

Health Affairs

At the Intersection of Health, Health Care and Policy

Cite this article as:

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and Paula A. Johnson

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Health Affairs, 30, no.2 (2011):247-255

doi: 10.1377/hlthaff.2010.0319

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DOI: 10.1377/hlthaff.2010.0319
HEALTH AFFAIRS 30,
NO. 2 (2011): 247–255
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Lack Of Access Due To Costs Remains A Problem For Some In Massachusetts Despite The State's Health Reforms

ABSTRACT Did the Massachusetts health reforms, which provided near-universal insurance coverage, also address problems of unmet need resulting from the cost of care and of inadequate preventive care for diverse patient groups? We found that nearly a quarter of adults who were in fair or poor health reported being unable to see a doctor because of cost during the implementation of the reforms. We also found that state residents earning less than \$25,000 per year were much less likely than higher earners to receive screening for cardiovascular disease and cancer. The state needs to implement new strategies to build on the promise of universal coverage and address specific needs of vulnerable populations, such as limiting out-of-pocket spending for this group. Also, more data are needed on the social determinants of health to identify specific barriers related to cost and access for vulnerable groups that general insurance reforms may not address.

The passage of health reform in Massachusetts in 2006 marked an important step toward increasing access to care for 500,000 previously uninsured state residents and provided a model for national reform efforts. The Massachusetts reforms were designed to provide near-universal insurance coverage through insurance-market changes that provided access to a common risk pool for small-group and non-group consumers; subsidies for low-income people; mandates for individuals to obtain insurance coverage; and mandates for employers to provide or contribute to coverage for employees.

The reforms were also expected to yield public health benefits in the state, such as increased use of preventive care and reduced unmet medical need due to cost. The early impact of the reforms on the use of preventive care—such as screening for cancer and cardiovascular disease—has yet to be examined. Early evaluations of the reforms report success in reducing the number of adults

ages 18–64 who did not receive needed care because of cost, including those with incomes below the federal poverty level. However, the early impact on other groups—such as the members of racial and ethnic minority groups, and people in poor health—is not yet clear.^{1,2}

This study examines trends in health care access and preventive health care use among non-elderly adults in Massachusetts before and after the implementation of the 2006 reforms. The study addresses the following questions: During the implementation of health reform, has improvement in access to care occurred evenly across diverse groups? How do improvements in access to insurance, reductions in unmet need due to cost, and increases in the use of preventive care compare with earlier periods, when Massachusetts also attempted to improve access to care? Are there early indications that the use of preventive care has increased? And what predicts the use of that care?

We raise the questions about how the 2006

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reforms affected access, unmet need, and preventive care against the backdrop of historical trends in Massachusetts. The context of reform efforts in the commonwealth includes a Medicaid expansion during 1996–97 to increase access to coverage, as well as changes in the economy and joblessness that may be expected to influence access to care.³

As we investigate the early impact of the 2006 reforms on access to insurance, it will be important to evaluate the relative importance of recent changes in access to and use of care in the context of these broader historical trends, as well as to assess whether gains are made evenly across diverse groups.

Study Data And Methods

DATA SOURCE AND POPULATION We analyzed data from the Massachusetts Behavioral Risk Factor Surveillance Survey, conducted by the Massachusetts Health Survey Program in conjunction with the Centers for Disease Control and Prevention (CDC).^{4,5} Contacting noninstitutionalized adults through land-line telephone calls, the surveillance survey tracks health conditions and health behavior in the United States and measures health care access and use.^{6–8} The methodology of the survey has been described elsewhere, along with estimates of survey items' reliability for Massachusetts.^{9,10}

We obtained yearly data for the ten years prior to the latest Massachusetts health care reforms, starting in 1996, and we observed trends until 2008, the latest year for which data were available as of May 2010. We restricted our analysis to adults ages 18–64, who were therefore not eligible for Medicare based on age.

MEASURES The surveillance survey items that identify uninsured populations, unmet care needs due to cost, and use of preventive screening for cancer and cardiovascular disease have been described elsewhere.^{11–14} The survey defined *unmet care needs due to cost* as the self-reported inability to see a doctor because of cost.¹¹ It did not ask about unmet needs in 2001 and 2002. It measured preventive care use by the recent use of screening tests for cancer and cardiovascular disease in a manner consistent with federal guidelines.^{15–17}

The survey measured demographic and health status characteristics—including sex, race or ethnicity (non-Hispanic white, non-Hispanic black, Hispanic), annual household income, employment status, and health status—by self-report.

STATISTICAL ANALYSIS To account for the complex survey design, we used the statistical package SUDAAN (Release 10.0) to compute descriptive statistics. Because of differences in the age

distribution of the samples between 1996 and 2008, we used age-standardized prevalence estimates to allow comparisons of estimates over time.

We used the 2000 US census standard population¹⁸ to obtain estimates of the age-standardized prevalence of uninsurance, unmet care needs due to cost, and use of preventive screening.⁴ We used logistic regression to assess whether there were any statistically significant short- or long-term changes in coverage and unmet need.⁶ We assessed short-term trends between 2005, the year before the Massachusetts reforms were passed, and 2008, the year of the most recent data available. We assessed long-term trends between 1996 and 2008.

ASSESSING IMPROVEMENT OVER TIME To estimate potential gains in access to care and use of preventive care during reform implementation, we compared the trends we observed during the reform implementation in 2008 to two historical periods: 1996–2001, a period of Medicaid expansion accompanied by very low unemployment in Massachusetts; and 2002–06, a period of continued expansion of Medicaid with rising unemployment.

We used multivariable logistic regression to estimate the odds of improvement in 2008 compared to each of the two earlier periods. To allow us to look for trends among specific groups, we stratified our models by sex, race or ethnicity, income, and self-reported health status.

PREDICTORS OF PREVENTIVE CARE USE We used logistic regression to estimate predictors of preventive care use during implementation of the reforms. We adjusted the models by age, sex, race or ethnicity, income, employment status, self-reported health status, and insurance status. The Massachusetts surveillance survey did not collect data on cholesterol screening in 2008, so we examined data from 2007 instead.

We conducted sensitivity analyses to estimate the effect of missing data on income. These analyses showed that the missing data did not materially affect our results.

To account for the survey sampling design, we estimated all the models in SUDAAN 10.0 with survey weights. We used two-tailed tests of statistical significance and established statistical significance at the 0.05 alpha level. The Appendix presents Massachusetts unemployment rates from the US Bureau of Labor Statistics during the study period.¹⁹

LIMITATIONS Potential limitations of the Behavioral Risk Factor Surveillance Survey data in Massachusetts include the low response rate, although this is unlikely to have substantially biased our results. The surveillance survey's estimates of increased insurance coverage are con-

We saw modest reductions in unmet needs due to cost for some groups but not for others.

sistent with recent data from the Massachusetts Health Reform Survey,²⁰ conducted by the Urban Institute and Social Science Research Solutions since 2006.^{2,21} The surveillance survey's estimates of unmet need due to cost were higher than that seen in the Health Reform Survey.²

A further limitation is that the surveillance survey excludes households with no land-line telephones.²² This may bias the sample by, for example, excluding younger people who use only mobile phones. Indeed, we found that the age of the survey sample increased over time, which could reflect either true population aging or a bias of this sort in the survey selection.²³

The 2009 surveillance survey includes—as subsequent surveys will—households with mobile phone numbers.^{4,22,24} Future analyses of health care access and use of preventive care that rely on the surveillance survey's data will reflect the change in the survey design, as well as trends in access or use over time.

A key limitation of our analysis is its inability to infer a causal relationship between the implementation of the Massachusetts health reforms and trends in health care access or use of preventive care. Some changes in the use of preventive care appeared to be more closely related to “secular,” or long-term, trends than to specific policies associated with the reforms. Our analysis could not tease out the impact of earlier legislation designed to improve women's access to screening tests, such as the National Breast and Cervical Cancer Early Detection Program, known as the Women's Health Network in Massachusetts.²⁵

An additional limitation of our analysis is that we chose to examine only one aspect of access: the inability to see a doctor because of cost. Even with near-universal coverage, access to care can be affected by delivery-system factors such as shortages of primary care providers. The Massachusetts reforms were amended in 2008 to address the rising cost of health care, reimbursement of providers, and other aspects of access. The amendment included new incentives to

encourage physicians to seek careers in primary care. Future research will be needed to assess the impact of these changes on access.

Results

CHARACTERISTICS OF PARTICIPANTS Appendix Exhibit A presents the sample characteristics of the Behavioral Risk Factor Surveillance Survey.¹⁹ Our sample contained 88,667 residents of Massachusetts, ages 18–64.

The mean age of the sample increased between 1996 and 2008 from 38.3 years (standard error 0.39) years to 40.8 years (SE 0.21). The prevalence of survey respondents who were unemployed at the time of the survey increased over time, roughly paralleling Massachusetts unemployment rates as estimated by the US Bureau of Labor Statistics.

TRENDS IN INSURANCE COVERAGE The age-standardized prevalence of uninsurance fell to twelve-year lows in Massachusetts, from 11.5 percent (SE 0.91) in 1996 to 3.5 percent (SE 0.33) in 2008 (Appendix Exhibit B).¹⁹ In most of the groups we studied—defined by sex, race or ethnicity, income, or health status—we found marked decreases in the proportion uninsured in 2008, after the implementation of reforms. Between 2005 and 2008 there was a decrease in the prevalence of uninsurance in all groups. Only among non-Hispanic blacks was this trend not statistically significant ($p = 0.052$).

Insurance coverage was greatest in 2008 for all of the groups mentioned above (Exhibit 1). This includes significantly increased coverage for those in fair or poor health in 2008 compared to both other periods.

Non-Hispanic blacks did not have statistically significant improvements in insurance coverage in 2008 compared to the other two periods. Hispanics, however, had significantly increased coverage rates in 2008 compared to 2003–06, but not compared to 1996–2000.

TRENDS IN UNMET NEEDS DUE TO COST The prevalence of unmet medical care needs due to cost fell from 9.2 percent (SE 0.76) in 1996 to 7.2 percent (SE 0.39) in 2008 (Appendix Exhibit C).¹⁹ We found statistically significant reductions in unmet needs due to cost between 2005 and 2008 for both men and women, non-Hispanic whites, low- and high-income earners, and people in good or excellent health, but not for Hispanics, non-Hispanic blacks, middle-income earners, or those in fair or poor health.

As shown in Exhibit 2, the adjusted odds of experiencing unmet care needs due to cost did not improve in 2008 compared to 1996–2000 for any group. But we did see improvements in 2008 compared to 2003–06.

EXHIBIT 1**Prevalence Of Uninsurance In Massachusetts By Group, In Three Time Periods, 1996–2008**

Group	Age-standardized prevalence of uninsurance (%), by time period			Adjusted odds ratio of improvement in 2008	
	I (1996–2001)	II (2002–06)	III (2008)	III vs. I	III vs. II
Male	9.7	11.1	5.1	2.09 ^a	2.61 ^a
Female	6.5	6.2	2.0	2.93 ^a	3.04 ^a
White, non-Hispanic	7.4	6.9	2.4	3.07 ^a	3.36 ^a
Black, non-Hispanic	12.1	12.8	7.6	1.42	1.59
Hispanic	13.3	21.3	10.1	1.37	2.20 ^a
Low income	19.4	20.7	9.7	2.43 ^a	2.66 ^a
Middle income	6.4	8.3	3.8	1.97 ^a	2.47 ^a
High income	2.5	2.6	0.5	5.49 ^a	5.87 ^a
In fair or poor health	12.8	17.0	8.3	1.90 ^a	2.52 ^a
In good or excellent health	7.6	7.8	3.1	2.47 ^a	2.81 ^a

SOURCE Authors' analysis of data from the Massachusetts Behavioral Risk Factor Surveillance Survey, 1996–2008. **NOTES** Prevalence was age standardized to the 2000 US standard population. Odds ratios for improvement among the uninsured in 2008 were adjusted for age, unemployment, race or ethnicity, income, and sex in models not already stratified by these demographic groups. 2008 was the referent year in all models. Medicaid expansion took place in time periods I and II. Unemployment rates for the time periods were as follows: I, 2.7–4.6 percent; II, 4.8–5.3 percent; III, 5.3 percent. Low income is less than \$25,000 per year; middle income is \$25,000–\$74,999; high income is \$75,000 or more. ^aSignificant reduction in uninsurance ($p < 0.05$).

TRENDS IN PREVENTIVE CARE USE The prevalence of screening for cancer and cardiovascular disease is high in Massachusetts (Exhibit 3). With respect to cancer screening among women, we found no statistically significant improvements in 2008 compared to the other two periods for mammography within the previous two years, or Pap smear use within the previous three years. The prevalence of colorectal cancer screening within the previous five years im-

proved significantly among both men and women in 2008 compared to both other periods, and this was consistent with a linear trend increase for men and women since 1996.

The prevalence of cholesterol screening within the previous five years increased in 2007 compared to prior periods for women, but not for men. Improvements for women were consistent with a linear trend increase.

PREDICTORS OF PREVENTIVE CARE USE We

EXHIBIT 2**Unmet Medical Care Needs Due To Cost, Massachusetts, In Three Time Periods, 1996–2008**

Group	Age-standardized prevalence of unmet need (%), by time period			Adjusted odds ratio of improvement in 2008	
	I (1996–2000)	II (2003–06)	III (2008)	III vs. I	III vs. II
Male	7.5	8.4	6.5	1.04	1.34 ^a
Female	8.5	9.3	7.8	0.97	1.14
White, non-Hispanic	7.4	7.6	5.8	1.04	1.27 ^a
Black, non-Hispanic	11.1	15.0	12.6	0.75	1.18
Hispanic	14.2	17.4	15.8	0.98	1.12
Low income	17.7	21.3	17.5	1.06	1.32 ^a
Middle income	7.1	9.1	8.6	0.87	1.09
High income	2.7	3.1	1.8	1.41	1.51 ^a
In fair or poor health	16.8	23.7	23.2	0.79	1.13
In good or excellent health	7.2	7.2	5.6	1.08	1.25 ^a

SOURCE Authors' analysis of data from the Massachusetts Behavioral Risk Factor Surveillance Survey, 1996–2008. **NOTES** Prevalence was age standardized to the 2000 US standard population. Unmet medical care needs due to cost were measured by the inability to see a doctor in the past twelve months because of cost. Odds ratios for improvement in unmet needs in 2008 were adjusted for age, unemployment, race or ethnicity, income, and sex in models not already stratified by these demographic groups. 2008 was the referent year in all models. Medicaid expansion took place in time periods I and II. Information on unemployment rates and income levels is available in Exhibit 1 Notes. The survey did not collect data on unmet needs due to cost in 2001–02. ^aSignificant reduction in unmet need ($p < 0.05$).

EXHIBIT 3**Use Of Preventive Care In Massachusetts, In Three Time Periods, 1996–2008**

Preventive care use	Age-standardized prevalence of preventive care use (%), by time period			Adjusted odds ratio of improvement in 2008		Linear trend p value
	I (1996–2001)	II (2002–06)	III (2008)	III vs. I	III vs. II	
WOMEN						
No recent mammogram (ages 40–64)	17.6	16.1	15.1	1.04	1.00	0.50
No recent Pap smear (ages 18–64)	10.1	9.8	11.2	0.87	0.86	0.97
No recent colonoscopy/flex. sig. (ages 50–64)	69.1	52.3	38.9	3.47 ^a	1.72 ^a	< 0.001
No recent cholesterol screening (ages 25–64)	18.9	16.0	13.5	1.45 ^a	1.22 ^a	< 0.001
MEN						
No recent colonoscopy/flex. sig. (ages 50–64)	61.5	47.3	35.0	2.98 ^a	1.74 ^a	< 0.001
No recent cholesterol screening (ages 25–64)	21.5	19.0	17.9	1.12	1.02	0.18

SOURCE Authors' analysis of data from the Massachusetts Behavioral Risk Factor Surveillance Survey, 1996–2008. **NOTES** Prevalence was age standardized to the 2000 US standard population. Flex. sig. is flexible sigmoidoscopy. "Recent" is explained in Note 15 in the text. The survey did not collect data on the use of colonoscopy or flexible sigmoidoscopy in 1996 (data are from 1997 instead) or on the use of cholesterol screening in 2008 (data are from 2007 instead). Odds ratios were adjusted for age, race and ethnicity, income, and unemployment. Medicaid expansion took place in time periods I and II. Information on unemployment rates and income levels is available in Exhibit 1 Notes. ^aSignificant change in the use of preventive care ($p < 0.05$).

used multivariable analyses to identify the key predictors of being screened for cancer and cardiovascular disease during implementation of the reforms, adjusted for age, sex, race or ethnicity, income, unemployment, health status, and insurance status (Exhibit 4). People with the lowest incomes were much less likely than those with the highest incomes to obtain age-appropriate mammography, Pap smears, colorectal cancer screening, or cholesterol screening. People in the middle-income category were also less likely than those with the highest incomes to obtain mammography, Pap smears, colorectal cancer screening, or cholesterol

screening.

Unemployed women were less likely than employed women to have a mammogram. People who were uninsured were less likely than those who were insured to receive Pap smears, colorectal cancer screening, or cholesterol screening, but not less likely to have a mammogram.

Additionally, we found that women were more likely than men to obtain cholesterol screening. Non-Hispanic blacks were less likely than non-Hispanic whites to have a Pap smear. Hispanics were less likely to obtain cholesterol screening, but more likely to have a mammogram, than non-Hispanic whites.

EXHIBIT 4**Odds Ratios For Use Of Preventive Care In Massachusetts, By Population Group, 2008**

Group	Type of preventive care			
	Recent mammogram (women ages 40–64)	Recent Pap smear (women ages 18–64)	Recent colonoscopy/flexible sigmoidoscopy (men and women, ages 50–64)	Recent cholesterol screening ^a (men and women, ages 25–64)
Age	1.07 ^b	1.00	1.09 ^b	1.08 ^b
Female	—	—	0.86	1.39 ^b
Black, non-Hispanic	1.20	0.62 ^b	0.82	1.14
Hispanic	2.11 ^b	1.04	0.95	0.46 ^b
Low income	0.56 ^b	0.48 ^b	0.43 ^b	0.37 ^b
Middle income	0.74 ^b	0.71 ^b	0.71 ^b	0.62 ^b
Unemployed	0.60 ^b	1.07	1.01	0.86
In fair or poor health	0.77	0.85	1.28	0.94
Uninsured	1.18	0.29 ^b	0.25 ^b	0.22 ^b

SOURCE Authors' analysis of data from the Massachusetts Behavioral Risk Factor Surveillance Survey, 1996–2008. **NOTES** Figures represent odds ratios of receiving care in 2008, adjusted for listed covariates. Reference categories are male, non-Hispanic white, high income, employed (including self-employed), in good or excellent health, and insured. Data for other employment status categories (homemaker, retiree, student, not able to work) are not shown. Information on income levels is available in Exhibit 1 Notes. "Recent" is explained in Note 15 in the text. ^aThe survey did not collect data on the use of cholesterol screening in 2008 (data are from 2007 instead). ^bSignificant difference from the reference category ($p < 0.05$).

Discussion

It is important to monitor early trends in the implementation of Massachusetts' health reforms in diverse groups to understand the reforms' impact and to take full advantage of opportunities that have been provided to enhance equity through reform efforts.

Our analysis showed that implementation affected people's access to care differently depending on their sex, race or ethnicity, income, and health status. We found marked improvements in coverage overall among people ages 18–64. Most groups, including people with low incomes, had large gains in coverage.

We saw modest reductions in unmet needs due to cost for some groups—men, non-Hispanic whites, those with low and high incomes, and people in good or excellent health—but not for others. Unmet needs due to cost remained high among people in fair or poor health.

Disparities in unmet needs by race or ethnicity, income, and health status were lower in 1996–2000, a period of Medicaid expansion with low unemployment, than in the other two periods we studied. However, for vulnerable groups—such as people in fair or poor health—these reductions in disparities disappeared in 2003–06, a period of rising unemployment. Even the 2006 reforms have not yet reduced disparities to the level of the earliest period.

With respect to the use of preventive care, we found increased use of colorectal cancer screening for men and women, and increased cholesterol screening for women during the implementation of the health care reforms, which was consistent with secular, or long-term, increases. However, so far there are no indications of increased use of breast or cervical cancer screening for women or cholesterol screening for men, compared to prior periods. People with annual incomes under \$25,000 were still less likely in 2008 to use any form of screening that we studied. People who remained uninsured after the reforms were also less likely to receive certain types of screening.

A core goal of health reform is to increase coverage and access to care, regardless of changing economic conditions. The data from the Behavioral Risk Factor Surveillance Survey suggest that the 2006 reforms in Massachusetts were able to improve access for some groups, particularly people with low incomes, before the recession increased unemployment. However, additional strategies are needed to achieve equitable access for other vulnerable groups, particularly people in fair or poor health.

The survey data cannot explain the persistence of high unmet needs due to cost among vulnerable groups, or the lack of changes in women's

A core goal of health reform is to increase coverage and access to care, regardless of changing economic conditions.

use of cancer screening or men's use of cardiovascular screening. The survey does not measure various costs associated with accessing care, including costs associated with obtaining child care and opportunity costs, when seeking care means missing work and losing wages.

Previous studies show that people's use of preventive care is sensitive to copayments and subsidies for screening; models of care delivery, such as assistance with navigating the health care system; having a usual source of care; and the social determinants of health, such as an individual's income and access to transportation, and resources at the community level.^{25–29}

To craft and monitor policies and interventions that narrow disparities in access to care, greater national and state attention to collecting and reporting additional data will be necessary. In particular, we need more data on the social determinants of health to identify specific barriers related to cost and access for vulnerable groups that general insurance reforms may not address.

The Massachusetts Behavioral Risk Factor Surveillance Survey includes a substantial sample of underrepresented racial and ethnic groups, which allows researchers to investigate changes in diverse populations. Our study found that disparities in unmet care needs due to cost according to health status, race or ethnicity, and socioeconomic status were smallest during periods of minimal unemployment. We also found that insurance reforms may be providing some protection against unmet needs due to cost in the face of rising unemployment for some groups.

Conclusion

Our study leads us to suggest two important changes in reform efforts in Massachusetts.

First, more should be done to identify and address the access barriers faced by people in fair or poor health. Available data do not reflect the impact of recent strategies to limit out-of-

pocket spending for this group, including caps on deductibles, which may reduce their unmet needs. Future reform goals should include providing additional relief for the high-need group of nonelderly adults in fair or poor health.

Second, better and more explicit monitoring of trends in diverse groups will be critical to assessing the benefits of reform and to identifying where more intervention is needed.

In the short term, it will be difficult to evaluate

reform efforts in Massachusetts and nationally, as the next round of data will reflect the impact of nearly unprecedented levels of unemployment caused by the recession. Collecting and reporting more-detailed data—including data on out-of-pocket spending, opportunity costs, and social determinants of health—will be essential to help policy makers craft insurance and delivery-system reforms to sustain improvements in health care access across diverse groups. ■

The authors gratefully acknowledge the funding support of the Advancing System Improvements to Support Targets for Healthy People (ASIST) 2010 grant (No. ASTWH070011) from the Office on Women's Health in the US Department of Health and Human Services. The authors thank the Massachusetts Department of Public Health for providing the Massachusetts

Behavioral Risk Factor Surveillance Survey data. The authors are not affiliated with the Massachusetts Department of Public Health. The Massachusetts Department of Public Health is not responsible for the accuracy or validity of the results. The views stated here are not necessarily those of the Massachusetts Department of Public Health. The authors thank

Piper Orton, Garrett Fitzmaurice, David Bates, Helen Hawk, Tracey Hyams, Emily Martin O'Donnell, Wanda McClain, and Kim Simonian for their support and assistance. Part of this paper was presented at the annual meeting of the Society of General Internal Medicine in Minneapolis, Minnesota, on April 29, 2010.

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In this issue, a collaborative team from Brigham and Women's Hospital, in Boston, explores how effective Massachusetts health reforms are at meeting the preventive and ongoing care needs of the state's vulnerable populations. The team brought together several areas of expertise to conduct the study under a grant from the Office on Women's Health in the US Department of Health and Human Services (HHS), as part of a project to achieve the goals of Healthy People 2010.

The study's lead author is Cheryl Clark, director of health equity research at the Center for Community Health and Health

Equity at Brigham and Women's Hospital, an affiliate of Harvard Medical School. Clark is also a hospitalist and an instructor in the Division of General Medicine and Primary Care at Brigham and Women's Hospital, where her research focuses on the social determinants of health as explanatory factors for racial and ethnic disparities in health outcomes and aging. She earned her master of science and medical degrees at Stanford Medical School and a doctor of science degree at the Harvard School of Public Health.

Jane Soukup is a senior programmer analyst at Brigham and Women's Hospital. She ran all of the analyses of the data that the team collected. She received a master's degree in biostatistics from the Harvard School of Public Health and has published nearly twenty papers related to patient safety, health disparities, and health care.



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Usha Govindarajulu is a biostatistician at Brigham and Women's Hospital and has provided statistical expertise for health policy-related studies. She has experience working with numerous medical investigators in study design, analysis, and grant preparation. She earned a doctorate in biostatistics from Boston University and did postdoctoral work in biostatistics at the Harvard School of Public Health. She also has a master's degree in biostatistics from the George Washington University.



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As a research manager in the Division of Women's Health and the Connors Center for Women's Health and Gender Biology, Heather Riden contributes to the study of gender disparities in access to care. Riden also helped keep the project on schedule, monitored its budget, and interacted with community health centers and state health agencies. Her previous work includes research in child abuse and neglect and women's rights. She holds a master's degree in sociology from the University of Virginia.



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Paula A. Johnson is chief of the Division of Women's Health at Brigham and Women's Hospital.

Since 2007 Clark has worked with Paula Johnson, chief of the Division of Women's Health and executive director of the Connors Center at Brigham. Johnson is a nationally recognized leader in efforts to improve the health care of women and minorities, as well as a practicing cardiologist and leader in public health and health equity. She chairs the board of the

City of Boston's Department of Public Health. Johnson also founded Brigham's Center for Cardiovascular Disease in Women, which develops new strategies for the prevention and treatment of coronary heart disease in women and for rehabilitation of patients with the disease.

Johnson has served as acting executive director of the Office on Women's Health in the US Department of Health and Human Services and of the Center of Excellence in Women's Health at Harvard Medical School. Johnson is an associate professor of medicine at Harvard Medical School and a graduate of Harvard Medical School and the Harvard School of Public Health.