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## Have Working-Age People with Disabilities Shared in the Gains of Massachusetts Health Reform?

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*The Massachusetts health reform, implemented in 2006 and 2007, reduced the uninsurance rate for working-age people with disabilities by nearly half. Enrollment in Medicaid and subsidized insurance accounted for most of the gain in insurance coverage. The reduction in uninsurance was greatest among younger adults. The reform also reduced cost-related problems obtaining care; however, cost remains an obstacle, particularly among young adults with disabilities. The Massachusetts outcomes demonstrate that insurance subsidies, Medicaid expansions for low-income adults, individual insurance mandates, and enrollment initiatives can lead to substantial reductions in uninsurance and cost-related problems obtaining care among working-age people with disabilities.*

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In 2006, Massachusetts enacted legislation to provide near-universal health insurance coverage. The health reform decreased the uninsurance rate among Massachusetts children and working-age adults, improved access to health care, and reduced the burden of health care costs among working-age adults (Long and Stockley 2010; Kenney, Long, and Luque 2010; Long and Massi 2009; Tinsley et al. 2010). These positive effects of the reform are well known; however, there has been only limited study of the effects of the reform on a large (up to 18% of working-age people) and particularly vulnerable subgroup: working-age (19–64) people with disabilities (Tinsley et al. 2010).<sup>1</sup> In this paper we examine the effects of the Massachusetts health reform on people

with disabilities, a subgroup that is frequently omitted from health reform discussions and research.

The Massachusetts reform includes extensive changes that potentially affect working-age adults with and without disabilities, including Medicaid expansion, a new health insurance exchange, health insurance subsidies for low- and moderate-income people, mandates that adults who can afford insurance obtain insurance, new employer requirements intended to increase employer-sponsored coverage, insurance market reforms, and enrollment initiatives.<sup>2</sup> Whether the changes affect people with and without disabilities similarly is not known and the potential for different effects exists.

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The effects on uninsurance may be different for people with and without disabilities. People with disabilities are much poorer on average than those without disabilities and we expect people with disabilities to be more affected by reform changes targeted to low-income people compared to people without disabilities.<sup>3</sup> Many low-income people with severe disabilities qualify for disability-based public health insurance, Medicaid, or Medicare, but others with less severe disabilities do not qualify and remain uninsured (Sommers 2006). Two Massachusetts reform changes provided new opportunities for low-income people, without regard to disability severity or status, to obtain no-cost or low-cost insurance. The reform lifted an enrollment cap on coverage for long-term unemployed adults, referred to subsequently as the Medicaid expansion, and created a new subsidized insurance program, Commonwealth Care (Wielawski 2007).

We expect people with disabilities to be less affected by reform changes aimed at increasing employer-sponsored insurance because people with disabilities have much lower employment rates compared to people without disabilities.<sup>4</sup> We also expect the reform to indirectly increase enrollment in disability-based Medicaid among people with disabilities. The individual mandate likely prompted some people who would not have done so in the absence of the mandate to apply for disability-based Medicaid. Enrollment initiatives, such as the use of a common application for both Commonwealth Care and Medicaid that includes disability screening, likely resulted in the enrollment of some people in disability-based Medicaid that would not have occurred in the absence of the enrollment initiative.

The effects on cost-related problems obtaining care may also be different for people with and without disabilities because the health care expenditures for people with disabilities are much higher.<sup>5</sup>

We do not know whether these differences will result in larger health reform effects for people with disabilities compared to those without disabilities or vice versa; however, the differences are substantial and point out the need for separate health reform effect

estimates for people with disabilities. In this paper, we estimate the Massachusetts health reform effects on uninsurance and cost-related problems obtaining care among people with disabilities.

This study adds to the literature on the Massachusetts health reforms by providing new health reform effect estimates for an under-reported subgroup, people with disabilities, including effect estimates by age group. The estimates are produced with methods that accommodate for potential bias because of unobserved effects of time. Bias is a real possibility because the Massachusetts reforms were implemented shortly before the economic downturn, and the downturn could also affect insurance coverage and cost-related problems obtaining care. Also, the study demonstrates the use of a public health survey, the Behavioral Risk Factor Surveillance System (BRFSS) survey, as a data source for state health reform research. Because of the large within-state samples and the breadth of public health questions, the BRFSS survey could be an important data source for future research on state implementations of the recently enacted Patient Protection and Affordable Care Act.

## **Study Methods**

We assume the Massachusetts reform did not affect people in Massachusetts before the changes were implemented. Given this assumption, one method for estimating the effects is a comparison of the outcomes before and after the reform. However, this pre/post comparison does not take into account changes in coverage and other outcomes that would have occurred in Massachusetts in the absence of the reform, and the estimates may be biased by the unobserved effects of time. To reduce this vulnerability, we adjust the pre/post comparison to account for changes that would have occurred in the absence of the reform. Assuming the reform affected Massachusetts residents but did not affect the residents of other states, we use residents of other states to define a comparison group assuming that the change in the outcome over the pre/post period in the comparison group reflects the

change that would have occurred in Massachusetts in the absence of the reform. This estimate is commonly referred to as a difference-in-differences (DID) estimate. For this study, the estimate is the outcome difference from the pre-period to the post-period in Massachusetts minus the outcome difference from the pre-period to the post-period in the comparison group.

We define the pre- and post-periods based on the Massachusetts health reform implementation dates. Most reform changes were implemented in 2006 and 2007. The earliest Massachusetts reform changes took effect in July 2006 expanding MassHealth, the Massachusetts Medicaid program, to children in families with incomes up to 300% of the federal poverty level (FPL), and restoring MassHealth coverage to long-term unemployed adults. In October 2006, a new subsidized insurance program, Commonwealth Care, became available to people with incomes below 100% of FPL. In January 2007, eligibility for Commonwealth Care was expanded to people with incomes up to 300% FPL. The mandate that people who have access to affordable insurance obtain health insurance became effective July 1, 2007. To accommodate for the possibility that the effects of health reform were not fully realized during the implementation period, we omit the period from July 2006 through June 2007 when estimating the effects. We define the pre-period as January 2004 through June 2006, and the post-period as July 2007 through December 2009. Even though most policy changes were in effect by July 2007, the program remained in transition during the post-period as additional policies were implemented. The estimates of this study are average effects for this transitional period.

Ideally, the time-dependent factors affecting the uninsurance rates and cost burden in the comparison states would match the circumstances of Massachusetts in the absence of the Massachusetts reforms. In practice, the factors are not known with certainty. To accommodate for the uncertainty, we define six comparison groups and make estimates for each comparison group. The multiple comparison groups allow us to

evaluate whether the effect estimates are sensitive to the comparison group definition.

The results reported here are for the “comparable uninsurance” group comprised of eight states with uninsurance rates among people with disabilities that are comparable to the Massachusetts rate in the pre-period. That group includes Connecticut, Delaware, the District of Columbia, Hawaii, Maine, Minnesota, Vermont, and Wisconsin. We also defined five other comparison groups. Each comparison group was defined by one of the following characteristics: proximity to Massachusetts, the employment-to-population ratio among working-age people with disabilities, the Social Security Disability Insurance and Supplemental Security Income take-up rate, disability prevalence, and the extent of Medicaid expansions for people with disabilities.<sup>6</sup> The effect estimates obtained using the five other comparison groups are very similar in terms of sign, magnitude, and statistical significance to the results reported in this paper (these findings are available upon request from the authors).

To accommodate for differences in characteristics between Massachusetts residents and residents of the comparison group states and to accommodate for possible changes in group composition over time, the effects are estimated using regression models with person-level covariates. The person-level covariates are: age, education, gender, race, and marital status. See Appendix Table 1 for summary statistics for Massachusetts and the comparison group. Linear probability models are estimated to provide direct effect estimates.<sup>7</sup>

The DID model with covariates is equation 1:

$$Y_{ist} = \alpha + \beta_1 X_{ist} + \beta_2 M_s + \beta_3 P_t + \beta_4 U_s + \beta_5 (M_s \times P_t) + \varepsilon_{ist} \quad (1)$$

In equation 1,  $i$  indexes individuals,  $s$  indexes states and  $t$  indexes the pre- and post-periods.  $Y_{ist}$  is the outcome variable, either uninsurance status or problems obtaining care status.  $X_{ist}$  represents the person-level covariates.  $M_s$  is a dummy variable set to 1 for Massachusetts residents.  $P_t$  is a dummy variable set to 1 for individuals in the post-period.  $U_s$  is the state monthly unemployment rate for the

**Table 1. Changes in insurance coverage and difference-in-differences effect estimates among working-age adults with disabilities in Massachusetts**

|  | Pre-reform period<br>(%) (N=3,465) | Post-reform period<br>(%) (N=7,321) | Pre/post<br>difference | Difference-in-differences<br>(N=39,764) |
|--|------------------------------------|-------------------------------------|------------------------|---|
| <b>Insurance coverage among working-age adults with disabilities</b>             |                                    |                                     |                        |   |
| Uninsured  | 10.7                               | 5.7                                 | -5.0****               | -5.2****                                |
| Employer-sponsored insurance   | 50.5                               | 50.2                                | -.3                    | N/A                                     |
| MassHealth/ Commonwealth Care  | 11.7                               | 17.5                                | 5.8****                | N/A                                     |
| Public other   | 19.4                               | 19.7                                | .3                     |   |
| Other  | 7.6                                | 6.8                                 | -.8                    | N/A                                     |
| <b>Uninsurance rate among working-age adults with disabilities, by age group</b> |                                    |                                     |                        |   |
| Age 19-34  | 17.4                               | 8.8                                 | -8.6**                 | -11.7****                               |
| Age 35-44  | 11.0                               | 5.5                                 | -5.5***                | -7.0****                                |
| Age 45-54  | 9.2                                | 5.3                                 | -4.0***                | -3.9****                                |
| Age 55-64  | 6.1                                | 4.1                                 | -2.0                   | .7                                      |

Source: 2004–2009 Behavioral Risk Factor Surveillance System (BRFSS) surveys. The source for insurance types is the Massachusetts Department of Public Health BRFSS surveys.

Notes: See text, equation 1 for the specification of the difference-in-differences model. Commonwealth Care is only available in the post-reform period. See Appendix Table 2 for full difference-in-differences regression estimates. N/A = not available. \* $p < .10$ ; \*\* $p < .05$ ; \*\*\* $p < .01$ ; \*\*\*\* $p < .001$ .

month of the observation.<sup>8</sup>  $\varepsilon_{ist}$  represents unobserved factors that influence the outcome.

The individual characteristics control for differences between Massachusetts and the comparison group and composition changes between the pre- and post-periods (captured by the coefficient vector  $\beta_1$ ). The Massachusetts variable controls for time-invariant differences between Massachusetts and the comparison group ( $\beta_2$ ). The post-period variable controls for differences between the pre- and post-periods ( $\beta_3$ ). The unemployment rate variable controls for the change in economic conditions over time ( $\beta_4$ ). The interaction between the Massachusetts variable and the post-period variable ( $\beta_5$ ) is the DID estimate of the effect of health reform in Massachusetts (relative to the comparison states) after the reform (relative to the period before the reform).

The DID estimate is vulnerable to bias if there was an event coincident with the Massachusetts health reform that affected individuals' health insurance status or cost burden and which had a different effect in Massachusetts relative to the comparison group. The recent economic downturn is an

event that may have affected individuals' health insurance status and cost burden and was coincident with the Massachusetts health reform. Whether the downturn affected Massachusetts differently from the comparison group is not known and the potential for bias exists. Two features of the study design address this vulnerability. The first is estimation of effects for multiple comparison groups. If there were wide variation in the economic downturn across states, we would expect wide variation in the effect estimates across comparison groups. In contrast, consistent estimates across comparison groups suggest that the estimates are not an artifact of bias. We compare the estimates across comparison groups in the "Results" section. The second feature is the inclusion of the state unemployment rate in the month of the observation as a control variable in the DID model. It is likely that the economic downturn's effects on uninsurance and cost burden would be related to changes in unemployment rates. Including the unemployment rate as a covariate in the DID model thus provides some control for the effects of the economic downturn.

The estimates of this study are also vulnerable to bias if there were changes in the comparison states affecting uninsurance or cost burden that were coincident with the Massachusetts reforms. As is typical during any time period, many states made policy changes related to insurance coverage, including Medicaid eligibility and services, during the study period.<sup>9</sup> These changes may bias the estimates of this study. While bias is possible, the inclusion of multiple states in each comparison group reduces the vulnerability. Each comparison group likely includes both states that did and did not make changes. For those states that made changes, the timing of the changes also likely varies across states within comparison groups. Both sources of variation reduce vulnerability to bias. In addition, because of the variation in the timing and extent of state policy changes and variation in the states included in the comparison groups, we would not expect the bias, if existent, to be consistent across comparison groups. As discussed earlier, consistent estimates across comparison groups would suggest that the estimates are not an artifact of bias.

### Data Source

The data sources are the 2004 to 2009 Behavioral Risk Factor Surveillance System surveys.<sup>10</sup> The BRFSS, a collaborative project of the Centers for Disease Control and Prevention and the states, is a telephone survey of the adult population (age 18 or older) living in households. The sampling designs vary by state; however, all state designs are justifiable as a probability sample of households with telephones in the state.<sup>11</sup> The BRFSS design does not directly compensate for households without telephones; however, the weighting procedures may reduce the bias vulnerabilities.

The survey, designed to measure behavioral risk factors of the adult population, includes questions that may be used to determine disability status, health insurance status, and cost-related problems obtaining care. Prior research using DID methods to estimate the effects of the Massachusetts reforms used the Annual Social and Economic

Supplement (ASEC) as the data source (Long, Stockley, and Yemane 2009; Kenney, Long, and Luque 2010). We were not able to use the ASEC because the survey does not adequately identify people with disabilities for the full time period of the study.<sup>12</sup>

Health insurance status was determined using the following BRFSS survey question: “Do you have any kind of health care coverage, including health insurance, prepaid plans such as HMOs, or government plans such as Medicare?” People answering “no” were classified as uninsured.

Disability status was determined using the following two BRFSS survey questions: 1) “Are you limited in any way in any activities because of physical, mental or emotional problems?” 2) “Do you now have any health problem that requires you to use special equipment, such as a cane, a wheelchair, a special bed, or a special telephone?” People responding “yes” to either question were considered to have a disability.

There is no universally agreed-upon method for identifying people with disabilities although there are well-accepted conceptual models of disability, for example the *International Classification of Functioning, Disability and Health* (ICF) (World Health Organization 2001). The BRFSS questions are consistent with the ICF model. In the ICF model, disability is an umbrella term encompassing impairment, activity limitation, and participation restriction. The first BRFSS question (noted earlier) identifies activity limitation. The second question identifies physical impairment. These questions do not directly identify sensory or cognitive impairments or participation restrictions—for example employment participation restrictions—so it is possible that some people with disabilities are not identified. The BRFSS questions are not bounded by duration or severity of disability. Thus, the group of people with disabilities identified will cover the full range of duration and severity. Using this definition and 2009 BRFSS survey data, we estimate that 18% of U.S. working-age people had a disability in 2009.

Whether a person had a cost-related problem obtaining care was determined using the following BRFSS survey question: “Was there a time in the past 12 months when

**Table 2. Changes in insurance coverage and difference-in-differences effect estimates among working-age adults without disabilities in Massachusetts**

|   | Pre-reform period<br>(%) (N=13,878) | Post-reform period<br>(%) (N=25,780) | Pre/post<br>difference | Difference-in-differences<br>(N=156,085) |
|---|-------------------------------------|--------------------------------------|------------------------|--|
| <b>Insurance coverage among working-age adults without disabilities</b>             |                                     |                                      |                        |  |
| Uninsured   | 11.2                                | 5.4                                  | -5.8****               | -5.2****                                 |
| Employer-sponsored insurance  | 72.1                                | 72.8                                 | .7                     | N/A                                      |
| MassHealth/ Commonwealth Care   | 4.7                                 | 10.2                                 | 5.5****                | N/A                                      |
| Public other  | 3.1                                 | 4.0                                  | .9***                  |  |
| Other   | 8.7                                 | 7.5                                  | -1.2***                | N/A                                      |
| <b>Uninsurance rate among working-age adults without disabilities, by age group</b> |                                     |                                      |                        |  |
| Age 19-34   | 17.5                                | 8.3                                  | -9.2****               | -8.6****                                 |
| Age 35-44   | 7.9                                 | 4.4                                  | -3.5****               | -2.6****                                 |
| Age 45-54   | 7.0                                 | 3.7                                  | -3.3****               | -2.8****                                 |
| Age 55-64   | 7.7                                 | 3.7                                  | -4.0****               | -4.0****                                 |

Source: 2004–2009 Behavioral Risk Factor Surveillance System (BRFSS) surveys. The source for insurance types is the Massachusetts Department of Public Health BRFSS surveys.

Notes: See text, equation 1 for the specification of the difference-in-differences model. Commonwealth Care is only available in the post-reform period. N/A = not available.

\**p*<.10; \*\**p*<.05; \*\*\**p*<.01; \*\*\*\**p*<.001.

you needed to see a doctor but could not because of cost?” People answering “yes” were considered to have a cost-related problem obtaining care. Using this definition and 2009 BRFSS survey data, we estimate that 30% of U.S. working-age people with disabilities had a cost-related problem obtaining care. Because the reference period for the cost measure is retrospective, we define the post-period for the cost-burden estimates to be July 2008 through December 2009.

**Results**

The results are presented in Tables 1 to 4 for people with and without disabilities. The pre-reform and post-reform percentages and pre-post differences are unadjusted sample mean estimates based on the BRFSS survey data. The difference-in-differences estimates are pre/post differences adjusted to accommodate for pre/post changes in uninsurance or cost burden that would have occurred in Massachusetts in the absence of the reforms. The difference-in-differences estimates are linear probability model regression estimates of equation 1 (coefficient  $\beta_5$ ). The estimates

were made using the comparison group comprised of states with pre-reform uninsurance rates that were similar to the Massachusetts pre-reform rates.

Prior to health care reform, the uninsurance rate among working-age people with disabilities in Massachusetts was 10.7% (Table 1). The uninsurance rate decreased by nearly half (46.7%) to 5.7% after the reform. The combined participation in MassHealth and subsidized insurance (Commonwealth Care) was 5.8 percentage points higher post-reform compared to the pre-reform MassHealth participation, an approximate 50% increase. We do not estimate participation in MassHealth separately from Commonwealth Care because BRFSS survey respondents may not be able to distinguish between the two programs.<sup>13</sup> There were no appreciable changes in employer-sponsored coverage, other types of public coverage, or other coverage.<sup>14</sup>

Prior to health reform, there was wide variation in the uninsurance rate across age groups with the uninsurance rates being highest among younger adults, ranging from 17.4% for 19-to-34-year-olds to 6.1% for 55-to-64-year-olds. After health reform, the

**Table 3. Changes in cost-related problems obtaining care and difference-in-differences effect estimates among working-age adults with disabilities in Massachusetts**

| Group  | Pre-reform period<br>(%) (N=3,465) | Post-reform period<br>(%) (N=4,032) | Pre/post<br>difference | Difference-in-differences<br>(N=29,473) |
|--|------------------------------------|-------------------------------------|------------------------|---|
| All working-age<br>adults with<br>disabilities | 17.0                               | 14.3                                | -2.7*                  | -3.8****                                |
| By age groups                                  |                                    |                                     |                        |   |
| Age 19-34                                      | 26.3                               | 21.0                                | -5.3                   | -9.7**                                  |
| Age 35-44                                      | 16.4                               | 13.0                                | -3.4                   | -6.7****                                |
| Age 45-54                                      | 16.3                               | 15.1                                | -1.2                   | -1.5****                                |
| Age 55-64                                      | 10.3                               | 10.4                                | .1                     | .7                                      |

Source: 2004-2009 Behavioral Risk Factor Surveillance System Surveys.

Notes: See text, equation 1 for the specification of the difference-in-differences model. See Appendix Table 2 for full difference-in-differences regression estimates.

\* $p < .10$ ; \*\* $p < .05$ ; \*\*\* $p < .01$ ; \*\*\*\* $p < .001$ .

range was substantially smaller, ranging from 8.8% for 19-to-34-year-olds to 4.1% for 55-to-64-year-olds. The biggest change in uninsurance between the pre- and post-periods occurred among 19-to-34-year-olds, a reduction of approximately half, from 17.4% to 8.8%. We were not able to detect a change in uninsurance rates among those ages 55 to 64.

The pre/post differences clearly indicate lower uninsurance rates among working-age adults with disabilities in the post-period compared to the pre-period. However, the differences may either underestimate or overestimate the true effects of health reform because of the unobserved effects of time. The DID estimates of Table 1 adjust for the unobserved effects of time.<sup>15</sup> As the estimates of Table 1 show, the effect on uninsurance among younger adults is larger than is

apparent from the pre/post comparison, with the effect on 19-to-34-year-olds being -11.7 percentage points and the effect on 35-to-44-year-olds being -7 percentage points. These higher adjusted estimates suggest that the uninsurance rates among people with disabilities would have increased among those ages 19 to 44 from the pre-reform period to the post-reform period in the absence of the reforms.

The health reform effects among working-age people without disabilities are remarkably similar to the effects among people with disabilities (see Table 2). Comparable to the effects among people with disabilities, the uninsurance rate decreased by approximately half (51.8%); the biggest insurance gains occurred in the MassHealth and Commonwealth Care programs, and the insurance

**Table 4. Changes in cost-related problems obtaining care and difference-in-differences effect estimates among working-age adults without disabilities in Massachusetts**

| Group   | Pre-reform period<br>(%) (N=13,878) | Post-reform period<br>(%) (N=14,228) | Pre/post<br>difference | Difference-in-differences<br>(N=118,011) |
|---|-------------------------------------|--------------------------------------|------------------------|--|
| All working-age<br>adults without<br>disabilities | 8.0                                 | 6.0                                  | -2.0****               | -2.7****                                 |
| By age groups                                     |                                     |                                      |                        |  |
| Age 19-34   | 11.5                                | 8.2                                  | -3.3***                | -4.3****                                 |
| Age 35-44   | 7.1                                 | 6.0                                  | -1.1                   | -.9***                                   |
| Age 45-54   | 5.7                                 | 4.3                                  | -1.4**                 | -2.5****                                 |
| Age 55-64   | 4.5                                 | 3.5                                  | -1.0                   | -2.0***                                  |

Source: 2004-2009 Behavioral Risk Factor Surveillance System Surveys.

Notes: See text, equation 1 for the specification of the difference-in-differences model.

\* $p < .10$ ; \*\* $p < .05$ ; \*\*\* $p < .01$ ; \*\*\*\* $p < .001$ .

gains were largest among 19-to-34-year-olds. We were unable to detect a statistically significant difference between the effect estimates (ages 19 to 64) for people with and without disabilities.<sup>16</sup>

The Massachusetts reforms also reduced the cost-related problems in obtaining care among people with disabilities (see Table 3). Prior to the reform, 17% of working-age Massachusetts people with disabilities had a cost-related problem obtaining care. After the reform, the percentage decreased by 2.7 points. The percentage having a cost-related problem obtaining care was highest among younger adults both before and after the reform. Among 19-to-34-year-olds in the pre-period, 26.3% reported having a cost-related problem obtaining care, in contrast to 10.3% among 55-to-64-year-olds. The disparity between age groups in the post-period is comparable. We were not able to detect any statistically significant pre/post unadjusted differences in the percentage having cost-related problems obtaining care across periods within the four age groups.

Adjusting for the unobserved effects of time, the DID effect estimates indicate the health reform effects on cost-related problems obtaining care were greater than are apparent from the pre/post comparison, particularly among younger adults (Table 3). Health reform decreased the percentage of working-age adults who had a cost-related problem obtaining care by 3.8 points. The effects were greatest among younger adults. Among the 19-to-34-age group, health reform decreased the percentage by 9.7 points. The effects were -6.7 and -1.5 percentage points for the 35-to-44 and 45-to-54 groups, respectively. We were unable to detect an effect for the 55-to-64 group.

The Massachusetts reforms also reduced the cost-related problems obtaining care among people without disabilities (see Table 4). The reductions were similar among people with and without disabilities (-3.8 vs. -2.7 percentage points). We were unable to detect a statistically significant difference between the effect estimates (ages 19 to 64) for people with and without disabilities.<sup>17</sup> However, the pre-reform baselines were very different for people with and without disabilities. Prior to the

reform, approximately 17% of people with disabilities experienced cost-related problems obtaining care compared to 8% of people without disabilities. This relative disparity persisted after the reforms (14.3% vs. 6%).

The results discussed here, obtained using the “comparable uninsurance” comparison group, are consistent with the results generated with the other five comparison groups (results are available upon request). The estimates for the effects on uninsurance among working-age people with disabilities range from -3.4 to -5.2 percentage points across the six comparison groups. The effects on cost-related problems obtaining care range from -3.6 to -4.6 percentage points. This consistency suggests that the findings are not an artifact of the comparison group chosen, not the result of differences in the economic downturn effects in Massachusetts relative to the comparison group, and not an artifact of policy changes in comparison states affecting uninsurance or cost burden.

## **Discussion**

The findings of this study demonstrate that people with disabilities have shared in the positive effects of Massachusetts health reform. Health reform lowered the uninsurance rate among working-age adults with disabilities by approximately half (5.2 percentage points), which is comparable with the estimates for people without disabilities and comparable with the estimates of prior research for the overall working-age population (Long and Stockley 2010; Long, Stockley, and Yemane 2009). Thus, even though the insurance opportunities are different for people with and without disabilities due to variations in income, employment, and access to disability-based Medicaid, the effects of the Massachusetts health reform on uninsurance rates are quite similar.<sup>18</sup>

The gains in insurance among people with disabilities occurred primarily in the Medicaid and the subsidized insurance (Commonwealth Care) programs. This was expected because many people with disabilities are low income and these programs serve low-income people. We were not able to detect any difference in employer-sponsored insurance



between the pre-reform and post-reform periods. It is possible that the reform mitigated employer-sponsored insurance loss during the recent recession, but we do not have the data to evaluate this.

There is an important distinction among the low- and moderate-income programs available to people with disabilities. The Medicaid expansion and Commonwealth Care provide no-cost or low-cost health insurance without the requirement that participants be severely disabled. The pre-existing disability-based Medicaid program, CommonHealth, requires that participants be severely disabled. Thus, the opportunity for Medicaid coverage for people with severe disabilities in Massachusetts was already extensive prior to the reforms. The CommonHealth program, which was unchanged by the reforms, provides Medicaid to people with severe disabilities at all income levels who “buy in” to Medicaid.<sup>19</sup> However many low- and moderate-income people with chronic health conditions and disabilities have not had access to disability-based Medicaid because they did not meet the Medicaid requirements for severe disability. For low- and moderate-income people with short-term or less severe disabilities, the Massachusetts Medicaid expansion and Commonwealth Care program have provided new insurance opportunities.

Additional research is needed to determine how much of the insurance gain among people with disabilities is attributed to the new programs versus the pre-existing, disability-based Medicaid program. This research could have important implications for states under the national reforms included in the Patient Protection and Affordable Care Act (ACA). Under the ACA, costs for new enrollees in Medicaid expansion or subsidized coverage will be paid largely by the federal government. Under the current cost-sharing arrangements, costs for new enrollees in pre-reform Medicaid programs are shared by the states and the federal government.<sup>20</sup>

The reduction in uninsurance among people with disabilities is the result of extensive Massachusetts reform changes. It would be useful to know the relative contribution of each change; however, the changes probably

interact in ways that make it impossible to separate any one change from the others. It is likely that the new insurance opportunities, the individual mandate and the extensive outreach and enrollment initiatives, combined, were critical to the Massachusetts insurance gains among people with disabilities.

The reform effects on uninsurance vary by age, with the largest effects being experienced among younger adults. Among adults with disabilities between the ages of 19 and 34, the health reform lowered the uninsurance rate by 11.7 percentage points. This is significant because many youth with disabilities lose health insurance as they transition from youth to adulthood and are subsequently uninsured for a period as young adults (Wang, Grembowski, and Watts 2010). The loss occurs because youth often lose public insurance and parental coverage in the transition. The public health insurance loss occurs because participation in the State Children’s Health Insurance Program (SCHIP) is restricted to people under age 19 and because adult disability-based programs apply a more stringent requirement for severe disability. The Massachusetts reforms have smoothed the transition.

Prior research suggests that part of the insurance gains among young adults with disabilities may be the result of two Massachusetts reform changes targeted at young adults: an increase in the age of dependent coverage from age 19 to 26, and new, lower-cost private insurance options for young adults ages 18 to 26 living in families with incomes above 300% FPL (Long, Yemane, and Stockley 2010). Massachusetts was not unique in increasing the age of dependent coverage during the study period; 17 other states implemented comparable changes between January 2004 and January 2008 (Monheit et al. 2011). The insurance gains among young adults in the states increasing the age of dependent coverage during the study period, while estimated to be small relative to gains among young adults in Massachusetts, could bias (reduce) the effect estimates of this study for the 19-to-34 age group.<sup>21</sup>

We also found that health reform decreased the percentage of working-age people with disabilities having a cost-related problem obtaining

care by approximately one-quarter (3.8 percentage points), which is also comparable with the reduction among people without disabilities and the prior research on all working-age people. Yet, even though there were strong insurance gains, health care costs remain a significant obstacle for many people with disabilities. For this subgroup with disabilities, having health insurance does not alleviate the cost-related problems obtaining care.<sup>22</sup>

The findings of this study have implications for national health reform. Massachusetts demonstrated that it is possible for health reform to substantially reduce the uninsurance rate among people with disabilities. Similar to Massachusetts, the national reform also includes Medicaid expansion for

low-income adults, new subsidized coverage, enrollment initiatives, and an insurance mandate.<sup>23</sup> These similarities suggest that the national reform has the potential for substantial improvements in insurance coverage among people with disabilities. Massachusetts reduced uninsurance rates based on a pre-reform rate among people with disabilities that was already low relative to nearly all other states.<sup>24</sup> In 2009, more than half of the states had uninsurance rates among people with disabilities that were more than 50% higher than the pre-reform Massachusetts rate.<sup>25</sup> The higher uninsurance rates nationally suggest that the potential exists for gains under the ACA even larger than the substantial gains in Massachusetts.

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## Notes

*The opinions, conclusions, and any errors in this paper are the sole responsibility of the authors and do not represent the official views of the Commonwealth of Massachusetts, the Executive Office of Health and Human Services, the Centers for Medicare and Medicaid Services, or the University of Massachusetts. The authors are not affiliated with the Massachusetts Department of Public Health, and the Massachusetts Department of Public Health is not responsible for the accuracy and validity of the results.*

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- 1 Statistics have also been reported for people with chronic illness, many of whom may have an illness-related disability (Long and Stockley 2009). The percentage of people with disabilities depends on the data source and the definition of disability. The estimate of 18% is the authors' tabulation from the 2009 BRFSS survey. See the Data Source section for the definition of disability. In comparison the percentage estimated with the 2008 American Community Survey data, which has more restrictive disability questions, is approximately 10.5%.
- 2 For a more complete list of the components of the Massachusetts reform, see Nordahl, K., "Appendix A: Key Components of Chapter 58—An Act Providing Access to Affordable, Quality and Accountable Health Care" in Wielawski (2007).
- 3 Prior to the 2006 health reform, approximately 40% of uninsured working-age people with

disabilities lived in households with a total annual income of less than \$20,000 compared to 24% of people without disabilities (authors' tabulation from the 2004–2006 BRFSS survey). See the Data Source section for the definition of disability and Study Methods section for the definition of the pre-reform period.

- 4 The pre-reform employment rate was much lower for uninsured people with disabilities compared to uninsured people without disabilities (50% vs. 73%) (authors' tabulation from the 2009 BRFSS survey). The employment rate is the percentage of the population either working for wages or self-employed at the time of the survey. See the Data Source section for the definition of disability.
- 5 Stapleton and Liu (2009) estimated that the annual national per-capita health care expenditure for people with disabilities is more than four times the expenditure for people without disabilities. We expect that the Massachusetts relative expenditures are similar. The combination of high medical expenditures and low income results in people with disabilities having more cost-related problems obtaining care compared to people without disabilities (pre-reform uninsured in Massachusetts, 58% vs. 33%; authors' tabulation of the 2004–2006 BRFSS surveys).
- 6 The proximity comparison group includes the other New England states. The comparable employment-to-population comparison group includes Florida, Illinois, Michigan, New Jersey, New York, Oregon, Rhode Island, and Washington. The disability program take-up rate comparison group includes Illinois, Louisiana, Maine, North Carolina, Pennsylvania, Rhode

- Island, South Carolina, and Tennessee. The disability prevalence comparison group includes California, Colorado, Indiana, Maryland, Nebraska, Rhode Island, Texas, and Wisconsin. The Medicaid eligibility among people with disabilities comparison group includes California, Connecticut, Indiana, Iowa, Minnesota, New York, Pennsylvania, and Wisconsin.
- 7 Norton, Wang, and Ai (2004) described the complexities of estimating the marginal effect of the change in two variables in non-linear models compared to estimates using linear models. For simplicity, we present linear probability model estimates.
  - 8 The monthly unemployment rates are from the Local Area Unemployment Statistics program, Bureau of Labor Statistics (<http://www.bls.gov/lau/home.htm>).
  - 9 There is no complete data source for all changes. For a description of state Medicaid changes affecting children and parents, see the reports of periodic Kaiser Family Foundation surveys of the 50 states (<http://www.kff.org/medicaid/50StateSurvey.cfm>). The Robert Wood Johnson State Coverage Initiatives website also provides a listing of state changes (<http://www.statecoverage.org/node/23>).
  - 10 With the exception of the insurance types, the estimates in this study are based on annual BRFSS survey data that are publicly available from the Centers for Disease Control at [http://www.cdc.gov/BRFSS/technical\\_infodata/surveydata.htm](http://www.cdc.gov/BRFSS/technical_infodata/surveydata.htm) [accessed June 10, 2010]. The Massachusetts BRFSS survey contains additional questions on insurance type that are not available in the national core survey. The Massachusetts Department of Public Health is the source of the Massachusetts BRFSS Survey data.
  - 11 The state surveys are disproportionate stratified sample designs. The standard error estimates in this paper were determined using statistical procedures that account for the complex survey design. The survey response rates vary across states and years. Response rate data by state and year are available on the Centers for Disease Control and Prevention website ([http://www.cdc.gov/brfss/technical\\_infodata/quality.htm](http://www.cdc.gov/brfss/technical_infodata/quality.htm)). The Massachusetts response rate was approximately 37.2% in the pre-period and 45.2% in the post-period. The change in response rates could affect the estimates of this study.
  - 12 Prior to 2009, the ASEC only included one question to identify work disability. In 2009, a broad set of disability questions were added.
  - 13 The Massachusetts BRFSS survey contains Massachusetts-specific questions on insurance type. Respondents are asked, "What type of health care coverage do you use to pay for most of your medical care?" Respondents are read a list of options (e.g., your employer, Medicare, Commonwealth Care) including the following list of names representing the Massachusetts Medicaid program: Medicaid, MassHealth, CommonHealth or MassHealth HMOs offered through Neighborhood Health Plan, Fallon Community Health Plan, BMC HealthNet or Network Health. Because some of these names are similar to "Commonwealth Care," a separate item in the list, and because Commonwealth Care and Medicaid share a common application form, some survey respondents may not be able to accurately distinguish between Medicaid and Commonwealth Care coverage types.
  - 14 Employer-sponsored insurance includes insurance sponsored by the respondent's employer and someone else's employer. Other public coverage includes Medicare, military-related coverage and Indian Health Service coverage. Other coverage includes a plan that the respondent or someone else buys or any other source.
  - 15 We are not able to make DID estimates for the effects on insurance types because the insurance type survey data is specific to Massachusetts only.
  - 16 To test this, we used a difference-in-difference-in-differences model to estimate the reform effects on uninsurance among people with disabilities (relative to people without disabilities) in Massachusetts (relative to the comparison states) in the post-period (relative to the pre-period). The estimate was .1 percentage points ( $p = .62$ ). The model and results are not shown and are available from the authors on request.
  - 17 To test this, we used the method described in note 16. The estimate was  $-1.5$  percentage points ( $p = .21$ ). The model and results are not shown and are available from the authors on request.
  - 18 To assess whether the effect sizes estimated with the BRFSS survey are comparable with the Current Population Survey effect sizes of the earlier study by Long, Stockley, and Yemane, we used the BRFSS survey to estimate the effects of reform on the uninsurance of all working-age people using a similar difference-in-differences model to that used in the earlier study. The effect estimates are comparable but somewhat smaller than the effect estimates of the earlier study ( $-4.4$  percentage points vs.  $-6.6$  percentage points). The model specification and results are available from the authors on request.
  - 19 The CommonHealth program was implemented as a state-funded program in 1988 and became part of the Massachusetts Medicaid program in 1997. As of 2009, 42 states had Medicaid Buy-In programs that provided Medicaid coverage to working people with severe disabilities. The Massachusetts program is unique in that it is the only buy-in program

- for non-working adults and the only program without an earnings limit.
- 20 Holahan and Headen (2010) made state-by-state Medicaid health care reform cost estimates using two participation rate scenarios for people newly eligible for Medicaid expansion and people eligible (but not participating) in pre-reform Medicaid. The estimates suggest that most of the Medicaid costs for new participants will be paid by the federal government.
- 21 Monheit et al. (2011) estimate that increasing the dependent age results in an increase in dependent coverage ranging from 1.52 to 3.84 percentage points for 19–25-year-olds residing with parents.
- 22 The cost-related problems obtaining care are also substantial among working-age people who participate in Medicare because of disabilities (Cubanski and Neuman 2010; Hanson et al. 2003).
- 23 For a description of the enrollment initiatives of the national reform, see Morrow and Paradise (2010).
- 24 The authors’ tabulation from the 2004, 2005, 2006 BRFSS survey. Massachusetts had the third lowest rate; however, because of sampling error there is uncertainty in the rank.
- 25 The authors’ tabulation from the 2009 BRFSS survey. The estimated uninsurance rates among working-age people with disabilities exceeded 16.1% in 32 states in 2009.

**Appendix Table 1. Summary statistics for Massachusetts and the “comparable insurance” group for the pre-period**

| Characteristic                                 | Massachusetts    | Comparison group  |
|--|------------------|-------------------|
|  | Mean (N = 3,390) | Mean (N = 12,243) |
| Uninsured                                      | .107 (.0084)     | .113 (.0051)      |
| Cost-related problem obtaining care            | .170 (.010)      | .200 (.0063)      |
| Age  | 45.0 (.39)       | 45.0 (.22)        |
| Male   | .446 (.013)      | .463 (.0077)      |
| Education                                      |                  |                   |
| Never attended                                 | .003 (.0014)     | .001 (.0006)      |
| Elementary                                     | .035 (.0041)     | .012 (.0013)      |
| Some high school                               | .074 (.0077)     | .063 (.0040)      |
| High school graduate                           | .257 (.011)      | .307 (.0071)      |
| Some college or technical school               | .281 (.012)      | .308 (.0073)      |
| College graduate                               | .350 (.012)      | .308 (.0068)      |
| Employed                                       | .491 (.0093)     | .599 (.0074)      |
| Marital Status                                 |                  |                   |
| Married  | .489 (.013)      | .559 (.0077)      |
| Divorced                                       | .151 (.0080)     | .150 (.0045)      |
| Widowed  | .033 (.0032)     | .027 (.0019)      |
| Separated                                      | .041 (.0043)     | .022 (.0018)      |
| Never married                                  | .233 (.012)      | .193 (.0069)      |
| Member of an unmarried couple                  | .053 (.0062)     | .049 (.0045)      |
| Race   |                  |                   |
| White only                                     | .874 (.0082)     | .862 (.0050)      |
| Black or African American only                 | .041 (.0054)     | .055 (.0030)      |
| Asian only                                     | .001 (.0026)     | .013 (.0019)      |
| Native Hawaiian or other Pacific Islander only | .0001 (.0004)    | .005 (.0011)      |
| American Indian or Alaskan Native only         | .012 (.0028)     | .014 (.0017)      |
| Other race only                                | .050 (.0047)     | .020 (.0021)      |
| Multiracial                                    | .012 (.0027)     | .031 (.0028)      |

Source: 2004–June 2006 Behavioral Risk Factor Surveillance System Surveys.

Notes: Standard errors are in parentheses. The comparison group includes Connecticut, Delaware, District of Columbia, Hawaii, Maine, Minnesota, Vermont and Wisconsin. All observations are people with disabilities, aged 19 to 64. See text for definition of disability.

**Appendix Table 2. Difference-in-differences regression results for comparable insurance group**

| Variable                               | Uninsurance           | Cost-related problems obtaining care |
|--|-----------------------|--------------------------------------|
|  | Estimate (N = 39,764) | Estimate (N = 29,743)                |
| Intercept ( $\alpha$ )                 | .313 (0.054)          | .4368 (0.093)                        |
| Massachusetts ( $\beta_2$ )            | -.006 (0.007)         | -.029 (0.007)                        |
| Post ( $\beta_3$ )                     | .016 (0.006)          | .014 (0.011)                         |
| Massachusetts * Post ( $\beta_5$ )     | -.052 (0.005)         | -.038 (0.009)                        |
| Male                                   | .040 (0.001)          | -.038 (0.009)                        |
| Age                                    | -.004 (0.003)         | -.002 (0.003)                        |
| Age-squared                            | .000 (0.000)          | .000 (0.000)                         |
| Education                              |                       |                                      |
| Never attended                         | .102 (0.065)          | .125 (0.097)                         |
| Elementary                             | .091 (0.021)          | .120 (0.016)                         |
| Some high school                       | .099 (0.027)          | .124 (0.026)                         |
| High school graduate                   | .074 (0.004)          | .073 (0.006)                         |
| Some college or technical school       | .042 (0.005)          | .071 (0.005)                         |
| College graduate                       | Reference category    | Reference category                   |
| Marital status                         |                       |                                      |
| Married                                | -.117 (0.028)         | -.145 (0.019)                        |
| Divorced                               | -.030 (0.018)         | -.028 (0.013)                        |
| Widowed                                | -.055 (0.014)         | -.050 (0.013)                        |
| Separated                              | -.044 (0.008)         | -.050 (0.026)                        |
| Never married                          | -.019 (0.021)         | -.064 (0.012)                        |
| Member of an unmarried couple          | Reference category    | Reference category                   |
| Race                                   |                       |                                      |
| White only                             | -.050 (0.023)         | -.063 (0.034)                        |
| Black or African American only         | -.046 (0.024)         | -.055 (0.033)                        |
| Asian only                             | -.042 (0.020)         | -.088 (0.029)                        |
| Native Hawaiian or other Pacific       |                       |                                      |
| Islander only                          | .142 (0.096)          | .064 (0.037)                         |
| American Indian or Alaskan Native only | -.008 (0.024)         | -.023 (0.060)                        |
| Other race only                        | .005 (0.033)          | .012 (0.038)                         |
| Multiracial                            | Reference category    | Reference category                   |
| State unemployment rate ( $\beta_4$ )  | -.003 (0.002)         | .004 (0.002)                         |

Source: 2004–2009 Behavioral Risk Factor Surveillance System Surveys.

Notes: Standard errors are in parentheses. The comparison group includes Connecticut, Delaware, District of Columbia, Hawaii, Maine, Minnesota, Vermont, and Wisconsin. The estimates were determined using a linear probability model using General Estimating Equations to accommodate for correlated observations within states (see equation 1). All observations are people with disabilities, aged 19 to 64. See text for definition of disability.

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