedures approved by the Report Review Committee of the National Academies of Sciences, Engineering, and Medicine. The purpose of this independent review is to provide candid and critical comments that will assist the institution in making its published report as sound as possible and to ensure that the report meets institutional standards for objectivity, evidence, and responsiveness to the charge. The review comments and draft manuscript remain confidential to protect the integrity of the process.

We thank the following individuals for their review of this workshop summary: Eileen M. Crimmins, Davis School of Gerontology and Andrus Gerontology Center, University of Southern California; Mark D. Hayward, Population Research Center, University of Texas at Austin; and Afaf I. Meleis, Nursing and Sociology, University of Pennsylvania School of Nursing.

Although the reviewers listed above provided many constructive comments and suggestions, they did not see the final draft of the workshop summary before its release. The review of this report was overseen by Eileen Crimmins, Davis School of Gerontology and Andrus Gerontology Center at the University of Southern California. Appointed by the National Academies of Sciences, Engineering, and Medicine, she was responsible for making certain that an independent examination of this report was carried out in accordance with institutional procedures and that all review comments were carefully considered. Responsibility for the final content of this report rests entirely with the author and the institution.

Peter Donaldson, *Director*
Committee on Population

Rose Marie Martinez, *Director*
Board on Population Health and Public Health Practice

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The Relative Health Disadvantage of U.S. Women

BACKGROUND

A growing literature—the result of several major investigations—is documented in a compelling manner the relative and growing health disadvantage of U.S. women in comparison with women in other countries. In particular, *U.S. Health in International Perspective: Shorter Lives, Poorer Health* (National Research Council and Institute of Medicine, 2013) found that, across many measures, the health of women in the United States was significantly worse than the health of women in many other high-income countries. That report and subsequent discussions have spurred in interest deeper analysis of those differences, elaborating their causes, and detailing their effects.

In her introductory remarks, workshop chair Nancy Adler (Departments of Psychiatry and Pediatrics, University of California, San Francisco) noted that the 2013 report is an example of how careful and authoritative reports not only have an immediate impact but also have ripple effects. This workshop, she said, is one of the ripple effects of that report.

In examining the causes and consequences of women's health disparities, Adler stated that it is important to understand that these span multiple levels. Some involve the health care system, including patients and providers. Others involve risk behaviors, unhealthy diets, low levels of physical activity, and alcohol and tobacco use. Still others factors are further removed from people's daily lives, such as socioeconomic status, insurance status, and inequities in income, housing, safety, education, and

job opportunities. And all of these intersect with issues of race, ethnicity, and geographic location.

Janine Clayton (Office of Research on Women's Health, National Institutes of Health) outlined the rationale and objectives for the workshop. The Office of Research on Women's Health is the architect of the institute-wide initiative at the National Institutes of Health (NIH) to require scientists to take gender into account in preclinical research studies involving animals and cells. The office also leads NIH's efforts to advance women in science careers. Clayton emphasized the need to focus on the factors that are leading to the relative health disadvantage of U.S. women and to work on remedies to support the health of women in this country.

She pointed out that 2015 was the 25th birthday of the Office of Research on Women's Health. Over that time, there have been major gains from research that has shown that lives can be saved and important health questions can be answered through clinical trials. Investments in medical research have yielded significant advances: examples include developing effective means to prevent mother-to-child transmission of HIV and a vaccine that prevents cervical cancer.

At the same time, she noted, the environment for women's health has also changed over the last 25 years. For example, increased use of automobiles can lead to health risks from lack of physical activity. There has also been an increase in access to and consumption of unhealthy food. Other changes in the past 2 to 3 decades include such changes in women's lives as the significant increase in the number of women who are heads of households and responsible for all aspects of a household and family. Many women now are also having children later in life, which poses interesting issues for both biology and sociology. The growing stress faced by women and the effect of stress on health and illness are issues that need a more comprehensive examination, as do issues of mental health and mental illness, which have become more increasingly common and thus more prominent issues for U.S. women. Chronic pain differentially affects women, which has had collateral damage in the surge of opioid abuse, Clayton noted.

During these 25 years, the U.S. maternal mortality rate has been a growing problem as the United States has experienced the highest infant mortality rate of all high-income countries. The United States also rates poorly on most other birth outcomes, such as low birth weight and the fact that American children are less likely to live to the age of 5 than children in other high-income countries.

Clayton stressed that it is important to take a multifaceted approach to these complex topics. Work needs to focus on access to medical care and bias in medical care delivery; factors that influence differences in morbid-

ity and mortality, such as socioeconomic status, education, employment and geography; and health risk behaviors.

The goal of this workshop, then, is to develop a list of key items for attention and postulate a research agenda to systematically approach the main issues. It would be useful, as well, to identify alliances to tackle those issues collaboratively. Finally, Clayton said, it will be important to specify and then to collect data as work is done so progress can be measured.

THE REPORT ON U.S. HEALTH IN INTERNATIONAL PERSPECTIVE

Steven H. Woolf (Virginia Commonwealth University), who served as the chair of the panel that authored *U.S. Health in International Perspective: Shorter Lives Poorer Health*, summarized the findings of that report. His presentation focused on findings with regard to international comparisons of women's health, and he labelled the findings as "disturbing." He offered his conclusion that there is a major public health crisis that affects more than half of the U.S. population, which needs attention.

The panel compared the health of Americans with people in 16 other high-income countries.[1] The goal of the panel was to follow up on the work of a prior panel that had focused on people aged 50 and older (National Research Council, 2011), as well as to look across all age groups at how the health of people in the United States compares with people in other countries, focusing both on mortality and morbidity and quality of life. This task required examining all of the health statistics that were available for comparison purposes.

The report is divided into three parts: the first part documents the health disadvantage; the second part looks at the reasons for this health disadvantage; and the third provides the panel's recommendations. Due to time constraints of this workshop, Woolf said, he will focus on the health findings, and more specifically, on the findings that pertain to women's health.

Mortality in the United States can be classified as falling into three big categories: noncommunicable diseases, communicable diseases, and injuries. Noncommunicable diseases include chronic diseases, such as heart disease, cancer, and diabetes. For communicable diseases, the United States ranks next to last of the countries compared: see Figure 1-1.

[1]The comparison countries were Australia, Austria, Canada, Denmark, Finland, France, Germany, Italy, Japan, The Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

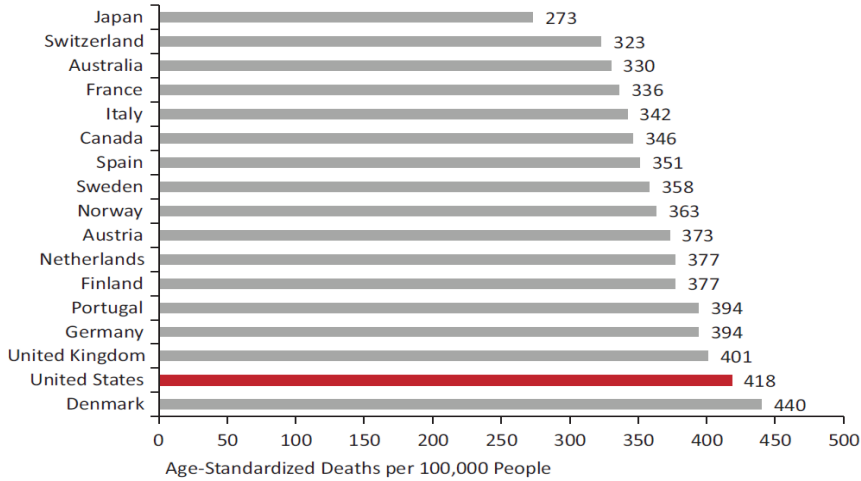

FIGURE 1-1 Mortality from noncommunicable diseases in 17 peer countries, 2008.
SOURCE: National Research Council and Institute of Medicine (2013, Fig. 1-1).

For communicable or infectious diseases, the United States ranks fourth highest in mortality among the comparison countries, and it ranks second highest for mortality from injuries.

The panel took the analysis a step further and probed the very diverse nature of those conditions, Woolf said. Some are traditional chronic diseases, some of them are injuries, some of them are psychosocial problems and some of them are related to maternal and child health. The disadvantage spans a very diverse spectrum of conditions.

The classic indicator that is used for international comparisons is life expectancy: U.S. life expectancy ranks second to the bottom for females. But life expectancy is influenced by mortality at different periods of the life course, so the panel tried to identify the stage of life at which U.S. women incur the disadvantage. Figure 1-2 shows the pattern in life expectancy at birth for females beginning in 1980: the dark dots represent the United States, and the light dots are the comparison countries. As can be seen in the figure, at the beginning of the 1980s U.S. women were was in the middle of the pack, but 25 years later they had fallen to the bottom.

Woolf pointed out that this pattern has been going on for decades and that the trend seems to be worsening. The pattern is true for every age group, from birth to age 75. After age 75, however, U.S. women no longer rank at the bottom. Some analysts have suggested that women who make

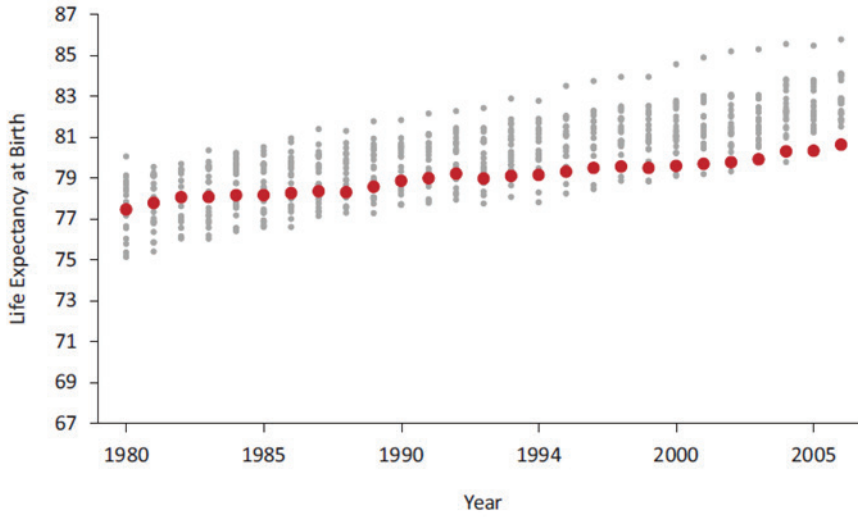

FIGURE 1-2 Life expectancy at birth for females in 21 high-income countries, 1980-2006.
SOURCE: National Research Council (2011, Fig. 1-4).

it to 75 are in good shape in the United States, but all through the life-course stages leading up to that age they are at a health disadvantage.

The life expectancy disadvantage is a pervasive problem across all age groups. The probability of a U.S. woman surviving to age 50 is lower than that of a woman in any of the comparison countries.

Woolf reported that the panel he chaired and its predecessor were both intrigued by the fact of higher U.S. female mortality and sought to identify potential explanations. One hypothesis concerns smoking rates and trends. The epidemiologic data on smoking rates and smoking-related deaths suggest that because smoking is a behavior that creates tobacco-related illness decades after the onset of the behavior, the peak in tobacco-related illness comes many years after the peak in smoking behavior.

This hypothesis is supported by the data. The peak in male smoking in the United States in the post-World War II period preceded the peak for female smoking. The U.S. women's peak in trachea-related illness started to climb after the smoking peak, providing evidence of the after effect of the delayed increase in smoking rates. However, based on further assessment of international trends, the panel concluded that although smoking may have made some contribution to the health disadvantage, it does not fully explain it.

This analysis, Woolf explained, was a reason for the panel to take a comprehensive look at health access, health quality, and health behaviors, as well as socioeconomic conditions (poverty rates, patterns in income inequality, and educational status) and the physical and social environment (how U.S. cities are organized, the environment, air pollution, social capital, residential segregation, and social instability). A difficult but necessary domain for the panel was to assess the role of public policies in the observed outcomes, including spending, cultural values, how society make decisions about how lives are structured, education, types of jobs and employment.

OTHER EVIDENCE

Woolf next summarized some corroborating findings from other studies that continue to point to a health disadvantage for U.S. women. For example, there appears to be a geographical component. A series of studies by Kindig and colleagues have compared mortality rates at the county level for the United States for the 1990s and the current period (see, e.g., Kindig and Cheng, 2013). Importantly, in 42 percent of U.S. counties, mortality rates for women have increased since the 1990s. The conclusion is that there is more than a generic phenomenon in terms of the United States in comparison with other countries: spatial epidemiology also plays a role.

The role of education is also important. The work of David Cutler and colleagues (2011) included analysis of different datasets in order to focus on race, gender, and education trends in life expectancy. This work identified the special phenomenon that white women with low levels of education experience dramatically lower life expectancy than better educated white women. The same phenomenon was identified by Olshansky and colleagues (2012).

Recent work at the Urban Institute makes a contribution by identifying different potential factors that may explain these phenomena. Figures 1-3 and 1-4 compare reasons for causes of death rates for white and nonwhite non-Hispanic women for 1999 and 2011. The arrows indicate the direction of the causation over time.

The general trend is a decrease in mortality over the period, but with some factors having increased effects and others having decreased effects. Some interesting factors have emerged, most notably, accidental poisoning, which is mostly drug poisoning. It has increased remarkably for both males and females (Richardson et al., 2015): see Figure 1-5.

Drug poisoning deaths are now competing with motor vehicle crashes as the leading cause of unintentional injury deaths in the United States. It is important to distinguish this trend from intentional drug poisoning—

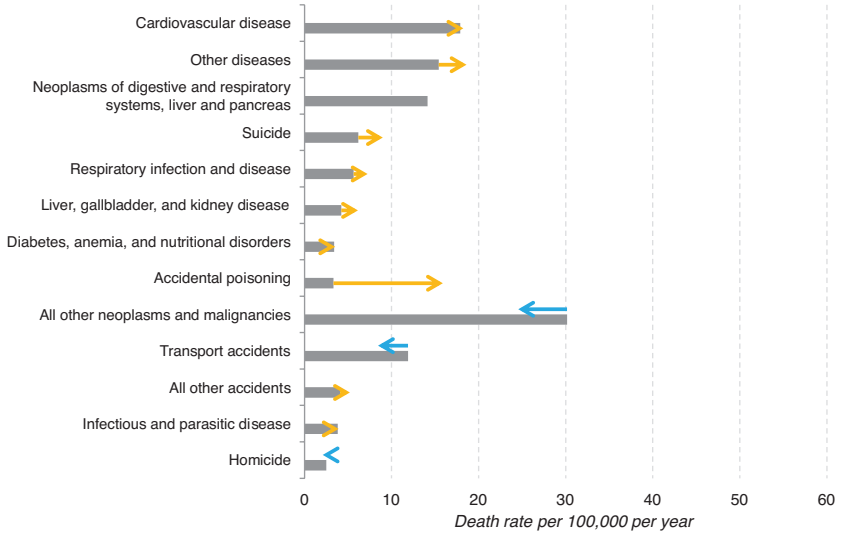

FIGURE 1-3 Trends in death rates for non-Hispanic white women aged 12-54, 1999 and 2011.
NOTE: See text for discussion.
SOURCE: Astone et al. (2015, p. 3).

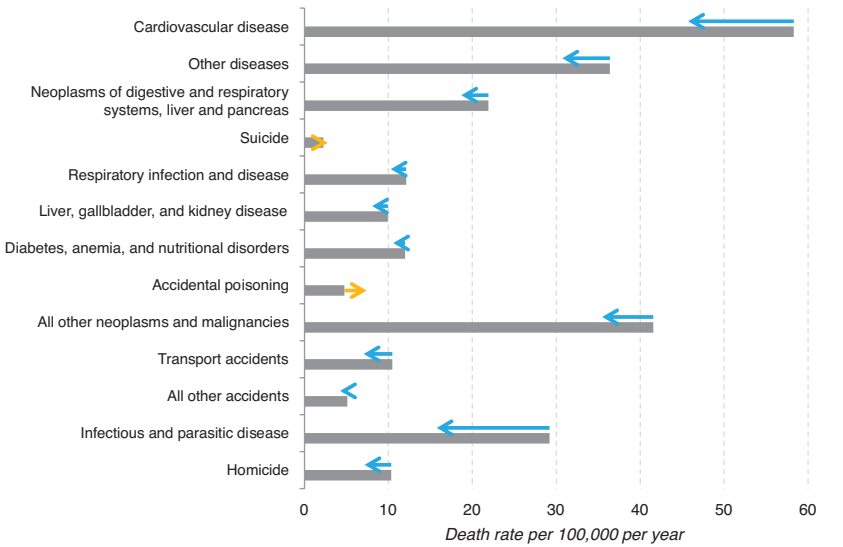

FIGURE 1-4 Trends in death rates for nonwhite, non-Hispanic women aged 15-54, 1999 and 2011.
NOTE: See text for discussion.
SOURCE: Astone et al. (2015, p. 5).

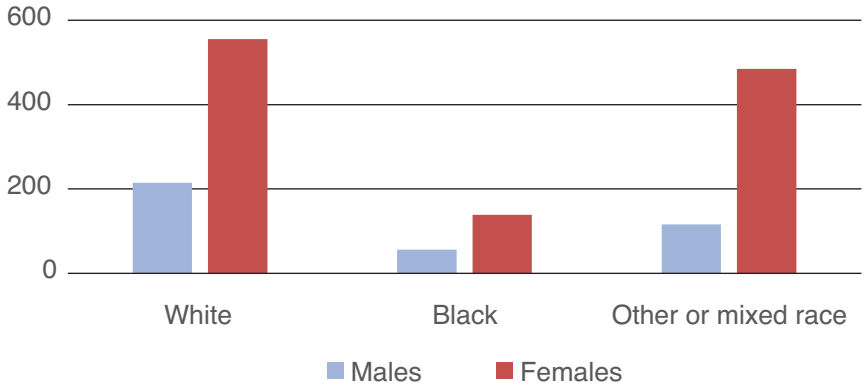

FIGURE 1-5 Percentage increase in poisonings between 1994 and 2010.
SOURCE: Data from Richardson et al. (2015, Table 1, p. 1682).

people committing suicide by taking a drug overdose, which has not increased much. Rather, it is unintentional deaths from drug ingestion (much of which is thought to be due to pharmacologic opioid prescriptions) that has climbed dramatically. As can be seen in Figure 1-5, women are far more affected by the growth of drug poisonings than men.

Woolf then turned to the big picture, using the World Health Organization's conceptual model for the determinants of health to classify the interrelationships of the determinants and outcomes: see Figure 1-6.

Woolf suggested that the figure illustrates that it is useful to think about the inequity the health of U.S. women in terms of the environments in which women live and their life-course experience across the various domains that affect health. It also illustrates that there is a tremendous need for research, some of it the most basic of research, to try to understand the gaps revealed in descriptive epidemiology.

Woolf also stressed that public investment is an important factor in health outcomes. He referred to the work of Bradley and colleagues (2011) about how much that a society invests in social services and other programs outside of health care may be very important to health outcomes. Figure 1-7 shows all the countries of the world ranked in terms of the ratio of how much they spend on social services and health services and their gross domestic product. There is a cluster of industrialized countries in one section of the figure, with the United States clearly outside that cluster. That is, although the United States spends relatively more on health services than the other countries, it spends relatively far less on social services and, overall, it has worse health outcomes. The countries that spend relatively more on social services (above the OECD average) have longer life expectancies than the United States and better health outcomes.

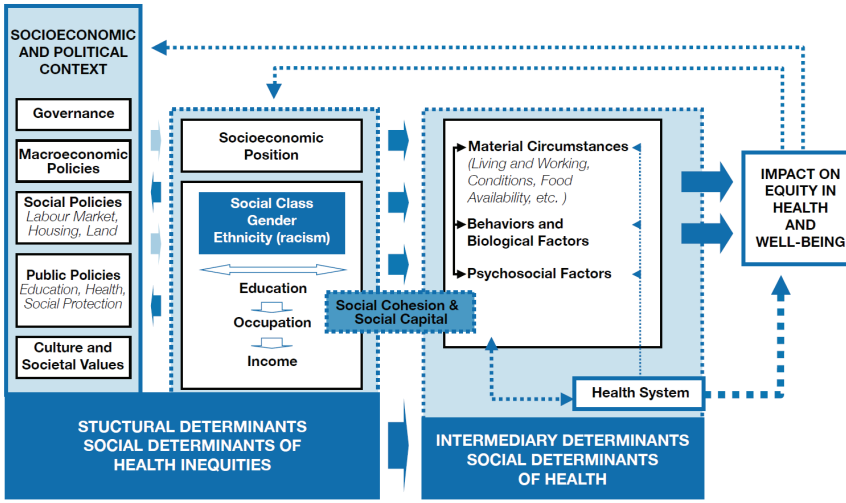

FIGURE 1-6 World Health Organization conceptual determinants model.
SOURCE: Solar, O., and Irwin, A. (2010). *A Conceptual Framework for Action on the Social Determinants of Health. Social Determinants of Health Discussion Paper 2.* Geneva, Switzerland: World Health Organization. Reprinted with permission, Figure A, p. 6 (final form of the CSDH conceptual framework).

Woolf pointed out that the public health implications of the problem of the disadvantage of U.S. women also extend to their children. He expressed a concern that the causes of the adverse health disadvantage for U.S. women might have implications for the next generation, who are being raised by those women. For this reason, he summarized, coming to an understanding of the cause of the growing health disadvantage for white women in the United States in comparison with their peers in other high-income countries will be important for understanding the factors that likely affect women of all races and ethnicities in the country.

DISCUSSION

Following up on this point, a workshop participant wondered if the mortality trends for white women have been evident for black women and Hispanic women over the past 25 or more years. Woolf responded that the available data do not permit the conclusion that there is a lagged effect so that the problems of white women will in the future be shown to be affecting other racial and ethnic groups. It could also be that the current trends are a sentinel effect: what is being seen in white women now is going to be coming next to other women. There is a need, he said, for

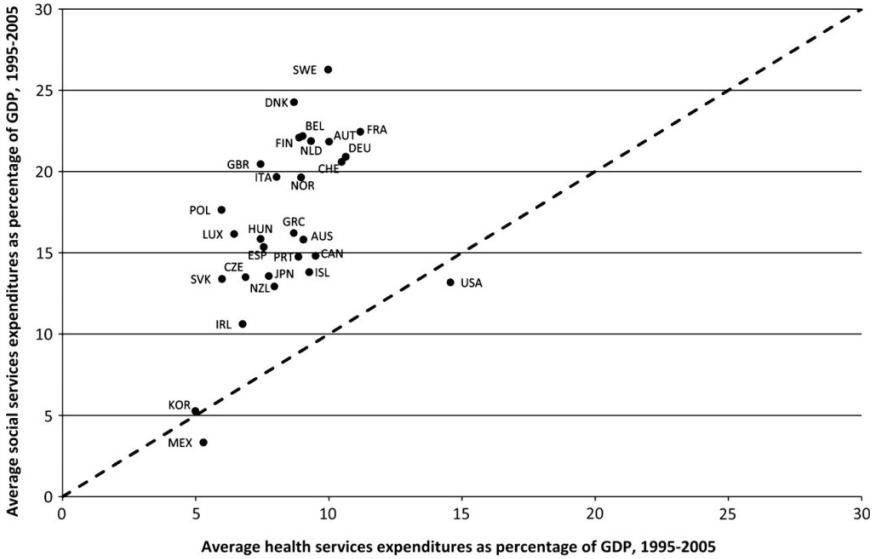

FIGURE 1-7 Countries ranked in terms of the ratio between how much they spend on social services and health services and gross domestic product (GDP), 1995-2005. SOURCE: Bradley, E.H., Elkins, B.R., Herrin, J., and Elbel, B. (2011). Health and social services expenditures: Associations with health outcomes. *BMJ Quality & Safety, 20*(10), 826-831. Reprinted with permission from BMJ Publishing Group Ltd.

the funding of some simple descriptive epidemiologic studies to try to analyze in appropriate detail what conditions are responsible for what is now being observed and the time trends as to how those causes of death have evolved over time. He postulated that this would not be expensive research—just basic "shoe leather" epidemiology—to figure out the causes and answer some of the basic questions.

Another participant asked about the role of cigarette smoking, which was mentioned, relative to such other factors as physical activity or dietary factors that may contribute to the obesity epidemic that is important in terms of health outcomes and mortality. Woolf responded that it is important to think about all five domains—health systems, health behaviors, socioeconomic conditions, physical and social environment, and public policies and social values. Health behaviors, including physical activity, need to be considered, as well as the complex interactions between the domains. This kind of analysis would require postulating the interactions and then "unpacking" the interrelationships through traditional epidemiologic methods, such as multivariate regressions. He underscored the importance of considering that health behaviors are shaped by the envi-

ronment and by socioeconomic conditions and that they need to be understood holistically in the context of all of the factors.

Returning to the international comparisons, a participant asked whether it would be possible to identify countries in which women's health outcomes are relatively better and then identify the characteristics of the countries where women are doing relatively better in comparison with U.S. men. Woolf replied that the study panel did not do that level of analysis. However, the report did look across the five domains—including the fifth domain of the nature of the macrostructural environment in those other countries—and to the extent possible with the available data, listed their public policies, social services, investments in supporting families and early childhood development, and other social services. Generally, the panel concluded that the countries that are doing better than the United States in health outcomes—for both women and men—generally have far more robust social service and related programs and policies than those in the United States. For example, mandated maternal leave is standard in in all the other countries but is not mandated or widely available in the United States. Though these comparisons yield clues, the lack of available cross-national data for making comparisons limits the ability to identify causal factors.

2

Institutional Factors That Influence Differences in Women's Health Outcomes

In developing the agenda for the workshop, the steering committee identified a wide range of factors that could influence the differences in U.S. women's health outcomes in comparison with outcomes in other countries. Those potential factors include several institutional factors that were discussed at the workshop: access to health care, possible biases in the delivery of health care, and the quality of health care for cardiovascular disease and diabetes.

ACCESS TO HEALTH CARE

In her opening remarks, Alina Salganicoff (Henry J. Kaiser Family Foundation) argued for incorporating gender-stratified analysis in all work on public health issues. The gender-specific analysis that has been done illustrates the importance of learning about why there are significant differences in mortality and in well-being between women in the United States and women in other countries and also within different groups of women in the United States. Her presentation included findings from unpublished surveys by the Kaiser Family Foundation.

Access to medical health care is one of the key components in health, Salganicoff noted, but she said that other health care services to women—beyond what actually takes place in doctors' offices—are also important to health outcomes. An examination of access issues would include insurance coverage, the range of services that women need, and how they use the available service. It would also include how primary

care, preventive services, reproductive and sexual health care services, mental health, chronic conditions, and cancer contribute to or diminish women's health.

Access should be examined over the life span, Salganicoff said. Though the report on international comparisons discussed by Woolf cover the mortality of women before age 50, it is important to consider issues of access for women over the age of 50. For those older women, a key issue is one's quality of life.

Health Insurance

Salganicoff said that progress is being made in the area of health insurance. The Affordable Care Act (ACA) has affected coverage rates for both women and men in the United States. From 2010, before the ACA was enacted, to 2014, the uninsured rate for women fell from 19 percent to 11 percent (National Center for Health Statistics, 2015). Over this period, there have been in increases both in enrollment in Medicaid and in private insurance. The increase in Medicaid enrollment has taken place even though only about half the states expanded Medicaid to include their poorest residents, she noted.

The uninsured rate for men is higher, largely because men have not historically qualified for Medicaid. The larger proportion of female enrollees is evident in all states, not just those in which Medicare has been expanded. Salganicoff's conclusion is that women place a priority on having health coverage. She speculated that the larger proportion of female enrollees may be due to their past experiences with the health care system.

But many women still are not insured. She referred to a 2014 survey conducted by the Kaiser Family Foundation (unpublished) that looked at why the uninsured remained uninsured. For purposes of this workshop, she stratified the results by gender. Even after the expansion of Medicaid, 47 percent of women responded that the available insurance was too expensive: 13 percent who said they were unemployed or not eligible through work; 8 percent who were told they were ineligible; 7 percent who said they were not eligible because of their immigration status; and only 4 percent of women who said they do not need insurance. (The survey did not include information on the other 15% of women who reported that insurance was too expensive.) Salganicoff said that these data indicate that women overwhelmingly want to be insured, but they do not have a pathway to get coverage.

Coverage is important because it enables access to a usual source of primary care, she noted. In turn, having a usual source of primary care is an important determinant for successful health outcomes.

Type of Providers

Other survey data show that women use the health care system differently than men. For example, one study (Salganicoff et al., 2014) found that women are much more likely to have multiple providers. One-quarter of women said that one of their routine providers is an obstetrician/gynecologist, but that changes over their lifetimes; and as they age, they rely on other specialists and so become accustomed to relying on multiple providers. The penchant for using multiple providers introduces issues of communication and care coordination. The effect on health outcomes of using multiple providers needs more research, she said.

The type of insurance coverage also determines the type of providers that women use. Women with private insurance are much more likely to use a private doctor's office or a health maintenance organization (HMO). Women with public insurance tend to use clinics, although with the advent of ACA, a significant share of them are now using HMOs or doctors' offices. Women who are uninsured obtain their usual care largely in clinics, or, for 16 percent, in emergency rooms. Salganicoff suggested that a research agenda on women's health consider the effects of these different sites of care on outcomes, considering how they shape the type of care that is provided.

Preventive Services

Another impact of the ACA has been to broaden coverage of preventive services. Because of the impotence of preventive services, the U.S. Preventive Services Task Force, the Advisory Committee on Immunization Practices, and the Health Resources and Services Administration of the U.S. Department of Health and Human Services recommend or require that all private insurance plans cover several services without cost sharing. Many of these services, such as Pap tests to screen for cervical cancer and mammograms to screen for breast cancer, as well as blood pressure, cholesterol, and colon cancer screening, are critical to women's health outcomes.

The 2013 Kaiser Women's Health Survey (unpublished) found that rates of Pap tests, mammograms, blood pressure, and cholesterol screenings were already quite high for women with both private and public insurance programs. However, fewer than one-half of the insured had colon cancer screening and the rates for the uninsured were well below the rates for the insured. Screening is an important step, but more research is needed on what happens after screening. For example, African American women are more likely to get a Pap test than non-Hispanic white women, but they have a higher incidence of cervical cancer and a higher likelihood of mortality from cervical cancer.

Reproductive and Sexual Health

Salganicoff discussed another issue of importance to women's reproductive and sexual health—contraception. She stressed that reducing the rate of unintended pregnancy and increasing the rate of intended pregnancy could make a really huge difference in women's quality of life and their health and well-being. One in five women of reproductive age is not using any contraception, which is the reason for the high unintended pregnancy rate in the United States relative to other countries. About one-half of pregnancies are unintended pregnancies, and they tend to result in poorer outcomes, perhaps starting with delayed initiation of prenatal care. The consequences appear to differ by race and ethnicity. It would be especially important for research and analysis to focus on American Indian and Alaskan Native populations.

A research agenda on women's health should take into account the improvement in the use of long-acting reversible contraceptives, such as intrauterine devices, implants, and injections. Such contraceptives are now covered by insurance, and it is likely that usage will increase: the effect on the unintended pregnancy rate should be measured, Salganicoff said. It is important also to understand the reason for the long-standing dramatic declines in teenage birthrates: Is the decline due to reduced sexual activity, increased access to contraception, or both?

The rates of preterm births, which are declining, are another topic worthy of further research. Infant mortality is extensively researched, but the United States also has unacceptably high maternal mortality, with particularly high rates for African Americans, Salganicoff noted.

Violence

Violence in women's lives is related to both well-being and health. It can be as blatant as the sexual assaults on college campuses, or it can be related to issues of sexual identity, sexual orientation, and the health disadvantage of bisexual women, which is emerging as a topic in research. The issue is persistent, and Salganicoff contended that this is an area that is ripe for exploration.

Despite the high prevalence of violence in women's lives, it is not a topic that is often discussed between women and their doctors or other health care providers. The 2013 Kaiser Family Foundation women's health survey (unpublished) found that only about one in four women have ever discussed, or have discussed in the past 1-3 years, any level of dating or sexual violence.

An associated topic is mental health, which is an important area for researchers. There are differences in the types of mental health conditions that affect women and men. In addition, little is known about the

relationship between mental health and other health conditions. Likewise, depression, anxiety, and postpartum depression need study. Research has shown that women experience double the rates of serious psychological distress of men. Yet only 41 percent reported that they discussed a mental health issue, such as depression or anxiety, with their health care provider in the past 3 years (unpublished Kaiser Family Foundation survey).

Costs and Time

Costs and time play a role in obtaining health care, Salganicoff said. The 2013 Kaiser Family Foundation survey (unpublished) found that 65 percent of the uninsured said they delayed or went without needed care because of cost, which is not surprising. But surprisingly, 16 percent of those with private insurance and 35 percent of those on Medicaid reported that costs were a barrier to obtaining health care, citing increasing deductibles and premiums as reasons. Over the past 5 years, workers' earnings have increased by about 10 percent while deductibles now cost 67 percent more than in 2010, and premiums have increased by an average of 27 percent.

Logistical issues also loom large for women. Often, they just cannot find the time to obtain care. In the 2013 Kaiser Women's Health Survey, about one in four women said that they delayed or went without needed care because they could not find time. This included one in four women, particularly low-income women, who said they could not take time off of work. Many women in low-wage jobs do not have sick pay leave, and they forfeit wages when they go to the doctor. In addition, one in five low-income women said that they could not take time to obtain health care because they had problems getting child care. Postponing or delaying care can affect women's health and well-being.

Long-term care is a women's issue because it is hugely expensive, and women have higher rates of chronic conditions and limited functional status than men at every age and thus are more likely to need long-term care. Moreover, Salganicoff said, when women get ill, they are much less likely to have social support than men. For example, 41 percent of women today who are over 65 are widowed, compared with 13 percent of men. One-third of those widows are living alone, and 39 percent live on incomes of less than $20,000 a year. Moreover, women are much more likely than men to serve as caregivers, which can affect their own health and well-being.

In closing, Salganicoff emphasized that insurance coverage matters: things are improving but still far short of where the nation needs to be, and women experience barriers for all types of services. She suggested the need for a gender-sensitive approach to research on health services and public health, as well as clinical research.

Discussion

In response to a question from the floor, Salganicoff said that women sometimes do not avail themselves of care for addictions because of concern for their children. They fear that, once the police and the courts get involved, there is a possibility of losing their children. That fear makes a huge difference in the likelihood of their seeking care.

A participant noted that issues of substance abuse and mental health disorders are extremely complex situations. There is a lack of capacity in treatment programs that can accommodate children and pregnant women, and there is a stigma attached to substance-abusing women. For female drug users, particularly those who have children, that stigma is a huge barrier to seeking services.

BIAS IN MEDICAL CARE DELIVERY

The subject of bias in health care delivery as a factor in explaining the relative differences in women's health was addressed by Paula Johnson (Harvard Medical School and Brigham and Women's Hospital). As background, she first introduced the Social Progress Index, developed by a collaboration of a number of health institutions and the Harvard Business School. The index looks at the foundations of well-being with data from about 130 countries, which represent 95 percent of the world's population.

In this index, as in the study discussed by Steven Woolf (National Research Council and Institute of Medicine, 2013) earlier in the workshop, the United States is ranked low—35th with regard to the foundations of well-being and 68th in health and wellness. The Social Progress Index found that the factors driving the country's low rankings are premature deaths from noncommunicable disease, obesity, disparities with regard to the environment, and violence.

As further background, Johnson reminded participants of a few of the factors that affect women's health. She noted that the disadvantage of U.S. women is not only in terms of mortality but also in terms of morbidity. Depression is the number one cause of women's disability in the United States, as it is around the world. She said that women are 70 percent more likely to be diagnosed with depression across their lifetimes, and they are misdiagnosed somewhere between 30 and 50 percent of the time. Johnson also noted that the higher rates of cancer for U.S. women are associated with cigarette smoking: lung cancer is the number one cancer killer of women. It is important to note that although smoking rates are plateauing, women develop lung cancer with less smoking than do men.

Women who are nonsmokers are more likely to be diagnosed with lung cancer than male nonsmokers, but Johnson observed that the current criteria for screening for lung cancer are the same for women and men.

She suggested that they should be different. Screening should take into account that there are powerful combinations of risk factors that predict lung cancer in nonsmoking women that usually occur at a much younger age for women than for men.

A major health system issue in the United States, Johnson stated, is the fragmentation of health practice and service. At the patient level, this translates into a lack of integration across providers. At the physician level, it translates into a lack of integration of gender-specific information into practice. There is also a failure to take a life-span approach, to look only at women's health at specific times or for specific episodes of life.

Johnson then introduced three discrete examples to illustrate the topic of bias in health care delivery—caregiving, violence, and the need for a model for care delivery that is more integrated for women of reproductive age.

Caregiving

Caregiving is a major women's health issue. Johnson reported estimates that 25 percent of women caregivers have health problems as a result of their caregiving activities (Family Caregiving Alliance, 2016). In addition, the reported health issues of caregivers are more severe than for women generally: 25 percent of female caregivers reported fair to poor health, in comparison with 12 percent of women more generally. Other differences in the study noted by Johnson were that women caregivers were twice as likely *not* to fill a prescription because of cost than noncaregivers, and they tended to have mammograms less often than recommended.

Johnson reported other risks to a woman's health if she is a caregiver. The relative risk of the development of cardiovascular disease in women caring for an ill or disabled spouse for more than 9 hours a week is nearly twice the average risk—1.82. And the relative risk of death from coronary heart disease is about 2.5 times higher than the average for women. And women who provided 36 or more hours of care weekly to a disabled spouse were almost 6 times more likely than noncaregivers to experience depressive symptoms. Caregivers were also 2.5 times more likely than non-caregivers to live in poverty and to receive supplemental security income (from the Social Security Administration).

Johnson next discussed an ongoing study at the Brigham and Women's Hospital that is looking at transitions of care by the Patient-Centered Outcomes Research Institute. The survey asked people who were being discharged from the hospital about receiving care and caregiving responsibilities. The preliminary findings are revealing: 24 percent of female patients reported that they were cared for by their husbands

while 48 percent of the male patients reported that were cared for by their wives; 29 percent of the women were a caregiver for someone else, compared with 17 percent of the men were also caregivers. Of the caregivers, 61 percent of the women were full-time caregivers; only 35 percent of the men were full-time caregivers.

These issues are not being adequately addressed in the health care system, Johnson said. She advocated for acknowledging that caregiving is a major issue at the individual and population levels. She emphasized the need for community and public health strategies in both ambulatory and inpatient settings that address caregiving as a risk to health.

Violence

The experience of violence is the highest correlate of chronic disease in women. Violence is associated with depression, obesity, cardiovascular disease, substance abuse, and pain. It brings an increased risk of depression. Johnson said that research shows that women who have experienced domestic violence are 80 percent more likely to have a stroke, 70 percent more likely to have heart disease, 60 percent more likely to have asthma, and 70 percent more likely to drink heavily than women who have not experienced intimate partner violence (Centers for Disease Control, 2008).

Recognizing this issue of violence, a new concept called trauma-informed care, is emerging. The key elements of trauma-informed care are (1) realizing the prevalence of trauma, (2) recognizing how trauma and exposures to violence, especially cumulatively, affects people, and (3) responding by putting this knowledge into practice.

Care for Reproductive-Age Women

Johnson asserted that reproductive health and cardiovascular health live in separate silos, in spite of what is known about their relationship to each other. Women who experience preeclampsia, gestational diabetes, preterm delivery, or have a low birth-weight baby will in later years have twice the risk of cardiovascular death as that of women who did not experience those conditions or outcomes. Research is finding that children of these women will also be at higher risk for negative health outcomes.

There is a racial disparity in pregnancy-related conditions, Johnson noted. Although rates of preeclampsia and gestational diabetes are increasing among white, black, and Hispanic women, the rate is increasing significantly more for black women. For all groups, the increase underscores the importance of looking across the life span at diseases that affect women's health and the ultimately the health of their children.

Johnson acknowledged that there is a lack of evidence-based research on how to decrease the risk of pregnancy-related conditions. Along with such research, there is also a need for improved measurement. Such important measures as the Healthcare Effectiveness Data and Information Set (HEDIS), which are used to evaluate health care systems by a set of standard measures, are not stratified by gender. Although some of the measures are female specific, most are aggregated. She noted the new Triple Aim Initiative, which was instituted by the Institute for Healthcare Improvement to measure improvements in the individual experience (quality and satisfaction) in the health of populations, along with reductions in per capita costs of health care.[1]

In closing, Johnson observed that the advancement of the idea of precision medicine in the health care delivery system requires sensitivity to gender issues.

Discussion

A workshop participant inquired about the status of the important research on caregiving as a risk factor. It would be important to segregate the impact of caregiving by educational level, race, and culture. Johnson replied that some studies are under way, but the data are preliminary, and sample sizes have been too small to support conclusions. She stated that there is a need to get caregiving on the agenda for funding and research organizations and agencies and to organize larger multicentered trials so the full depth and breadth of the problem can be examined.

Another participant turned to the issue of physician effects. He expressed a concern that male physicians (who are twice the number of female physicians) may not be as aware of some of these women's health issues. There is a need for outreach to male health care providers.

In response, Johnson underscored the need to implement evidence-based structural change in the health care system so that recognition of the issues becomes part of the delivery system. For example, questions about caregiving should be part of the normal conversations between health care providers and women patients. It is also important to identify and deal with the stress that accompanies caregiving. A participant asked if it would be possible, within the context of electronic health records, to include prompts that are relevant to gender so that information that will help guide solutions is made readily available. With regard to bias in the delivery system, necessary changes could be incorporated in medical training. Johnson agreed that incorporating gender-specific prompts

[1]For detailed information on the Triple Aim framework, see http://www.ihi.org/engage/initiatives/tripleaim/Pages/default.aspx [January 2016].

on electronic medical records would be helpful, but would not be the whole answer to the problem. Changes in the means of identifying treatments based on evidence are also needed. For example, medical personnel already screen for domestic violence because it is a requirement of the Joint Commission on Accreditation of Health Care Organizations, but in many cases, checking the box is not followed by an understanding of the history of the violence and its cumulative effect.

In a follow-up question, a participant wondered about the practical implications of some of the research that was just reported. Once you have determined the importance of a certain potentially harmful factor, such as caregiving, the question becomes what to do about it. Health care professionals need access to support systems—social support services, peer navigators, and other support systems—to help with the economic and health care challenges that individuals face. These systems need to be developed. The research agenda needs to include evaluations to see what those interventions should look like.

Johnson responded that it is important to think in terms of implementation science around these particular issues. The implementation would include not only social supports, but also traditional approaches to such issues as the risk factors for cardiovascular disease. Such an approach requires a merging of two worlds of medical care.

QUALITY OF CARE FOR CARDIOVASCULAR DISEASE AND DIABETES

Chloe E. Bird (RAND) reported on current research that is mapping differences in quality of care using the HEDIS measures that focus on cardiovascular disease and diabetes to understand why women receive poorer quality care than men. She prefaced her remarks with the observation that, in any other area of routine care except cardiovascular disease and HIV, women have higher quality of care than men. The data show that if women have insurance and access to care, they get screened for various conditions at higher rates than men. They also generally get their prescriptions and take them, and they often have better outcomes, except for cardiovascular disease.

Bird addressed attempts to determine if cardiovascular disease is actually different in men than in women. Although the 1993 Revitalization Act (amended in 2001) directed the National Institutes of Health (NIH) to include appropriate proportions of women and minorities in research, gender-based analysis is not required. If one wants to understand women's health, she argued, it is important not only to have women in the research but also to analyze the data by gender.

Bird referred to research that shows that women have different types

of heart disease than men—they are much more likely to have blockage in the small vessels of the heart, microvascular disease (Handberg et al., 2006). This becomes a problem if angioplasty is not properly placed.

Secondary prevention is another example of gender differences in cardiovascular care, Bird noted. Statins are generally prescribed, but they do not seem to be tolerated as well in women as they are in men. Women often report musculoskeletal pain from statins. So women are less likely to be getting care from a cardiologist, but, when they are, they are also less likely to be getting titrated on a statin, thus able to control high cholesterol. These differences have tended to shift the survival curve in favor of men.

California has seen a shift in the heart-disease survival curve for women. In 2013, for the first time, the state saw the same rates of women dying from heart disease as men. To understand this trend, RAND mapped gender gaps in care based on data from the California health plan (Bird et al., 2014). The study focused on people with cardiovascular disease and whether the quality of care and screening for high levels of LDL cholesterol would help to explain this trend. In seven of the eight regions in California in the study, women were not getting as high-quality care as men. In three of the regions, the care gap was more than 5 percentage points. Bird said the same gap in care is true for diabetes, a disease that traditionally affects women more than men. Diabetes affects the risk of cardiovascular disease, and it has a bigger effect on women than on men: for men, diabetes doubles the risk of cardiovascular disease; for premenopausal women, it quadruples the risk. In a study at the county level in California using data from one health plan, the same relationship was found: 79 percent of the counties had gaps in care that favored diabetic men at risk for cardiovascular disease (Bird et al., 2014). Recent research shows that women have 40 percent greater likelihood of having a heart attack if they have diabetes than do men (reported by *Diabetologia*, 2015).

These findings relating to the gender gap and its effects have been building over many years. RAND studies have looked at gender, race, and socioeconomic disparities in the quality of care for cardiovascular disease and diabetes over more than a decade (see Bird et al., 2007). The studies found gender gaps across all of these measures.

Quality of care plays a role in outcomes, too, Bird noted. The mapping analysis indicates that HMOs are better at hitting quality indicators than preferred provider organizations (PPOs). In routine aspects of care, HMOs do a good job in comparison with PPOs. This finding may be related to the fact that HMOs are designed to emphasize routine, inexpensive aspects of screening, treatment, and also hitting intermediate outcomes. Also of importance, the mapping study found that there were no gender gaps on average among the HMO patients, but there were gaps for PPO patients (Bird et al., 2014).

Bird concluded that the mapping approach is showing promise as an analytical tool. It has been extended to using the data from the Centers for Medicaid & Medicare Services, looking at all of the measures that are available across the entire Medicaid managed care sample and focusing on measures for which there was a gap of 5 percentage points or more. To summarize the research, for all of these measures except the control of high cholesterol, women did better than men. Other indicators tended to show that differences in cardiovascular outcomes were much larger for gender than for socioeconomic status. The gaps for younger women were more pronounced than those for older women.

Although mapping holds promise, there are challenges, Bird said. For one thing, analysis of the gender gap by race and ethnicity faces an obstacle in that health plan data do not generally include data on race and ethnicity; consequently, investigators have had to develop algorithms for interpolating race data. Bird speculated that these beginning analytical efforts may be enhanced by the new NIH Institute for Minority Health and Health Disparities.

A participant asserted that NIH has done a better job of including more women in its sponsored trials and surveys, but NIH is not necessarily doing subgroup analysis on women. Other federal agencies are doing less. For example, the U.S. Food and Drug Administration (FDA) is not required to do subgroups analysis on women (as NIH is), and that agency seems reluctant to push subgroup analysis on studies conducted by industry. The participant posited that the lack of analyses by gender affects the validity of those studies, and FDA is therefore making decisions about whether to approve a drug or device on the basis of inadequate studies. For example, the questioner suggested that cardiac devices are not being studied for their effects on women.

Bird responded that it is important for federal agencies to set requirements for analyses by gender both for grant reports and published journal articles. The requirement for gender analysis is gaining ground in Europe, she noted, where it is becoming the standard. Other countries make an effort, when deciding about health and health care funding, to give women "a seat at the table." She stated that the NIH Office of Research on Women's Health is able to promote this approach, but the organization is small and has limited ability to implement the widespread changes in approach throughout NIH.

A participant suggested the creation of a repository for federally funded research in order to create a body of knowledge on women's health issues. The repository might be able to support investigators to readily research knowledge about women's issues.

Another participant returned to the role of FDA, noting that its Office of Women's Health published a report in 2013, which indicated that while

there are some areas where progress still needs to be made, in the majority of the reports the gender analyses are being done. The FDA is now trying to find ways that advance the knowledge and address women's issues in the current climate. Bird suggested that a step in the direction of subgroup analysis would be for the FDA to require that one of the publicly available pieces of information be whether the particular medication works in women.

Another participant pointed out that surveillance data from the U.S. Department of Health and Human Services do not adequately present data disaggregated by gender. Surveillance data, which include thousands and thousands of interviews or records review, should easily be able to provide information by gender.

Bird responded that agencies claim that providing data by gender cuts the data too thin for reliable analyses. The counterargument is that women are the majority of the population and that it is possible to draw more conclusions from the available data than is now being done. One approach is to isolate one area for focus. The reason for the success in treating breast cancer is that the women's health movement focused on that disease, she said. Today, the money that goes to research on breast cancer research is three times more than the money that goes to all research on heart disease.

A participant suggested that it would be useful to engage editors and reviewers of research-based papers in focusing on the influence of gender. In response, Bird reported that one publisher, Elsevier, is including this emphasis in its new editing and review system. Nancy Adler (University of California, San Francisco) reported that there was an Institute of Medicine workshop that focused on this issue, bringing together the editors to seek a solution (Institute of Medicine, 2012). She suggested that this is an important area for research and that there are always new opportunities since journal editors change over time.

3

Socioeconomic and Behavioral Factors That Influence Differences in Morbidity and Mortality

In addition to the factors that affect women's access to health care, its delivery, and its quality, the list of possible health-influencing factors includes a range of socioeconomic and behavioral topics. The workshop and this chapter cover geography, socioeconomic status, education, employment, and two behavioral factors, substance use and mental health.

GEOGRAPHY

Jennifer Karas Montez (Syracuse University) introduced her presentation as the result of collaborative work with Mark Hayward and Anna Zajacova over the last several years with the aim of explaining the large inequalities in women's mortality in the United States and, specifically, the inequalities at the state level. In her presentation, she first addressed the overall situation and then reported on a recently completed innovative project that attempted to explain those inequalities.

Montez emphasized that life expectancy varies markedly not only between the United States and other comparable nations (see Chapter 1), but also among the states in this country. The inequalities by state are really striking: some states have a life expectancy similar to very low-income countries around the world. For example, Minnesota has high life expectancy, on par with the United Kingdom. At the other extreme, Mississippi has a life expectancy on par with Syria.

The range in life expectancy across the states exceeds the range on life expectancy across comparable high-income countries. This is true both for

life expectancy at birth (the range at birth is 7.4 years for U.S. states and 4.7 years for comparable high-income countries) and for life expectancy at age 50, though to a lesser extent (the range at age 50 is 4.4 years for the states and 4.1 years for comparable high-income countries) (Wilmoth et al., 2010).

The situation is not improving, Montez said, and there is no sign of the states converging toward one common U.S. life expectancy. Comparing female life expectancy at age 50, a small handful of states, including Massachusetts, have seen some impressive gains in women's life expectancy, while other states, including Oregon and Mississippi, have shown only modest gains, and still others, including West Virginia and Wyoming, have actually seen women's life expectancy decline. (Life expectancy has not declined for men in any state.) The inequalities have been growing since the 1980s, and they have been growing more for women than they have for men.

Montez presented two hypotheses that have been suggested to explain the large differences across states, counties, and other geographic areas. The hypotheses are referred to as "people versus place" and "composition versus context." The hypotheses attempt to sort out whether the cause is women's characteristics or state characteristics.

Montez explained that it is only recently that the hypotheses have been subject to testing because of data limitations. Most public-use datasets that have mortality data do not contain geographic information. As a result, the small number of studies that have attempted to explain disparities have been focused on a "people" explanation. However, both individual and place characteristics affect how people live.

There are a wide range of place characteristics that could influence their residents' mortality, Montez suggested. One example is income-tax policy in that taxes affect residents' economic well-being, as does Medicaid eligibility rules. A state's abortion laws affect access to health care. At a more institutional level, corporate tax incentives determine how enticing it is for employers to move into a state, and state tobacco control strategies can shape health behaviors.

In addition to looking at specific characteristics, it is important to test the hypotheses over time. Montez noted. The large inequalities have grown since the early 1980s during a time when federal aid to states declined, and states have been granted more discretion over policies and programs.

Montez reported that it is now possible to test these hypotheses because, as of 2013, data from the National Longitudinal Mortality Study (NLMS) are available by state of residence for respondents. The NLMS was developed for the purpose of studying the effects of demographic and socioeconomic characteristics on differentials in U.S. mortality rates.

It is based on a random sample of the non-institutionalized population of the United States, comprising data from U.S. Census Bureau's Current Population Surveys and annual social and economic supplements and a subset of 1980 census data. These data are combined with death certificate information to identify mortality status and cause of death. The NLMS currently consists of approximately 3.8 million records with more than 550,000 identified mortality cases with socioeconomic variables.[1]

The hypotheses tested focused on women aged 30-89. Over the course of the study, women in this age cohort experienced almost 26,000 deaths. The study gathered data on some fundamental characteristics that might shape mortality, including race, education, and income. Montez said that she and her colleagues also collected information on several characteristics of states, such as economics, politics, and the tobacco environment. With these data in hand, the team estimated a series of multilevel models. Montez summarized the findings—not yet published—which showed that the variation in women's mortality across states reflects differences in both people and place, that is, both composition and context.

Montez concluded that inequalities in women's mortality reflect more than individual choices, characteristics, and behaviors. States seem to play an important role in creating and sustaining the inequalities in women's mortality and morbidity. Research agendas for women's health should focus on the role of differences in state environments in women's mortality trends overall, as well as the differences within the United States. She suggested, given the amount of inequality that is related to geography, the usefulness of tracking health only at the national level as an average is questionable: comparative analysis based on percentiles or ranges of risk rather than averages might be more useful.

A participant noted that the research shows why it is so important to stratify and to have access to new data sources and wondered about the effect that this information would have for the shaping of women's health policy. Montez responded that the results have not yet been discussed with a dedicated policy audience and that it is too early to identify any possible policy changes from the research

Another participant seconded the importance of undertaking analysis of local-area differences: How much of the residual would be reduced by adjusting for more granular place-based policies and conditions? Montez responded that other work, such as that by David Kindig and Erika Cheng (e.g., Kindig and Cheng, 2013), at the county level, shows differences within states. Some potential explanatory factors are better con-

[1]For information on the National Longitudinal Mortality Study, see https://www.census.gov/did/www/nlms/ [January 2016].

ceptualized as operating at more local levels. However, the local-level analysis is limited by the available data.

Continuing on the topic of local analysis, a participant wondered how the variables might change when incorporating local data. Certainly, the variable set will expand when assessing differences at the local level, Montez responded. Perhaps some of the variables that are being conceptualized as state-level variables will be reconceptualized as local–level variables. Factors that would be important at the local level are likely to be environmental issues. Additional detail on space and place would become critical, Montez said.

SOCIOECONOMIC STATUS

The research on socioeconomic status (SES) and health was summarized by Sarah Burgard (University of Michigan). In her introduction, she noted that this is a broad topic, and some key aspects will be covered by other panelists. Multiple aspects of SES are associated with health and survival, and there is a tremendous amount of information and evidence on this topic. The consensus conclusion is that social factors appear to be quite important in the overall poor performance of U.S. women's health relative to other wealthy counties.

Burgard began her talk with reference to a recent study, *The Growing Gap in Life Expectancy by Income* (National Academies of Sciences, Engineering, and Medicine, 2015), which contained estimates of remaining life expectancy at age 50 for men and women based on their quintiles of average Social Security earnings in their 40s. The report found that low-income adults in the United States are losing ground relative to their wealthier peers.

The study also found a stark differential by income quartiles for men and women. Among men, their remaining life expectancy at age 50 is basically flat in the bottom 40 percent of the income distribution for both 1930 and 1960, while gains have been made in the top 60 percent of the income distribution, strengthening the income gradient in life expectancy. But among women, there appear to be actual losses in expected life expectancy at age 50 in the bottom two income quintiles, no progress in the middle or fourth quintile, and gains only among the top quintile.

Burgard observed that these are shocking findings for many Americans. They point to the need to understand how socioeconomic status differences like this can emerge and how to interpret them. The understanding starts with focusing on two possible explanations—causal explanations and explanations based on health selection.

In a causal framework, SES embodies an array of factors, including such resources as money, knowledge, credentials, and power or beneficial

social connections. These in turn influence where people live, where they work, their earnings, and their working conditions as well as their stress levels and the way people cope with them; access to health care; and, ultimately, health and survival.

In a health selection framework, the explanation is that people with poor health tend to move down the socioeconomic hierarchy: that is, it is poor health that leads to the poorer outcomes. To understand health selection requires understanding of the relationship between indicators of SES, such as employment status and earnings, and health status. For example, poor health in early life health could impair educational attainment, which could influence subsequent earnings and then subsequent health prospects.

Both causal influences and health selection can be at work, and understanding them is very important for understanding SES gradients and health. For example, causation could be influenced by gender if women have less access to higher SES standing and the resources that it provides. Gender differences and selection processes could be important if health is less likely to be an impediment for women than for men, who more commonly occupy blue-collar occupations (as well as high status and less strenuous ones). However, women suffer from greater morbidity throughout their lives, so health selection may be a salient aspect in many dimensions of SES accumulation.

Burgard presented two heuristics that can help understanding of the ways SES is implicated in U.S. women's health. First, one can think about explaining the difference in the health of two groups by addressing the possibility that the distribution of SES resources varies across the groups, so that they have differential access to the health-promoting benefits of those resources. Average levels of income could be different, or income inequality could be different across groups, or one group might have a heavy concentration at the high or the low end of the income distribution. So, for example, U.S. women may have lower average SES on some key dimensions than men, or they may be more likely to be clustered below the poverty line. Similarly, U.S. women may have more years of education or be more likely to have completed a postsecondary degree than women in other wealthy nations, but they may be less likely to be employed full time.

Second, SES can be moderated by context when making these comparisons, for example:

- Does having a postsecondary degree "buy" the same amount of income for men and women in the United States?
- Do expectations about appropriate female behavior lead to differences in the way men and women perform their work or family roles, even if they are at the same SES level?

- Does having a low income mean the same thing across all countries, given wide variation in welfare state supports?

Using these heuristics, Burgard said, it is possible to make useful comparisons to isolate the way that SES operates to influence U.S. women's relative health standing. Comparing U.S. men and women directly targets the influence of gender, but there may be physiological as well as social differences to acknowledge. This is, women's reproductive capacity strongly shapes their social roles and resources and interactions between their biological and social lives. By contrast, distributional differences in SES and social factors (the way societal context might moderate or modify the ways that women can use their resources) can be better understood if the comparisons are made among women across peer nations. Finally, comparisons between U.S. women with high and low SES are more likely to isolate distributional differences in and the effects of consequences and mechanisms of the way SES works in this country. With all these approaches, the influence of a person's place in the social hierarchy in relation to health can be understood.

These alternative ways of considering the relationship of SES and health are a challenge to the design of future research. Burgard said that it is really important to consider the kinds of questions that can be best answered about women's health with each of these different kinds of comparisons and then to communicate better across the different research streams that look at these comparisons.

She noted that the past half-century has marked enormous progress for U.S. women in terms of socioeconomic resources and achievements, along with changes in other areas of life. From the 1960s to the mid-1980s, women attended college in greater numbers than they had previously, and rates of labor force participation grew almost continuously, even among mothers of young children. The gender gap in earnings has slowly eroded, and women have contributed more to family income. Overall, they have more resources to enhance their own health and the health of their families. Over the same period, fertility fell, although divorce and single parenting increased.

These are important social trends, Burgard contended, but while the changes in SES have been positive, women's health may not be benefitting at the same pace. For example, although the rising education of women is important, this trend does not seem to result in the same increase in income and assets (or control in the workplace) and other important resources as does the rising education trend for men. Even when they possess the same credentials as men, women face gendered norms about appropriate titles and types of jobs and careers, and they may face employer discrimination and other factors that make it difficult for them

to advance in their careers, leading to occupational segregation and flatter, less well-paying career ladders.

Women have lower labor-force participation rates, Burgard noted. One factor leading to that difference has to do with women's much greater obligations for unpaid household production work (see below). The difference in work histories has other effects. In addition, although men and women both benefit from social welfare programs in the United States, in some cases the social welfare programs are tied to labor-force participation histories, and women, who tend to have shorter work histories due to child-rearing responsibilities, may not benefit as much as men from those benefits.

Another dimension affecting the differential health experiences of men and women, even when they have the same level of SES, is patterns of time use. There are gender differences in use of time for leisure, exercise, sleep, and other health-enhancing behaviors. Burgard noted that men are penalized because they are more apt to work full time and, full-time workers have the least time for sleep. But in other ways, time use is modified by gendered expectations and structures that affect women's health more than men's health.

Women do more housework and have more interruptions in their personal time. Their time is not as "sacred" as men's, even when they have the same roles and the same SES. Burgard reported on her analysis (unpublished) of social and demographic characteristics and SES, as well as other aspects of time use (with date from the American Time Use Survey). She found that males had a major advantage in leisure time, but women actually slept a few minutes more than men at the same stage of their life cycles. Their sleep may not be of the same quality as men's sleep, however. Women tend to get up out of sleep to provide care to a child or another person more than men do. While this difference is understandable among those with very young children, the same gender gaps show across all different kinds of family arrangements. The quality of sleep is a health issue. Animal studies in which rats are awakened frequently show that they suffer high mortality rates.

Burgard then turned to analysis of the comparisons across groups of women in other wealthy countries. Noting that the international comparison studies have shown that U.S. women are losing ground relative to women in peer countries, she reported that part of the reason is the different levels of critical SES resources between the countries. Though average U.S. incomes are high relative to other countries, relative poverty is also the highest in the United States. Other reasons for the U.S. standing may be the higher U.S. female labor force participation, the rising rates of single parenting, and lesser access to steady working careers. Different patterns in women's parental support and caregiver support could be

particularly important for women's relative standing among peer counties, she noted.

Another perspective on the SES issue is offered by comparing U.S. women at different points on the SES ladder. Burgard stressed that there are clear differences in the lives of low-SES women in the past several decades that are especially concerning. She referred to an editorial in the *American Journal of Public Health* by Montez and Zajacova (2014) that presents two contrasting explanations of why low-SES women are doing particularly poorly: low SES causes poor health or the U.S. women with very low education are a special group that faces particular barriers to health.

Burgard stated that to better understand the role of SES, better measurements are needed. Although there are good measures of education and income in many studies, there are few measures of debt, income volatility, or assets—which could be hiding a tremendous amount of heterogeneity within a group of people with the same educational credentials, for example.

The measures need to take a life-course approach and consider a range of SES indicators that vary in importance as adults age. Analysis over the life course could help to identify for what stages it would be most productive to propose interventions and which aspects of SES could yield the largest returns to women's health. SES analyses need to pay attention to health conditions that particularly burden women, including arthritis and musculoskeletal disorders, other disabling disorders, and the disabilities that are influenced by both biological and sociological mechanisms.

Burgard suggested that an SES research agenda should consider such questions as how recessions perturb many aspects of SES; how the Affordable Care Act will affect gender differences health in the United States; and how interventions in workplaces could make them more family friendly and could both reduce inequality among men and women and also reduce inequality across high- and low-SES women.

EDUCATION

Mark D. Hayward (University of Texas at Austin) discussed the relationship between education and other SES indicators and mortality. In his presentation, he reviewed the empirical evidence documenting the dynamic nature of this association for men and women. He emphasized that the relationship between education and health is dynamic and pervasive. For example, as discussed below, over the past two decades, women with less than a high school education experienced increased mortality but there were extremely rapid *declines* in mortality among women with a college education or more. Mortality for men declined across the board.

He argued that the association between health and education has been strengthening in recent decades, and he ascribed these trends as a result of the acceleration in the pace of social change.

Hayward argued further that education can have massive consequences in terms of marriage, social relationships, economic consequences, where one lives, who are one's friends, and a sense of agency. All of these mechanisms can affect health. The core of Hayward's presentation was a review of trends in mortality rates and life expectancy and how they differ by gender and by race.[2]

There are three critical issues in understanding the effects of education on health, Hayward said. First, the associations between education and health are endogenous to larger societal changes in technology, the political economy, and changing demography. Second, the associations between education and health have changed in fundamentally important ways in recent decades, but not for everyone, and not in the same way. Third, knowledge about mechanisms is changing and is likely to change more in the future. The relationships are not in equilibrium.

A most important finding of several studies (Hayward et al., 2015; Montez et al., 2011, 2012; Olshansky et al., 2012: Sasson, 2014) is that, for non-Hispanic white women, the increasing gradient appears to be the consequence of two trends: *increases* in mortality for women with less than a high school education and extremely rapid *declines* in mortality among women with a college education or more. The first trend is in contrast with the experience for non-Hispanic white men: mortality for those with less than a high school education has remained relatively stable. The second trend is the same for men: mortality has declined rapidly for those with a college education or more.

Hayward next discussed the paper by Montez and colleagues (2011) that assesses the trends over three different time periods: 1986 to 1992, 1993 to 1999, and 2000 to 2006. Over all three time periods, mortality has increased for non-Hispanic white women with less than a high school education. In contrast, for black women, there have been some declines in mortality, especially among those with less than a high school education. Both of these trends—for white and black women—are in contrast to the experience for black men, who have enjoyed a rapid decline in mortality in the last decade or so. Hayward emphasized that mortality estimates, especially those based on vital statistics, depend on the assumptions that are made in the analyses. Even with simple epidemiologic data, it is important to be transparent in the assumptions that are made and how the estimates are obtained.

[2]The analysis covered only blacks and whites because there are insufficient data on Hispanics.

Turning next to the Sasson (2014) paper, Hayward reported that for white women for 1990-2010, there was a decline in life expectancy at age 25 for women with less than a high school education, a quite stable life expectancy for women with a high school education, and an increase in life expectancy for women with 16 years of education (college) or more. The combinations of the gains and losses in life expectancy expanded the educational gradient.

For men, too, advanced education is related to improvements in men's life expectancy at age 25. In contrast, however, life expectancy was relatively stable for men with less than a high school education. Thus, the overall growth in the educational gradient in life expectancy at age 25 was driven largely by the gains in life expectancy for men with 16 or more years of education.

By further decomposing the change in the life expectancy at age 25 between 1990-2010 by sex, age group, and years of schooling, it is possible to identify which groups are gaining or losing life expectancy for the 20-year period. Women with less than a high school education lost life expectancy primarily in the age ranges below 60, although losses in life expectancy occurred above age 60 as well. Women with a high school education experienced some losses in life expectancy in the age groups to about age 55 or 60; at older ages, women experienced improvements in life expectancy. For women with 16 or more years of education, there were improvements in life expectancy for all age groups and dramatic improvements at the older ages.

In summary, Hayward said, the improvements for educated women are being experienced at a variety of ages, which suggests multiple causes for these trends. At the other end of the spectrum, different causes are also involved with regard to the losses in life expectancy experienced by less educated women. A research agenda examining the association between education and women's mortality should focus on understanding how different mechanisms may influence mortality for different education groups.

A cohort analysis by Masters and colleagues (2012) yielded similar results, Hayward reported. The authors used random-effects models to simultaneously measure age, period, and cohort patterns of mortality risk between 1986 and 2006 for non-Hispanic white and black men and women with less than a high school education, a high school education, and more than a high school education. The analysis looked at mortality risk from all causes and separately for those from heart disease, lung cancer, and unpreventable cancers. Again, their results show that the life expectancy increases with increased education and that there is a clear cohort phenomenon and a weak period phenomenon. This study suggests that each new cohort goes through a different set of circumstances and

that advanced education is becoming more important in recent cohorts in reducing mortality risks.

Hayward said that these findings are illustrated in a paper by Montez and colleagues (2012), which estimated how much each additional year of educational attainment was associated with the risk of mortality. Previous studies had identified that mortality risk dropped at discrete points in the education distribution—12 and 16 years of education–and there were no changes in the risk before or between the points. The more recent study, however, shows that the basic association has changed: especially noteworthy were the very sharp declines in mortality risk associated with each year of additional year of education after grade 12, with no floor effects. This change in functional form pointed to the growing importance of advanced education for reducing women's mortality risk. Moreover, the change in functional form occurred in a very short time span—approximately 10 years. An update to the study (Hayward et al., 2015) documented that the trend was accelerating, with advanced education being even more strongly associated with low-mortality risks among women.

In summary, Hayward said, there is a growing literature that points to an increasingly stronger link between education and health in the United States over the past several decades. The reasons for that relationship are being explored. These changes are endogenous to larger societal changes in technology, the political economy, and changing demography. Technology, for example, increasingly defines the key activities of daily life. The market for health care, as well as the complexity of health care, has dramatically changed. And demographic changes, such as the trend for well-educated people to marry well-educated people, may be concentrating resources among the best educated groups in the population. These macrolevel changes have the reinforced what Fogel and Costa (1997) have termed "techno-physiological evolution"—a synergistic process in which technological change is tied to improved human physiology through humans' ability to gain control over their bodies. Education may be particularly important in responding to rapid social change and improvements in technology that result in health advantages.

Hayward introduced a conceptual framework for understanding the dynamic nature of the association between education and adult health in the United States: although it may not help to understand international comparisons, it is relevant for explaining U.S. trends. Hayward said that, in his framework, there is no inherent causal association between education and adult mortality. It is clear that the relationship is becoming increasingly important and is different for different parts of the educational distribution and for different gender and socioeconomic groups.

A participant asked about the influence of technology and the relationship of technology to health. The issue is whether there is a gender

difference in the use of the new technology and, if so, whether there is any age stratification to the use of technology. Hayward replied that he was not aware of any scientific evidence that there are differences in men's and women's use of digital devices.

Another participant asked what the data suggest about the differential health trends for men and women. Hayward responded that males start out with more of a health disadvantage as measured in terms of life expectancy so that the improvement reflects their low starting point. It is also useful, he added, to look at measures other than life expectancy. Using measures such as modal ages of death, well-educated women with 16 years of education could be characterized as "maximized," in sharp contrast to women with low educational levels. The long life expectancy for these highly educated women is due to the combination of resources accruing from stable marriages, excellent economic prospects in adulthood, healthy life-styles, and friends and neighborhoods that provide a range of social resources and the kind of health care that is available. At the other end of the educational distribution are women who possibly lack all of these resources.

Another participant commented that there is a lot of compositional change in educational attainment over recent decades. The prevalence of people with less than a high school education declined by 50 percent, from slightly more than 20 percent to slightly more than 10 percent of the population. This group is a differentially selected population, and the selection processes may help to explain the decline in life expectancy. It would also lead to understating the improvements in life expectancy in those other groups, as the other groups have grown. The participant also commented that a big factor in differentiating by education is conscientiousness rather than cognition. Education helps to know enough to do the right thing and having the practice of doing the right thing at the right time and place.

Montez responded that not much is known about how much of the increase in women's mortality is due to selection rather than causation. Some arguments work against selection. For example, selection would imply the same trend for low-educated men since they graduate high school at slightly lower rates than women. However, men do not share the some negative mortality trends

Another participant suggested that wealth accumulation and family status might be factors in health outcomes. Wealth accumulation is related to debt. More women are going to school and increasing their educational attainment, but they also incur greater debt that, in turn, leads to lower wealth. Hayward responded that, in a family, education is a resource. If a household has heterogeneous educational composition, the more educated people will help the less educated people in terms of health benefits.

A participant asked Hayward to comment on the social context of women's health. How much do the events of the past decades contribute to the higher mortality rate for either men or women and why the difference? Hayward responded that institutional factors at the federal and state level are important. However, the research has not yet been able to attribute women's health trends to macrolevel phenomena.

EMPLOYMENT

Nancy L. Marshall (Wellesley College) reviewed the latest research on employment and women's health in the context of the changing economy and changing family lives of the 21st century. Historically, she said, the argument has been that higher education would damage women's health and that employment would interfere with women's roles as mothers and wives or lead to rising health risks as women become "like men" and therefore at risk for cardiovascular disease and other "men's diseases." She noted that the context of employment for women's health has changed dramatically: women are now almost as likely to be employed as are men and so equally vulnerable to the effects of poor working conditions. However, she said, women's position in the economy is often different from that of men from similar backgrounds. In addition, women continue to have greater responsibility for caring for children and extended family, which creates additional demands on women.

Marshall pointed out that women's participation in the labor force has changed dramatically in the last 60 years, rising from 34 percent in 1950 to 45 percent in 1974 and to 57 percent in 2014 (Smith and Bachu, 1999; Bureau of Labor Statistics, 2015a). The largest gain in labor-force participation rates was by women with children under 6, from a participation rate of 39 percent in 1975 to 65 percent in 2013 (Bureau of Labor Statistics, 2014). In 2014, more than 68 million women in the United States were employed. Of these, more than 50 million (74%) were employed full time (Bureau of Labor Statistics, 2015b).

Marshall summarized two competing views of the role of employment on women's health: (1) women's employment conflicts with their family responsibilities and creates role overload, which would negatively affect their health and well-being; and (2) women's employment provides them with an additional arena in which to develop competencies, self-esteem, and social connections, and the combination of roles would enhance women's health. She stated that a review of the research between 1950 and 2000 on the relation between employment status and health found that employment either had no effect on women's health or had positive effects (Klumb and Lampert, 2004). But, she cautioned, state-

ments about what is true for "women" need to be followed by questions about "which women," and "under what circumstances."

Working conditions for women may also play a role in health. Several key aspects of the organization of work are related to job stress and lower job satisfaction, such as heavy workloads, little control over work, lower levels of substantive complexity, and little work-related social support. Trends in the economy—including downsizing and outsourcing of core functions, increasing use of contingent labor, flatter management structures and lean production technologies—have contributed to reduced job stability and increased workloads for many workers, and these factors give rise to high levels of job stress. Marshall pointed out that job stress has been found to be associated with cardiovascular disease and other illnesses, as well as psychological distress and depression, and that women are more likely to be employed in jobs with higher levels of stress (Vermeulen and Mustard, 2000).

Women are differentially exposed to particular health risks, Marshall noted. Some occupations with large proportions of women pose significant health risks. For example, the education and health services industries, which account for more than one-third of all employed women, have higher than average rates of nonfatal occupational injuries and illnesses (Bureau of Labor Statistics, 2010). Occupational health risks include low-back pain (nurses, child care workers), asthma (health-related industries and teaching), noise exposures that can contribute to reduction in hearing sensitivity and increased stress (teaching), and exposure to infectious, biological, or chemical hazards (nurses, child care workers) (McGrath, 2007).

Marshall also noted that sexual harassment has a direct health effect on the well-being of women (and men). It has been argued that sexual harassment is a stressful condition, and there is evidence that it reduces psychological well-being (self-esteem and life satisfaction) and increases psychological distress (depression, anxiety, symptoms of post-traumatic stress disorder) (Chan et al., 2008). Individuals often report what Selye (1993) calls "diseases of adaptation," such as headaches, gastrointestinal disorders, and sleep disturbances.

Although employment has many benefits for women, as it does for men, including more positive perceptions of health and improved physical functioning, combining work and family can lead to experiences of work-family conflict that may negatively affect health (Byron, 2005). Work-family conflict is more common among employed mothers than among employed fathers, Marshall said, which partly reflects the fact that mothers continue to bear greater responsibility for day-to-day parenting despite fathers' increased involvement with their children (Marshall and Barnett, 1993). Work-family conflict, in turn, is associated with overall physical health and, in particular, with hypertension and

high blood pressure (Frone et al., 1996). Overall, Marshall said, a large body of research has found that the working conditions—such as job demands and autonomy—are another significant contributor to work-family conflict, such that more stressful jobs are associated with greater conflict between the demands of work and family.

Work schedules are also a factor. When the schedules of paid work and family demands are incompatible, mothers of young children may choose nonstandard work schedules to facilitate combining work and family, often working evenings or nights while the fathers work days. Shift work, in general, has been associated with greater work-family conflict for both women and men (Haynes and Feinleib, 1980).

Finally, Marshall said, workplaces also vary in their norms and expectations of workers' behavior in negotiating the borders between work and family. Some workplaces view borders as rigid: family needs should not interfere with work responsibilities. Other workplaces view borders as temporally or spatially flexible: workers may select semipermanent employment schedules that fit their family needs or may use flexplace options (working from home). Still other workplaces view borders as permeable, allowing workers considerable day-to-day flexibility in managing the needs of family and work. One study found that flexible work arrangements are particularly important to women with a lot of family responsibility and that flextime was more strongly linked to reducing work interference with family life than was flexplace (Shockley and Allen, 2007).

Marshall reported that research has begun to examine variations in work-family conflict associated with women's life stages. Not all women have children or move through the same combinations of employment and family trajectories in the same way, and research has identified some important variations across the life span. For example, although combining employment and family is positive for many women, women with young children are more likely to report greater work-family conflict than are mothers of older children (Higgens et al., 1995).

This conflict is potentially most acute for mothers of infants, Marshall noted, and most new mothers return to work by the time their baby is 3 months old (Bureau of Labor Statistics, 2014). Research on postpartum health has identified health challenges faced by women, including physical recovery from childbirth, postpartum blues or depression, stresses in the marital relationship, as well as health problems of the newborns. Research on occupational health in the postpartum period has shown that longer maternity leave (time off from work) has a positive relation to maternal health and quality of life (Chatterji and Markowitz, 2005; Gjerdingen and Chaloner, 1994; Hyde et al., 1995; McGovern et al., 1997). A study of more than 700 working mothers of infants found that, while

employment provided these working mothers and their families with important income and other benefits, women in jobs with poor working conditions or who experienced greater work-family conflict because they were single mothers or caring for infants who were sick more often than other infants reported poorer emotional health (Marshall and Tracy, 2009).

Women with school-age children have the highest labor-force participation rate of women across all of the life stages, Marshall noted. At this stage of life, women either have reentered the labor force after having children or have several years of work experience; some women have advanced in their careers to positions that, while potentially more demanding, may also offer better pay and benefits. The parenting needs of school-age children are also different from, and less labor-intensive than, those of children under 3. These characteristics of this life stage contribute to the findings that women with school-age children report lower levels of work-family conflict than do women with preschool-age children (Martinengo et al., 2010).

Older women workers with grown children face different work-family challenges, with both growing numbers of older workers and growing numbers of workers with increasingly old parents. Some 15 percent of people 65 and older need assistance with one or more activities of daily living, and many more need assistance with chores, errands, or transportation (Treas, 1995). Most of this assistance is provided by family members, and, as been discussed earlier in this workshop, most of these caregivers in the United States are women (Barrah et al., 2004).

In summary, Marshall said, on the basis of several decades of research, it is clear that women react to stressful working conditions and to work-family conflict in much the same way that men do in terms of health outcomes. However, there are important differences in the levels and severity of stress women face, which are the result of differential exposures to stressful working conditions, to occupational hazards, to sexual harassment, and to work-family conflict.

A workshop participant asked about Marshall's views on whether these work and other life-course conditions in the United States are different from the conditions experienced by women in other countries. Marshall replied that two major differences between U.S. women and women in comparable countries are income and wealth disparity (inequality affects both women and men) and the relative lack of government policies that support working parents in the United States. Another participant asked if it is appropriate to think about redefining women's relationship to work rather than to employment, on the grounds that there is work at home in addition to work outside the home. Some have suggested defining work for women in terms of transportation, emotions, the burden of raising a family, and all the other demands on them. Marshall agreed, with a caveat:

she said that it is important to include consideration of caregiving and other unpaid family and relational labor, which are more likely for women than for men, but these work activities should be considered in the general context of paid work because more than one-half of all women are in the labor force, and three-fourths of them are working full time.

A participant asked about the status of women who do not have children. The health issues of these women are not linked to employment and family. Marshall replied that working conditions, occupational segregation, and sexual harassment in the workplace are important issues for all women, including women who do not have children, and have an influence on health.

Another participant noted that recent work has examined women in authority positions and the stresses they experience as they move up towards the "glass ceiling." The consequences are higher rates of depression than their male colleagues, and they also have high rates of breast cancer. There are indeed differences for men and women as they move up in their careers, Marshall responded. Both men and women take on more responsibility and work longer hours as the move into management and professional jobs. However, men have a return in terms of greater flexibility and more control over their work. Women do not have that return and therefore may be more exposed to job stress and related illnesses.

SUBSTANCE USE AND MENTAL HEALTH DISORDERS

Christine E. Grella (University of California, Los Angeles) focused on the behavioral health disorders—specifically, substance use and mental health disorders—and gender differences and their risk for morbidity and mortality among women. She said that it is important to consider these effects from a life-span perspective because the issues vary over the life course, from adolescence to older ages. Differential exposures to risk and caregiving also have an influence on morbidity and mortality.

Grella discussed the influence of biology on the etiology, development, and prevalence of substance use and mental health disorders. The biological responses to psychoactive substances vary by substance. Research on biological responses to alcohol has found strong gender differences in how men and women respond to alcohol, how they metabolize it, and its physiological effects in the body. These differences make women more vulnerable to organ-related damage and to morbidity associated with alcohol consumption at lower levels of consumption than men. Women tend to develop more increased symptoms at a faster pace—a phenomenon that has been labeled telescoping.

Telescoping has been identified in responses to alcohol, stimulants, and opioids, Grella noted. Women respond much faster biologically

and develop problems of greater severity to the use of these substances than do men (Hernandez-Avila et al., 2004). The science of understanding the biological responses to psychoactive substances is termed pharmacokinetics—the study of how psychoactive substances are distributed and metabolized throughout the body. Research has identified gender differences in the metabolic effects related to how substances are processed by the body (Greenfield et al., 2010). The gender differences in severity of alcohol-related morbidity, for example, are largely attributed to the difference in body mass between men and women. Women have less body mass so a smaller quantity of alcohol has a bigger effect.

Research has documented that men and women also have different enzymatic reactions to different psychoactive substances, Grella said. There are neurobiological differences in how the brain responds to psychoactive substances in ways that lead to women's greater sensitivity to the substances and faster development of problems. The evidence shows that women's response sensitivity is affected by different neural mechanisms that lead to analgesic effects—that is, the sedating effects of these substances.

Other effects, such as menstrual-cycle effects, have also been documented (Greenfield et al., 2010). It is important to understand how hormones influence the reinforcing experience of different substances in order to treat substance use disorders, Grella said. She noted that the very large gender differences, for instance, in the experiences of craving and withdrawal that are related to hormonal influences. These differences are seen in studies of nicotine addiction: women experience strong subjective reactions in terms of a craving response at different points in their menstrual cycles, which make it more difficult to treat tobacco dependence.

The response to stressors is an important aspect of the development of substance abuse, Grella noted. The sensitivity to substances may be influenced by a neuroendocrine response to stress, which may lead to changes in the neuroendocrine system. Prolonged exposure to environmental stressors as early as childhood may lead to emotional dysregulation—not having healthy responses to stressful situations, which in turn leads to a greater vulnerability to substance use disorders. There are gender differences in the extent to which emotional dysregulation leads to greater sensitivity, heightened responses, and more severity of disorders at a quicker period of onset.

The social–environmental context also plays a role in response to substance use. Grella summarized the results of a pivotal study examining sex differences in prevalence of use and opportunity to use for various substances (Van Etten and Anthony, 1999). Using data from a household survey, the examination of the general prevalence of use of cocaine, hallucinogens, heroin, and marijuana found that males in the population have higher prevalence of use of all of these substances. But substance

use is related to opportunity, and males also have a greater opportunity to procure these substances: when use is adjusted controlling for opportunity to use, the gender differences virtually disappear.

Grella stressed that it is important to understand the circumstances in which drug use is initiated. There are very different social factors and influences on men and women that stem from gender role expectations. With growing gender parity in many different domains, there is a greater likelihood that women will encounter greater opportunity, greater access, and less social inhibition to using alcohol and drugs.

The prevalence of drug use over people's lifetimes also varies by gender. Grella presented data from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), conducted by the National Institute on Alcohol Abuse and Alcoholism in 2001 and 2002. The survey found that there is roughly a 2-to-1 ratio of male to female use across the different types of substances, including alcohol, marijuana, sedatives, and opioids; the ratio is slightly less for amphetamines (Conway et al., 2006). Marijuana use is particularly dominant among men. The higher prevalence of substance use among men has led to more visibility associated with more male substance abusers, particularly in terms of interactions with the criminal justice system, violence, and the kinds of externalizing behaviors that come to the attention of society. Grella commented that the greater attention paid to male substance abuse has led to neglect of these issues among women, who have a greater susceptibility of developing problems once they initiate use of alcohol and drugs.

Grella next turned to the results of research studies on mental health disorders, which show a different pattern of prevalence (Grant et al., 2004). Women have higher rates of mood and anxiety disorders than men, while men have higher rates of antisocial personality disorder and substance use disorders. However, women tend to have a higher rate of both mental health and substance abuse problems than do men, thus increasing the complexity of treating women's substance abuse.

The life-span perspective is critically important in understanding the development of substance use and mental health disorders, Grella argued. She discussed the results of research (Cotto et al., 2010), based on the National Survey on Drug Use and Health (NSDUH), which provides national- and state-level data on the use alcohol and drugs (including nonmedical use of prescription drugs) and mental health disorders in the United States. The study looked at the rates of substance dependence in the past year among adolescents and young adults who reported any use of a particular substance. The outcome measure was the proportion who manifested dependence.

Among adolescents (aged 12-17) there is a parity of boys and girls who use alcohol and develop dependence. For marijuana users, there is a

higher rate of dependence on for boys than girls. Among adolescents who have used cocaine, girls have a higher rate of developing dependence. For prescription medications, girls have higher rates of dependence than boys. This difference for prescription medications may be the effect of a gender difference in opportunity: girls are more likely to be referred to mental health services than boys and thus may have more access and more opportunity to abuse prescription medications.

Among 18- to 25-year-olds, the differences continue. The gender differences are significant across all four drugs, with greater rates of dependence on cocaine and prescription medications among young women who have used those substances than among young men who have used those substances. Males use different substances at higher rates, but when girls and women use those substances, they develop problems more quickly and have more severe problems than men.

Similar results were found when measuring the symptoms of dependence for men and women by the number of days of cocaine use in the past year (Chen and Kandel, 2002). The findings of this study show that, among men and women who are dependent, women are using cocaine at higher levels with more frequency. This study added to the accumulating evidence that women's patterns of substance use are more severe, and the consequences are more rapid.

Other data showing years from first use of drugs to the onset of a disorder illustrate the telescoping phenomenon. The data show that women have a much quicker onset of dependence for alcohol, nicotine, marijuana, and all of the illicit drugs (Costello et al., 1999). Girls may have lower overall prevalence of use, but those who do initiate use become dependent more quickly than boys. The greater complexity, comorbidity and severity of disorders that women experience present complications for the health care system, Grella said. The system has not been designed to address the complexity of substance use and mental health disorders combined with physical health disorders.

Comorbidity is the crux of the issue of the greater severity among women when they initiate substance use and have comorbid mental health disorders, Grella stressed. Comorbidity is greater for women, even at lower levels of substance use. For example, depression is the most prevalent of the mental health disorders in the population, and women who have both depression and substance use disorders, particularly of alcohol, typically report that their symptoms of depression preceded the onset of alcohol disorder. Although temporal ordering is not clear evidence of causality (there could be a common third genetic factor), it is notable that women typically report initiation of alcohol use subsequent to symptoms of depression. In contrast, men tend to report alcohol initiation, then alcohol dependence, and then the onset

of depressive disorders, which often will resolve following a period of abstinence.

The interlinkage between the substance use and mental health disorders makes treatment for women who manifest these disorders complex. The challenge for the treatment system is that both internalizing disorders, such as depression and anxiety, and externalizing disorders, such as attention deficit hyperactivity disorder, conduct disorder, and antisocial personality disorder, are more severe and pronounced with comorbid substance use disorders. One striking example is antisocial personality disorder: it is relatively rare among women—affecting less than 5 percent of women—but the rates of substance use among women with the disorder are much higher than for men with the disorder (Alegria et al., 2013).

Grella discussed another study of opioid users that looked at gender differences in patterns of comorbidity (Grella et al., 2009). It found that, among opioid users, women were twice as likely as men to have co-occurring mood disorders (major depression, dysthymia, manic disorder, and hypomanic disorder) and anxiety disorders (panic, social, specific and generalized anxiety disorder), but they were less likely than men to have antisocial personality disorder and alcohol disorder.

At she noted earlier, Grella said that studies of juvenile populations indicate that the onset of substance use disorders among juvenile girls progresses rapidly from initiation of use. For girls in the juvenile justice system, their psychiatric disorders tend to persist (Abram et al., 2015).

Trauma is a critical issue among women with substance use disorders. A study of a cohort of women in a California prison (Grella et al., 2013) compared this sample of women in a prison-based substance-abuse treatment program with women in the general population who were matched on sociodemographic characteristics. The study found that women substance abusers who had been incarcerated had much higher rates of lifetime trauma exposure: more than 50 percent of the women in the prison sample reported seven or more types of traumatic exposures. They were from two to four times more likely to have suffered from a variety of types of traumatic exposure than their counterparts in the general population.

In understanding morbidity and mortality, Grella said, it is important to consider treatment access and utilization for women with substance use disorders. Using data from the NESARC population survey, she and a colleague found that women with substance dependency had low rates of help-seeking (about 24%), even lower than men (30.5%) (Grella and Stein, 2013; Grella and Otiniano Verissimo, 2015). The reasons for not seeking help can be attributed to stigma, financial reasons, structural barriers, and fear of the consequences of entering the substance abuse system, which women are more likely to report than men as barriers to seeking help.

Female substance abuse is strongly associated with morbidity. Grella reported on a study involving a sample of heroin users in which their age of death was compared with the age of death for women in the general population by computing standardized mortality ratios (Grella and Lovinger, 2011). The study found that substance-abusing women have a much younger age of death than women in the general population, with five times the risk of death (controlling for age and race and ethnicity). They also had a higher risk of death than substance-abusing men in the study sample. Similarly, they lose more years of life and have much higher rates of chronic health problems than did the male heroin users in the same study sample.

Another way to examine morbidity and mortality due to substance use and mental health disorders is by using the concept of the global burden of disease. The global burden of disease is calculated by aggregating data across regions, combining years of life lost and years lived with disability into an aggregate statistic, disability adjusted life years (DALYs). Using DALYs as the measure, the Global Burden of Disease study found that boys under the age of 10 have a bigger burden of disease due to mental health and substance abuse problems, primarily because of behavioral disorders, but that females over the age of 10 have a greater burden of disease at all age groups from the combined burden of substance use and mental health disorders (Whiteford et al., 2013). These global data portray a greater burden of disease for women over the life span stemming from substance use and mental health disorders.

4

Future Research Directions

KEY WORKSHOP THEMES

Alina Salganicoff (Henry J. Kaiser Family Foundation) and co-study director Rose Marie Martinez presented a summary of the key issues discussed in the workshop as a basis for developing a research agenda for the future. Salganicoff identified several cross-cutting issues that emerged as workshop themes:

- *More good, accessible, and consistent data that illuminate the issues in women's health are needed and critically important. A major block of missing data and epidemiological work relate to subgroups of women. Though there is a lot of evidence on differences between subgroups, there is no clear sense of the mechanisms by which these different factors might affect the health of different groups of women.*
- *Many analyses of all health-related data are not stratified by gender, which is needed to understand women's health outcomes.*
- *Research reports on women's health issues are inconsistent. Journals and government agencies—particularly the National Institutes of Health and the U.S. Food and Drug Administration—need to be more transparent and open, and they need to more widely share their information. Agencies need to find ways to encourage or require the needed gender-based analyses. There may be a possibility of finding relatively inexpensive ways of accomplishing this goal, such as re-analyses of data in published studies that did not examine the influence of gender: in many cases, the gender-based data were collected but not analyzed.*

- *The need for gender-based data and refined measurement tools is especially clear for research on the effects of socioeconomic status and the assessment of health policy. There is also a need for more gender-based data to assess the delivery system and to understand the variations of adequacy of delivery within health plans in various geographic areas. To the extent possible, it would be valuable to have data at the level of medical providers, perhaps through more extensive use of electronic medical records.*
- *The fragmentation in the health care system has significant consequences for women: for example, pregnancy-related care needs to be integrated with consideration of the effects on cardiovascular care.*
- *For all research on health, an integrated approach over the life span would provide important information.*
- *Two topics of special importance are the effects of caregiving and the effects of trauma on women's health needs.*
- *Understanding the roles of education, socioeconomic status, employment, and the social context on women's health requires interdisciplinary research and interdisciplinary training.*

In addition to these themes that were discussed by many workshop presenters and participants, Salganicoff noted three other topics that she said emerged from those presentations and discussions:

- *It is important to assess the impact of public policies on health. Research is needed on understanding both the intended and unintended consequences of policies, many of which tend to have a disproportionately negative impact on women.*
- *There is a need for an investment in the development and evaluation of effective interventions that consider the biological differences between men and women with respect to manifestation of disease and men's and women's responses to treatment.*
- *The health professions need to improve the means of communication about the role of gender and health. It is important to communicate the challenges to women's health that have been discussed in this workshop to policy makers, clinicians, and researchers so there will be a sense of what will stimulate action and change.*

DISCUSSION

The lively floor discussion addressed these and other issues mentioned during the workshop. A major theme that emerged from the discussion was the need to develop a research agenda with a cross-sector multilevel approach—one that takes a life-course perspective. Many participants said that it is important to recognize that health problems early

in women's lives can set trajectories that may be difficult to change later in their lives.

Several participants noted that the movement toward precision medicine raises important questions that need to be addressed in research on women's health. The key question—which pertains to both men and women—is how to integrate precision medicine with population health. It was suggested that the research community needs to incorporate gender in precision-medicine development activities, not using gender as a control variable, but seeking to understand the main effects and interaction effects of gender.

Salganicoff noted again the need for accessible data on gender differences so that they will be published in journals. A challenge is to seek creative ways of expanding gender-based analyses and the utility of existing data.

A participant emphasized the problem of the vulnerability of low-income, poorly educated women. Although health problems are growing for white women, the levels of mortality for African American, Latino, and Native American women need special attention. These issues may be driving part of the U.S. health disparity vis-a-vis other high-income countries. This concern was seconded by another participant who suggested that for low-income, poorly educated women, trauma might play a role. The causation is not straightforward since young men also have a lot of trauma in the United States. Perhaps the issue is that women internalize trauma differently, the participant said.

The participant went on to observe that the profession is beginning to understand the serious long-term consequences of trauma, and it goes beyond drug use and depression. Chronic disease also appears to be related. Another participant added that stress, which is less severe than trauma but more pervasive, may also play a role. The participant noted that the National Institute on Aging is supporting a research network to come up with a "gold standard" measure of stress that might help advance this work.

Another participant cautioned that the need to do integrated research that cuts across domains is at variance with the funding strategies of research funders and other sources of support. It is important that academics develop intriguing study designs and recommendations about how to do the research, but there is a need to educate different audiences as well. First, there is a need to alert women to the existence of this problem. More to the point, the participant said, journal editors and funding entities need to be educated that, first of all, there is a problem. Second, there is a need to develop new models for doing research that pull together datasets across domains that may fall outside, for example, agencies of the U.S. Department of Health and Human Ser-

vices (HHS) or may fall outside of the funding priorities of a particular foundation.

Following up, a participant expressed pleasure that the Office of Research on Women's Health at the National Institutes of Health (NIH) had encouraged and supported this meeting but noted that other HHS research and funding agencies are not participating in this workshop. She mentioned the critical role of the Agency for Healthcare Research and Quality (AHRQ) in terms of supporting health services and health policy research. She suggested that this workshop report should be shared so it can inform the research agenda of other agencies.

A participant representing the Health Resources and Services Administration (HRSA) commented that it has been helpful to have participated in this workshop. The HRSA Bureau of Primary Heath Care funds federally qualified health centers across the country and serves 22 million patients across the country. Some of the HRSA uniform data system measures, which are similar to measures in the Healthcare Effectiveness Data and Information Set, include early entry to prenatal care, tobacco cancer screening, and low birth weight, so many pertinent data points important to women's health are measured.

Another participant said, however, that there are still improvements to be made by HRSA. For example, the HRSA reports on cardiovascular interventions and treatments are not stratified by gender. There is also a need for a report that presents how the community health centers are serving women on a broad range of issues, not just the ones that are traditionally women's issues, such as maternal and child health, dental care, mental health. That information needs to be made publicly available, the participant said.

Another representative of HRSA proposed that the information about health services needs to be presented at the systems level, not just by an individual location. If there is going to be change in the delivery as well as the empowerment of women with their health care providers, it has to be on a systems level. The data also need to identify and understand intersections. For example, one of the most promising areas of current research is the intersection of violence and HIV. Results are showing the intersection is bidirectional. The national HIV/AIDS strategy now includes women, as an integrated issue, the participant said.

A representative of AHRQ informed the workshop participants that the agency will publish a chartbook based on the National Healthcare Quality Disparities Report.[1] The chartbook will present a wealth of data comparing men and women and note which indicators are showing better

[1]For a description of this report, see http://www.ahrq.gov/research/findings/nhqrdr/nhqdr14/index.html [February 2016].

health, which are showing no change, and which are showing worsening health. She also reported that HHS is required, as a result of the Affordable Care Act, to issue a biannual report on women's health activities across the department. She reminded the participants that government agencies are not permitted to play an advocacy role.

Another participant supported international comparisons as a means of understanding the health of women in the United States. Such comparisons would require an agenda of comparative research that includes people from other nations and women from other nations. One unique resource would be to tap into the huge immigrant group in this country. The participant suggested that an international perspective is especially important today because the United Nations is approving new millennium development goals that address gender equity and are related to women.

Following up on this point, another participant pointed out that the United Nations could be helpful. The United Nations often calls for nation reports on how the international treaties are being implemented in different countries and perhaps women's health would be an appropriate topic. Data collected in response to a U.N. call could be organized in a critical way.

The need for improved methodologies for understanding health and mortality was raised by a participant. There is a need for a portfolio of measures that would be followed systematically over time to allow focus on how mortality interacts with morbidity and disability. With this approach, for example, knowledge could be gained about the expected length of life with such conditions as cardiovascular disease or having difficulties in the activities of daily life. Monitoring would need to be continuous so a trend could be identified early enough to become the subject of research and analysis, the participant said.

This approach might be difficult to fund, a participant pointed out, but a long-term measurement approach is critically important. Some health effects operate on a trajectory, such as the latent effects of tobacco use, for which there appears to be a resting period before the effects appear. Another example is the trajectory of opioid use and HIV and AIDS. The process seems to be to move from opioids to injectable drugs and then to the onset of hepatitis and HIV. These trajectories have huge consequences for women's health. The participant said that preventive health approaches could focus on interrupting these trajectories. These approaches need methodological research that is designed to capture the richness of the variables that are affecting morbidity and mortality, a participant noted. When thinking about morbidity and mortality, the quality of women's life is a dependent variable.

The foregoing discussion suggests the need for a strategic plan, a participant observed. A research portfolio to address these issues would

focus on expanded methodologies, use of multilevel analyses and have the capability of integrating data across domains. The strategy would consolidate different research strategies from different disciplines. It would include a focus on ethnography and a more longitudinal study of populations who are underserved because they have limited access to health care.

Such a strategic plan would have both long-term goals and short-term objectives, he added. One such short-term objective would be an annual report card on women's health that was a year-to-year surveillance of status and progress, with line graphs showing temporal trends to highlight the findings. The report card could incorporate measures of health by socioeconomic status and race and ethnicity.

A participant representing the March of Dimes reported that the organization had been successful in raising the profile of preterm birth with annual report cards. The report cards help translate research for advocacy purposes. Organizations that are not constrained from advocacy can use the report card information to advocate for women and children's health and advocate for funding from the relevant agencies.

The HHS annual report to the nation on cancer is another example, a participant noted. The report was prepared in a partnership among two federal surveillance agencies—the American Cancer Society and the National Association of Cancer Registries. The HHS Office on Women's Health could profitably consider an annual report in conjunction with outside partners.

CHALLENGE FOR ACTION

Terri Cornelison, deputy director of NIH's Office of Research on Women's Health, expressed appreciation to the workshop organizers, presenters, and participants and summarized the accomplishments for the day. One objective of the workshop was to highlight a challenge—understanding the implications of a report that documented, in stark and compelling terms, that the health of U.S. women is significantly worse than the health of women in 16 peer countries (see Chapter 1). The workshop reached across sectors, disciplines, and areas of expertise to highlight what is known and what needs to be known. It served to identify key factors at the system, federal, state, patient, and provider levels that might explain the comparative deficiency of the health of women in the United States.

Cornelison said that the workshop identified key research areas to decrease mortality and morbidity, for both the short and long term. It also identified some areas in which small interventions that are relatively inexpensive could have large effects. The challenge now, she suggested, is

to communicate, educate, disseminate information to journal editors and colleagues and get the word to all women in the United States. When the health of women in the United States improves, the health of the United States improves.

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Appendix A

Workshop Agenda

Workshop on Raising the Bar–The Health of Women in America: A National Perspective on Women's Health

September 25, 2015

National Academies of Sciences, Engineering, and Medicine
Keck Center
Room 100
500 Fifth Street, NW
Washington, DC

9:00-9:10 **Welcome**
Nancy E. Adler (*Chair*), University of California, San Francisco

9:10-9:20 **Opening Remarks**
Janine Austin Clayton, Director, Office of Research on Women's Health

Session 1:
Findings of Shorter Lives, Poorer Health Regarding Women's Health

9:20-10:15 Steven H. Woolf, Virginia Commonwealth University

Session 2:
Factors Influencing Differences in Women's Health Outcomes

10:15-10:40 **Access to Medical Care**
Alina Salganicoff, Henry J. Kaiser Family Foundation

10:40-11:00 ***Break***

11:00-11:25 **Bias in Medical Care Delivery**
Paula A. Johnson, Harvard Medical School and Brigham and Women's Hospital

11:25-11:50 **Gender Gaps in Quality of Care for Cardiovascular Disease and Diabetes Within and Across Geographic Areas**
Chloe E. Bird, RAND

11:50-1:00 ***Lunch***

Session 3:
Research on Factors Influencing Differences in Morbidity and Mortality

1:00-1:25 **Trends and Inequalities in Women's Mortality Across Geographic Areas**
Jennifer Karas Montez, Syracuse University

1:25-1:50 **Socioeconomic Status and Health**
Sarah A. Burgard, University of Michigan

1:50-2:15 **Education**
Mark D. Hayward, University of Texas at Austin

2:15-2:40 **Employment**
Nancy L. Marshall, Wellesley College

2:40-3:05 **Risk Behaviors and Health Outcomes**
Christine E. Grella, University of California, Los Angeles

3:05-3:25 ***Break***

Session 4:
Future Research Directions

3:25-3:40 **Summary of Key Issues**
Alina Salganicoff

3:40 -4:15 **Floor Discussion**
Nancy E. Adler

4:15-4:30 **Closing Remarks**
Terri L. Cornelison, Office of Research on Women's Health, National Institutes of Health

Appendix B

Workshop Participants

Lauren Ainsworth, American University
D. Lee Alekel, National Institute of Arthritis and Musculoskeletal and Skin Diseases, National Institutes of Health
Kerry Allen, RAND
Whitney Barfield, National Institutes of Health
Donna Barry, Center for American Progress
Jennifer Bazinet, Office of Research on Women's Health, National Institutes of Health
Lisa Begg, Office of Research on Women's Health, National Institutes of Health
Christina Berry, March of Dimes
Liz Borkowski, George Washington University
Claudette Brooks, Office of Research on Women's Health, National Institutes of Health
Stephanie Brosig, Centers for Disease Control and Prevention
Margaret Carr, National Association of County and City Health Officials
Atyya Chaudhry, Association of Maternal & Child Health Programs
Preeta Chidambaran, Bureau of Primary Health Care, Health Resources and Services Administration
Lisa Chong, *Science*
Beth Collins-Sharp, Office on Women's Health, U.S. Department of Health and Human Services
Andria Cornell, Association of Maternal & Child Health Programs

Chantell Frazier, Iraq and Afghanistan Veterans of America
Aimee Gallagher, Society for Women's Health Research
Nicole Garro, March of Dimes
Lorrie Gavin, Office of Population Affairs, U.S. Department of Health and Human Services
J. Nadine Gracia, Office of Minority Health, U.S. Department of Health and Human Services
Kristina Gray-Akpa, Grantmakers in Health
Bob Griss, Institute of Social Medicine and Community Health
John Haaga, National Institute on Aging, National Institutes of Health
Nada Hanafi, U.S. Food and Drug Administration
Bamini Jayabalasingham, Office of Research on Women's Health, National Institutes of Health
Nancy Lee, Office on Women's Health, U.S. Department of Health and Human Services
Tamara Lewis Johnson, National Institutes of Allergy and Infectious Diseases, National Institutes of Health
Andrea Lowe, Society for Women's Health Research
Aracely Macias, Office of Minority Health, U.S. Department of Health and Human Services
Saralyn Mark, National Aeronautics and Space Administration
Eliot Markman, Foundation for Advanced Education in the Sciences, National Institutes of Health
Sabrina Matoff-Stepp, Health Resources and Services Administration
Afaf Meleis, University of Pennsylvania School of Nursing
Leah Miller, Office of Research on Women's Health, National Institutes of Health
Amy Mistretta, Office of Research on Women's Health, National Institutes of Health
Victoria Phifer, Centers for Disease Control and Prevention
Elena Rios, National Hispanic Medical Association
British Robinson, Women's Heart Alliance
Catherine Roca, National Institute of Mental Health, National Institutes of Health
Ching-yi Shieh, Office of Research on Women's Health, National Institutes of Health
Kimberly Thomas, Office of Women's Health, U.S. Food and Drug Administration
Margaret Villalonga, American Congress of Obstetricians and Gynecologists
Paris A. Watson, Office of Research on Women's Health, National Institutes of Health

Cora Lee Wetherington, National Institute on Drug Abuse, National Institutes of Health
Tia Zeno, U.S. Department of Health and Human Services
Diana Zuckerman, National Center for Health Research

Appendix C

Biographical Sketches of Steering Committee Members and Speakers

NANCY E. ADLER (*Steering Committee Chair*) is the Lisa and John Pritzker professor of psychology in the Departments of Psychiatry and Pediatrics, vice chair of the Department of Psychiatry, and director of the Center for Health and Community, all at the University of California, San Francisco. She also currently heads the National Program Office for the Robert Wood Johnson Foundation Investigator-Initiated Research Program, Evidence for Action. Her current work examines pathways from socioeconomic status to health and interventions to address the social determinants of health. She is a member of the National Academy of Medicine and the American Academy of Arts and Sciences. She is a fellow of the American Psychological Society and the American Psychological Association (APA). She served as president of the APA's Division of Population and Environmental Psychology and is a recipient of its Superior Service Award. She has a B.A. from Wellesley College and a Ph.D. in psychology from Harvard University.

CHLOE E. BIRD (*Steering Committee Member* and *Speaker*) is a senior sociologist at RAND and professor of policy analysis at the Pardee RAND Graduate School. Her research focuses on women's health and health care, as well as assessing the social determinants of disparities in physical and mental health and health care. She has also conducted assessments of gaps in quality of care for cardiovascular disease and diabetes within managed care settings for the Agency for Healthcare Research and Quality, the Centers for Medicare & Medicaid Services, the U.S. Department

of Veterans Affairs, and private-sector health plans. Her current work is focused on assessing and mapping gender differences in the quality of care for cardiovascular disease and diabetes, and she has also worked on neighborhood effects on health and health care and on social determinants of gender differences in health, allostatic load, and mortality. She is an elected fellow of the American Association for the Advancement of Science. She has a B.A. in sociology from Oberlin College and an M.S. and a Ph.D. in sociology from the University of Illinois at Urbana–Champaign.

SARAH A. BURGARD (*Speaker*) is an associate professor in the Departments of Sociology and Epidemiology and a research and associate professor at the Population Studies Center at the University of Michigan. Her research focuses on health disparities by socioeconomic status, gender, and race and ethnicity across the life course. She currently studies racial/ethnic and gender-based disparities in working conditions and occupational careers, the effect of these inequalities on health, and the impact of an individual's working life on the well-being of other family members. She has been a health and society scholar at the Robert Wood Johnson Foundation. She as a B.A. in international and comparative policy studies from Reed College and an M.A. and a Ph.D. in sociology from the University of California, Los Angeles.

JANINE AUSTIN CLAYTON (*Speaker*) is associate director for research on women's health and director of the Office of Research on Women's Health at the National Institutes of Health (NIH). She is leading the NIH policy change initiative that requires scientists to include female animals and cells in preclinical research design. Previously, she was the deputy clinical director of NIH's National Eye Institute. A board-certified ophthalmologist, her research interests include autoimmune ocular diseases and the role of sex and gender in health and disease. Her clinical research has ranged from randomized controlled trials of novel therapies for immune-mediated ocular diseases to studies on the development of digital imaging techniques for the anterior segment. She is the recipient of the senior achievement award from the Board of Trustees of the American Academy of Ophthalmology. She has an undergraduate degree with honors from Johns Hopkins University and an M.D. from Howard University College of Medicine.

TERRI L. CORNELISON (*Speaker*) is the associate director for clinical research in the Office of Research on Women's Health at the National Institutes of Health (NIH) and has a clinical and academic practice at the Johns Hopkins School of Medicine. Previously, she held academic appointments at Harvard University School and the State University of

New York. A board-certified gynecologic oncologist, her work focuses on women's health care, evidence-based medicine, and cancer prevention. At NIH, she oversees programs in career development, health disparities, global health, and the inclusion of women in clinical trials. She is a captain in the U.S. Public Health Service and serves as deputy director of the Medical Services Branch and lead provider on the Rapid Deployment Force 1 Team. She has an M.D. from Yale University and a Ph.D. from George Washington University.

CHRISTINE E. GRELLA (*Speaker*) is a professor in the Department of Psychiatry and Biobehavioral Sciences in the Geffen School of Medicine, co-director of the Integrated Substance Abuse Programs, and co-investigator and director of the Research and Methods Support Core of the Center for Advancing Longitudinal Drug Abuse Research at the University of California, Los Angeles. Her research focuses on the organization, delivery, and outcomes of substance abuse treatment for individuals with co-occurring disorders; youth; and women, including those in the criminal justice and child welfare systems. She has a B.A. from the University of California, Los Angeles, and an M.A. and a Ph.D. from the University of California, Santa Cruz, all in psychology.

MARK D. HAYWARD (*Steering Committee Member* and *Speaker*) is a professor of sociology, Centennial Commission professor in the liberal arts, and director of the Population Research Center at the University of Texas at Austin. His primary research interests center on the influence of life-course exposures and events on the morbidity and mortality experiences of the older population. He is currently involved in several studies focusing on the origins of health disparities at older ages: early life influences on socioeconomic, race and gender disparities in adult morbidity and mortality; the demography of race, ethnic, and gender disparities in healthy life expectancy; social inequality in the biomarkers of aging; and the health consequences of marriage, divorce, and widowhood. He has also worked on changes in morbidity and mortality determining trends in healthy life expectancy, socioeconomic and race/ethnic differences in healthy life expectancy, the association between childhood health and adult morbidity, and the socioeconomic origins of the race gap in chronic disease morbidity. He has a Ph.D. in sociology from Indiana University.

JAMES S. HOUSE (*Steering Committee Member*) is the Angus Campbell distinguished university professor emeritus of survey research, public policy, and sociology at in the Survey Research Center of the Institute for Social Research at the University of Michigan. Previously, he was on the faculty of Duke University. His research has focused on the role of social

and psychological factors in the etiology and course of health and illness, including the role of psychosocial factors in understanding and alleviating social disparities in health and the way health changes with age. He is a member of the National Academy of Sciences, the National Academy of Medicine, and the American Academy of Arts and Sciences. He has a B.A. in history from Haverford College and a Ph.D. in social psychology from the University of Michigan.

PAULA A. JOHNSON (*Speaker*) is the executive director of the Connors Center for Women's Health and Gender Biology, chief of the Division of Women's Health, and director of the Center for Cardiovascular Disease in Women at Brigham and Women's Hospital. Her work at the Center for Cardiovascular Disease in Women has been dedicated to developing new strategies for primary and secondary prevention of heart disease in women and to spearheading research that furthers knowledge of the effects of gender on heart disease. She is recognized as a national expert in the area of defining and understanding the quality of cardiology care for women and minorities. More broadly, her research has focused on understanding disparities in health care for women and minorities. She has an M.P.H. and an M.D. from Harvard University.

NANCY L. MARSHALL (*Speaker*) is a senior research scientist, associate director of the Wellesley Centers for Women, and adjunct associate professor at Wellesley College. Her research examines working conditions, work-family intersections, and worker health among U.S. adults. She is interested in the variations in employment and health associated with gender, race and social class, and with different life stages. She has also conducted studies of child care policy and early care and education. She leads Wellesley College's Work, Families & Children team and teaches courses at Wellesley College on gender, employment, and the sociology of children and youth. She has an Ed.D. in comparative human development from Harvard University.

JENNIFER KARAS MONTEZ (*Steering Committee Member* and *Speaker*) is an assistant professor of sociology and faculty affiliate of the Aging Studies Institute and the Center for Policy Research at Syracuse University. Her research examines the social determinants of mortality disparities among U.S. adults. It focuses in particular on explaining those disparities across education levels, gender, and geography. She is a member of the Network on Life Course Health Dynamics and Disparities in 21st Century America and an investigator on the Study of Women's Health Across the Nation. She is an elected council member of the American

Sociological Association's Section on Aging and Life Course. She has a Ph.D. in sociology from the University of Texas at Austin.

ALINA SALGANICOFF (*Speaker*) is vice president and director of women's health policy for the Kaiser Family Foundation. She directs the foundation's work on health coverage and access to care for women, with an emphasis on challenges facing underserved populations, including low-income and uninsured women, women on Medicaid, as well as women of color. Her current work is focused on the impact of the Affordable Care Act on women's coverage and access to care. Currently, she is a member of the board of the California Family Health Council. She has a B.S. from the Pennsylvania State University and a Ph.D. in health policy from Johns Hopkins University.

STEVEN H. WOOLF (*Speaker*) is director of the Center on Society and Health and professor of family medicine and population health at Virginia Commonwealth University. He is board certified in family medicine and in preventive medicine and public health. His career has focused on promoting the most effective health care services and on advocating the importance of health promotion and disease prevention and the need to address the social determinants of health. In addition to scientific publications, he has emphasized outreach to policy makers, the public, and the media to raise awareness about the factors outside of health care that shape health outcomes. He is a member of the National Academy of Medicine. He has an M.P.H. from Johns Hopkins University and an M.D. from Emory University.