SCHIP Expansion and Parental Coverage: An Evaluation of Wisconsin's BadgerCare

Barbara Wolfe
Department of Economics
Population Health Sciences
University of Wisconsin–Madison
E-mail: wolfe@lafollette.wisc.edu

Thomas Kaplan
Institute for Research on Poverty
University of Wisconsin–Madison
E-mail: kaplan@ssc.wisc.edu

Robert Haveman
Department of Economics
La Follette School of Public Affairs
University of Wisconsin–Madison
E-mail: haveman@lafollette.wisc.edu

Yoonyoung Cho
Department of Economics
University of Wisconsin–Madison
E-mail: yoonyoungcho@wisc.edu

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Abstract

The Wisconsin BadgerCare program, which became operational in July 1999, expanded public health insurance eligibility to both parents and children in families with incomes below 185 percent of the U.S poverty line (200 percent for those already enrolled). This eligibility expansion was part of a federal initiative known as the State Children's Health Insurance Program (SCHIP). Wisconsin was one of only four states that initially expanded coverage to parents of eligible children. In this paper, we attempt to answer the following question: "To what extent does a public program with the characteristics of Wisconsin's BadgerCare program reduce the proportion of the low-income adult population without health care coverage?"

Using a coordinated set of administrative databases, we track three cohorts of mother-only families: those who were receiving cash assistance under the Wisconsin AFDC and TANF programs in September 1995, 1997, and 1999, and who subsequently left welfare. We follow these 19,201 "welfare leaver" families on a quarterly basis for up to 25 quarters, from two years before they left welfare through the end of 2001, making it possible to use the labor market information and welfare history of the women in analyzing outcomes.

We apply multiple methods to address the policy evaluation question, including probit, random effects, and two difference-in-difference strategies, and compare the results across methods. All of our estimates indicate that BadgerCare substantially increased public health care coverage for mother-only families leaving welfare. Our best estimate is that BadgerCare increased the public health care coverage of all adult leavers by about 17–25 percentage points.

JEL Codes: I18, I10

Key words: Children's Health Insurance Program; BadgerCare; Health Insurance coverage

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I. INTRODUCTION

Soon after implementing the Wisconsin Works (W-2) welfare reform program in September 1997,[1] and in response to the federal State Children's Health Insurance Program (SCHIP), Wisconsin developed its "BadgerCare" program, and initiated it in 1999.[2] Unlike most other states' SCHIP programs, BadgerCare provides health insurance benefits to adults as well as children living in families. Moreover, families are eligible for coverage if their income is above that necessary to qualify for Medicaid but below 185 percent of the poverty line.[3] The benefits provided are identical to those under the Medicaid program (in Wisconsin known as Medical Assistance, or MA). BadgerCare attracted liberal and conservative political support because it offered both a reduction in the uninsured low-income

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[1]Although W-2 removed the entitlement to cash income support that existed under the Aid to Families with Dependent Children (AFDC) program, it ensured that all working-age adults with income at or below 115 percent of the poverty line and who are parents of minor children have the opportunity to participate in work activities. The state supported these activities with cash grants contingent on participation, child care assistance, and subsidized health insurance. According to Wiseman (1999), five features of W-2 distinguish it from reform policies in other states. First, the program focuses on adults, rather than children. Second, it denies cash assistance to most adults if they do not work full time. Third, eligibility for other services (health care, child care, transportation, child support enforcement) is not tied to receipt of cash benefits under Temporary Assistance for Needy Families (TANF), the successor to AFDC, and TANF funds are being used to augment some of these services. Fourth, the program places strong emphasis on individual responsibility and reciprocity. Finally, nongovernmental organizations are sometimes responsible for running W-2 programs.

[2]Wisconsin's BadgerCare program was one of four SCHIP programs that provided coverage to parents; programs in Minnesota, New Jersey and Rhode Island were the other three (Minnesota's was approved several months later than the other three.) Wisconsin's program began as a 1115 waiver program in July 1999 and has continued as such. The timing of Wisconsin's program and its independence from related predecessor programs makes it the most straightforward of these programs to study. For example, Minnesota's program was preceded by a state-funded program beginning in 1992, New Jersey's coverage began in fall 2000 and included federal fund match only to 133 percent of the federal poverty line, and Rhode Island's program was financed with state funds to provide coverage beginning in November 1998, and switched to 1115 waiver funds in early 2001. (For more detail see Howell et al., 2002.)

[3]BadgerCare eligibility levels are 185 percent of the poverty line for new entrants and 200 percent of the poverty line for continuing enrollees.

population and an incentive to employment in firms that may not offer health insurance.[4] As such it is one of the most extensive state reforms in response to SCHIP, and its eligibility criteria, financing, and benefit structure have been studied by several other states and considered at the federal level.

Because eligibility rules for Medicaid differ by age and pregnancy status in Wisconsin, and federal law requires enrollment in Medicaid where eligible, eligibility for BadgerCare is determined separately for each individual in a family unit.[5] Most low-income children under age 6 and pregnant women have continued to be covered by Medicaid, since the Medicaid and BadgerCare eligibility thresholds are nearly identical for these groups. The majority of BadgerCare enrollees have been adults with income above the Medicaid limit but below 185 percent of the poverty line. Figure 1 shows monthly enrollment in BadgerCare from its inception through 2001. In December 2001, the end point of our study, adults composed about two-thirds of the total caseload of 90,000 participants.[6]

From the inception of the BadgerCare program through 2001, families with incomes above 150 percent of the poverty line paid a monthly premium equal to about 3 percent of their income.[7] Despite this premium requirement for those at the higher end of the BadgerCare income distribution, BadgerCare has

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[4]Tommy Thompson, the governor of Wisconsin at the time, said repeatedly that BadgerCare was intended as a complement to W-2—as a source of health care support for W-2 participants as they moved off cash assistance and into work. On the State of Wisconsin web site, the program is described as follows: "BadgerCare seeks to eliminate barriers to successful employment by providing a transition for families from welfare to private insurance. BadgerCare is based on the premise that health care is essential for working families with children." http://www.dhfs.state.wi.us/badgercare/html/glance-1.htm

[5]Since the federal government pays a higher proportion of SCHIP program costs than of Medicaid costs, those who are eligible for both Medicaid and SCHIP are required to enroll in Medicaid. The Medicaid eligibility threshold in Wisconsin is 185 percent of the poverty line for children below age 6 and for pregnant women, 100 percent of the poverty line for children aged 6–14, and averaged about 57 percent of the poverty line for children aged 15–19 and for nonpregnant adults when BadgerCare was established.

[6]By August 2004 the BadgerCare caseload had grown to 100,949, two-thirds of whom were still adults. Probably owing in part to new requirements for more frequent documentation from employers that BadgerCare participants are ineligible for low-cost, employment-based health insurance, BadgerCare caseloads fell to 89,441 by July 2005, at which time adults were 68 percent of the caseload.

[7]In July 2003 the premium was raised to 5 percent. If other family members do not elect BadgerCare coverage, pregnant women and children below age 6 receive Medicaid coverage up to 185 percent of the FPL without paying a premium.

grown to become a major component of public health insurance coverage in Wisconsin. In July 1999, just before the introduction of BadgerCare, 218,000 people were enrolled in publicly subsidized family-based coverage[8]. By the end of 2001, 367,000 people were enrolled, and one-quarter of enrollees were covered by BadgerCare.

In this paper, we analyze the extent to which BadgerCare was successful in reducing the population of low-income single mothers without health care coverage among cohorts of low-income, single-mother families who received cash assistance under the Wisconsin AFDC and TANF programs in September 1995, 1997, and 1999 and subsequently left welfare. We have quarterly observations of the earnings and health insurance status of the entire population of families in these three cohorts, and measure quarters in terms of the time since leaving cash assistance.

In the absence of a random assignment framework, we require an estimation strategy that will enable us to effectively control for relevant economic and policy phenomena other than the program itself that may have affected the level of health insurance coverage for the three cohorts. To this end, we adopt several approaches to disentangling the effects of BadgerCare from other factors. First, we present probit and random effects estimates, both of which control for individual characteristics but with different assumptions about unobserved characteristics. Public health insurance coverage is the bivariate dependent variable in these estimates. Both of these models incorporate variables designed to control for economic conditions that are likely to affect health care coverage (e.g., county unemployment rate and the percentage of county employees working in larger firms more likely to offer health insurance). However, other relevant economic changes not reflected by these controls may influence the level of health insurance coverage for these populations.[9]

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[8]Family-based programs require the presence of a minor child for eligibility and exclude people eligible because of participation in the Supplemental Security Income (SSI) program.

[9] For example, a general trend of increased economic confidence over time for leavers with earnings or longer hours of work would reduce the number of leavers who apply for the Medicaid program, but we are unable to measure this confidence.

To address this deficiency, we also present results of two difference-in-difference estimates that control for economic and attitudinal changes not captured in the probit and random effects estimates. Time-related changes in the familiarity of single mothers with the welfare office where eligibility for public health insurance is established (or in their willingness to visit this office), preferences for work and welfare, economic factors not captured in the regressions, and program administration characteristics that affect likelihood of entry[10] are examples. One difference-in-difference estimate relies on the observation that two of the cohorts had similar patterns of program coverage during the early quarters after leaving welfare before BadgerCare was available for either cohort, and that these patterns diverged after one cohort gained access to BadgerCare. The second difference-in-difference estimate compares those continuously eligible for public coverage to those made newly eligible by the establishment of BadgerCare within each of two cohorts.

III. RELATED LITERATURE

Our estimates build on a number of prior studies that have attempted to assess the success of the federal SCHIP program in providing health insurance coverage to low-income populations, primarily low-income children. Several of the papers have sought to identify the role of state policy choices in the Medicaid and SCHIP programs on children's health coverage.[11] Both the proportion of eligible children who are enrolled in public health insurance programs (Medicaid and SCHIP) and the proportion of low-income children eligible for coverage have been studied. Many of the studies rely on either the Current Population Survey or the Urban Institute's Survey of America's Families, of necessity assessing the effect of policies on the samples selected by the two surveys. Our study, in contrast, uses administrative data

[10]Changes in the information available (e.g., through increased or decreased advertising of the public insurance program) and altered requirements for eligibility verification of income or private health insurance status are examples of such administrative developments.

[11]For example, the U.S. General Accounting Office (2001) studied how enrollment policies influenced take-up in ten states.

from one state, allowing for analysis of the effects of a policy change on entire populations of mother-headed families that left cash assistance at varying periods.

Dubay and colleagues (2002) used data from the Urban Institute New Federalism project along with CPS data to analyze children's coverage (compared to parent's coverage), and report substantial positive effects from the introduction of SCHIP on children's coverage. They create an eligibility simulation model for children and conclude that eligibility thresholds are an important determinant of coverage.

More recently, LoSasso and Buchmueller (2004) studied this same question and the related issue of the crowd-out of private insurance, using CPS data for 1996–2001. They rely on differences in timing and the details of state expansions, disaggregating estimated effects on coverage and crowd-out by family income levels and other characteristics, and find that the introduction of SCHIP caused a small increase in parental public coverage, with about a quarter of this increase offset by a decline in private coverage. Kronebusch and Elbel (2004) include Medicaid as well as SCHIP, and focus on the effect of state programmatic decisions on the Medicaid and SCHIP coverage of children in families with incomes below 400 percent of the FPL, using CPS data for 2000. Employing logit models with the dependent variable specified as enrolled in Medicaid, SCHIP (one or both), or privately insured, they find that states administering SCHIP programs as Medicaid expansions are more successful in enrolling children than those with either separate SCHIP plans or combination programs. They also find several policy designs that are important to enrollment expansions, such as removing asset tests and implementing presumptive eligibility (which lead to increased enrollment) and longer waiting periods and premiums (which lead to reduced enrollment). They estimate that if all states adopted the policy options that facilitate program use,

enrollment for children with family incomes less than 200 percent of the poverty line could be raised from the current rate of 42 percent to 58 percent.[12]

Finally, Wolfe and Scrivner (2005) study the effect of SCHIP on low-income (below 300 percent of FPL) children's coverage, using two years of CPS data; they emphasize the roles of state policy design characteristics and state-specific private insurance markets. Their simulations suggest that a set of design elements in state SCHIP programs reduced uninsurance rates among children from 21 percent in states without these policies to 14 percent in states with the policies. Examples of these design elements are the use of telephone hotlines and presumptive eligibility, and no requirement that applicants be without coverage for several months before applying or that applicants meet with eligibility workers face-to-face.

There has been less study of the effect of the SCHIP program on the health care coverage of adults, which is the focus of this paper. Kronick and Gilmer (2002) employ both a logistic equation with state fixed effects and a pre-post descriptive analysis, together with CPS data from 1988 to 1999, and study the extent to which SCHIP programs in four states increased the coverage of adults with incomes above and below the federal poverty line (FPL). They find evidence of increased coverage for those with incomes below the FPL and no evidence of crowd-out. For those with incomes from 100–200 percent of the FPL, they find both an increase in coverage and the substitution of public for private coverage.[13] Ku and Broaddus (2000) conduct a largely descriptive study of adult coverage in three states; their finding of increased coverage lacks controls for other policy changes introduced at the same time, reducing the reliability of the study's conclusions. In an analysis employing a state fixed effects estimation approach and several years of CPS data, Busch and Duchovny (2002) study the impact of state expansions of Medicaid to 100 percent or more of the FPL and find both increased coverage of parents and positive health impacts. Aizer and Grogger (2004) also used CPS data (1996–2001) to study the effect of

[12]While they do not identify the eligibility status of the children, they do include measures of income eligibility by state as independent variables.

[13]The robustness of this finding has been questioned, as the insurance coverage questions in the CPS were altered in 1995.

Medicaid expansions within states on the coverage of parents with income below 200 percent of FPL (and parents likely to be newly eligible or near-eligible for public health insurance coverage); in essence, they conduct a difference-in-difference comparison of those newly eligible to those continuously eligible, and find a positive effect on the coverage of non-white, but not white, parents.[14]

In this study, we extend the limited work on the effects of SCHIP-related policy expansions on the health coverage on low-income parents by focusing on the BadgerCare program in Wisconsin. We investigate the independent effect of the BadgerCare expansion of SCHIP to low-income parents on their overall health insurance coverage and on enrollment in public insurance. We also present estimates of the magnitude of effects. Unlike the prior studies, we employ multiple estimation approaches designed to assess the independent effect of the program. We also employ several years of quarterly data on the entire populations of three cohorts of families, rather than annual data or limited samples. The populations that we study are a central target population for the SCHIP policy innovation—low-income, mother-only families who were past recipients of cash public assistance.

IV. DATA AND DESCRIPTIVE ANALYSIS

Using a coordinated set of administrative databases, we analyze the quarter-by-quarter effect of the BadgerCare program on the probability that low-income, single-mother families are covered by: 1) public health insurance, 2) any form of health insurance, and 3) no health insurance. We measure quarters in terms of time since leaving cash assistance, and study three cohorts of mother-only families who

[14]A related set of studies of policy changes on coverage complements these more direct efforts. For example, Pavetti, Maloy, and Schott (2002) study the extent to which a set of "promising practices" of a set of local welfare offices (e.g., type and site of outreach, ease of application) in fifteen sites increased enrollment and retention in the Food Stamp and public health insurance programs. In a rather different approach, Dubay and Kenney (2004) simulate the potential effect of extending Medicaid and SCHIP coverage to parents, and find a large potential effect on low-income parents of such extensions—perhaps 70 percent of all uninsured parents would be covered if parental eligibility levels for parents and children were the same. Other papers have asked whether state provision of parental coverage by Medicaid increases the coverage of children. For example, Dubay and Kenney (2003) conduct a two-stage study (across states and within one state) of this question; both stages of the study suggest a strong link between increases in parental coverage and that of their children.

received cash assistance under the Wisconsin AFDC and TANF programs in September 1995, 1997, and 1999 and subsequently left welfare. Because we track these "leaver" families from two years before they left welfare through the end of 2001, we are able to use their quarterly labor market and welfare histories in analyzing the outcomes. In estimating the effect of BadgerCare on insurance coverage, we exploit the coverage patterns of these mothers from the period before BadgerCare to the period after BadgerCare was instituted.[15] Appendix 1 provides details of the data sets and the variables used.

The women in our data were those receiving assistance under the AFDC-Regular or W-2 programs in September of 1995, 1997, and 1999, and listed as the "case head" (without the father of any of the children also listed). We select from these participants those "leavers" who exited cash assistance within three months after our initial observation date and remained off the welfare caseload for at least two consecutive months. There are 8,042, 8,162, and 2,997 women who left AFDC during the last quarters of 1995, 1997, and 1999, respectively. (Our samples include some women who returned to welfare within the period of our observation.) Because our analysis covers the period from the 4th quarter of the year that each woman left welfare through the 4th quarter of 2001, we have 25 quarters of observations for the 1995 cohort, 17 quarters for the 1997 cohort, and 9 quarters for the 1999 cohort. Table 1 shows the characteristics of each of the three cohorts of AFDC recipients and leavers in the quarter of their exit. The 1995 cohort left cash assistance before statewide, work-focused welfare reforms (W-2). The 1997 cohort left cash assistance during the initial implementation of the W-2 program. The final cohort, left a W-2 program that retained its emphasis on work but had added substantial work supports in the form of child care and family health insurance. Given earlier welfare reforms and substantial declines in the cash assistance caseload, we would expect women in the 1997 and 1999 caseload to have greater barriers to independence (lower educational attainment, younger and more children, and the presence of someone in the household with a severe disability) than those receiving

[15]Although we also track the coverage of children of the members of each cohort, we focus on mothers because the extension of BadgerCare to families is a unique aspect of the program.

benefits in 1995. The statistics in Table 1 are generally consistent with this expectation: women in the 1997 and 1999 caseloads are younger, have less education and work experience, more children, and a higher probability of a child with significant disabilities (children on SSI) than those in the 1995 caseload.

Eligibility for and Enrollment in Public Health Insurance

Using these demographic and income data, we identify all families from among the population of leavers in each of the three cohorts that are eligible for BadgerCare/MA benefits, using an income-based algorithm that calculates MA eligibility for each household member based on the poverty-related criteria for eligibility.[16]

Figures 2a–2c show the quarterly trends in the percentages of women who are eligible for and who take-up public health insurance (MA and BadgerCare) from the date of exit from cash assistance for each of the three cohorts of women. The height of the bars indicates the proportion of women eligible for public health insurance; among those eligible, coverage could either be taken up or not.

As Figure 2a shows, nearly all 1995 welfare leavers were eligible for MA at the time that they left cash assistance; about 80 percent of them accepted MA benefits. Both MA eligibility and coverage fell after these women left welfare until the beginning of BadgerCare, when only 66 percent were eligible for MA and fewer than 20 percent were enrolled (implying a take-up rate of about 30 percent). After BadgerCare is introduced in the third quarter of 1999, both eligibility and the enrollment rates substantially increase. From the quarter prior to BadgerCare to the quarter after, the percentage of these women eligible for public support rose from 63 percent to about 92 percent and, the proportion covered by public health insurance increased from about 18 percent in the quarter prior to the introduction of

[16]Household earnings are calculated as the total earnings reported in the UI database, with deductions of $90/month for work expenses and $30/month plus 1/3 of the remaining earnings. A more detailed description of this calculation algorithm is available from the authors, upon request.

BadgerCare to nearly 30 percent by the end of 2001. By the end of 2001, over one-half of those with public coverage were enrolled in BadgerCare.

Figure 2b shows the same eligibility and take-up outcomes for the 1997 cohort. Relative to the 1995 cohort, a higher proportion of the 1997 cohort of leavers were eligible for and took up public insurance before the introduction of BadgerCare; given their less advantaged characteristics, this is not surprising. Again, however, both the eligibility and the enrollment rates rose after the start of BadgerCare, but the increases were much smaller than for the 1995 cohort. For example, from the quarter prior to the introduction of BadgerCare to the end of 2001, coverage by public health insurance rose by about five percentage points. By 2001, about 40 percent of the women in this cohort with public coverage were enrolled in BadgerCare.

For these two cohorts of leavers who did not initially have access to BadgerCare upon leaving cash assistance, the introduction of BadgerCare appears to have contributed to an increase in both the proportion eligible for public health insurance and the proportion enrolled. Both cohorts show a steady decline in public health insurance coverage from the time of exit to the introduction of BadgerCare, largely owing to the decline in MA coverage. However, when BadgerCare becomes available, the downward trends stop and enrollment in public health insurance increases.

The patterns for the 1999 cohort, for whom BadgerCare was an immediate option upon departure from cash assistance, are shown in Figure 2c. The eligibility rate remained above 90 percent for the entire period, and showed virtually no downward trend, suggesting that most of the women in this group of leavers had earnings insufficient to raise them above BadgerCare eligibility levels. By the last quarter of 2001, the take-up rate exceeds 70 percent, which is far higher than for the earlier cohorts; over one-quarter of those eligible are enrolled in BadgerCare.

Uninsured or Covered by Public and Private Health Insurance

Because some leavers find jobs that provide employer-based insurance coverage or marry a spouse with family insurance coverage, BadgerCare and MA are not the only sources of health insurance.

We use information in our data to estimate both the proportion of these women with private insurance coverage among these cohorts of leavers (and hence the level of overall insurance coverage) and the proportion of these women who remained uninsured—uncovered by both public and private insurance.[17] Hence, there are four mutually exclusive and exhaustive categories of health insurance coverage: 1) not eligible for public or private health insurance, and uninsured, 2) eligible for public or private health insurance, but uninsured, 3) covered by private insurance, and 4) covered by public insurance.

In Figures 3a and 3b we show the composition of women in the 1995 and 1997 cohorts, by these categories. For both cohorts, the utilization of private insurance steadily increases as the take-up of public health insurance drops during the initial quarters after women left cash assistance, reflecting their greater participation in the labor market. On the eve of BadgerCare, about 76 percent of 1995 leavers were eligible for some kind of health insurance, 65 percent for public health insurance and 11 percent for private health insurance, and about 87 percent of 1997 leavers were eligible for some form of coverage, 81 percent from public health insurance and 6 percent from private coverage.

After the introduction of BadgerCare, the proportion of these low-income single mothers eligible for some form of health insurance expanded, to about 90 percent for the 1995 cohort and 92 percent for the 1997 cohort. For both cohorts, the proportion of women covered by public health insurance increased after BadgerCare, while the share holding private health insurance remained relatively constant. A larger

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[17]Our estimate of the number of women who are covered by private health insurance is based on the following assumptions and procedures. Wisconsin Unemployment Insurance files indicate whether a firm offers health insurance to its employees. Using the Unemployment Insurance records for each leaver, we estimate the number of leavers with their own employer-based insurance. We assume that leavers with all of the following characteristics have private health insurance: (1) they had worked for at least two consecutive quarters for the same firm, which offers health insurance to its employees, (2) they earn sufficient for us to deem them "full-time" workers, and (3) they are not enrolled in MA or BadgerCare. Employers generally do not offer health insurance to employees working less than 50 percent of full time, and some employers offer health insurance only to full-time workers. We assume that women who earn at least $2,343 in quarterly earnings—equal to 35 hours per week times the minimum wage of $5.15 per hour—are full-time workers. In addition, we restricted our assumption of private coverage to those who worked for the same firm offering health insurance for at least two quarters because employers commonly do not offer health insurance for new employees. Wisconsin law does not allow potential BadgerCare participants who have access to private insurance for which the employer pays at least 80 percent of the premium to participate in BadgerCare.

percentage of the 1995 cohort had private coverage, probably reflecting their greater labor market success.[18]

The Uninsured Rate among Leavers

The top two categories in each bar of Figures 3a and 3b show the percentage of our sample of women in the 1995 and 1997 cohorts estimated to be uninsured (eligible for public coverage but uninsured, or not eligible for public insurance and without private coverage). In the first quarter after leaving, about 24 percent of the 1995 cohort and 16 percent of the 1997 cohort had no health insurance. The uninsured percentage rises in subsequent quarters; on the eve of BadgerCare over 69 percent of the 1995 women and nearly 41 percent of the 1997 women were uninsured. Shortly after the introduction of BadgerCare, these percentages fell for both cohorts, by about five percentage points for the 1995 cohort and by two percentage points for the 1997 cohort. However, even among those eligible for public insurance, about 52 percent of the 1995 leavers and 32 percent of the 1997 leavers remained uninsured by the end of 2001.[19]

V. ESTIMATING THE EFFECT OF BADGERCARE ON PUBLIC HEALTH INSURANCE COVERAGE

In this section, we report four estimates of the effects of the BadgerCare program on the level of public health insurance coverage for our cohorts of low-income women: probit estimates, random effects estimates, and two difference-in-difference approaches to account for unobserved factors related to the

[18]Over the entire period, but especially after BadgerCare was introduced, a far higher proportion of the 1995 cohort remained uninsured even though eligible for public coverage than was the case for the 1997 cohort. A possible explanation is that leavers in the 1995 cohort had been away from contact with the welfare system for a longer time than their counterparts in the 1997 cohort when BadgerCare was introduced, and hence less likely to be aware of their eligibility for BadgerCare.

[19]As a test of sensitivity to our definition of private coverage, we used two alternative definitions: (1) working one quarter for a firm that offers coverage and earning at least $2,343 and a more stringent definition (2) that requires an individual to be in the third quarter of working for a firm that offers coverage and again earning at least $2,343. The overall pattern is quite robust to these alternative definitions of private coverage.

time since leaving welfare that might affect the likelihood of public health care coverage. The first difference-in-difference estimate compares the 1995 and 1997 cohorts, relying on the observation that the two cohorts have similar patterns of coverage in their first seven quarters after exit, at which time the 1997 cohort, but not the 1995 cohort, gains access to BadgerCare. The second difference-in-difference estimate compares those continuously eligible for public coverage to those made newly eligible by the establishment of BadgerCare within each cohort.

Probit Estimates of the Effect of BadgerCare

The decision equation for our latent variable describing participation in public health insurance is specified as:

$$\begin{aligned} y_{it}^{*} &= \beta' x_{it} + \alpha_0 Q_t + \alpha_1 Q_t^{\,2} + \alpha_2 BC_t + \upsilon_{it}, \\ y_{it} &= \begin{cases} 1 \; if \;\; y_{it}^{*} > 0 \\ 0 \; if \;\; y_{it}^{*} \le 0 \end{cases} \end{aligned} \tag{1}$$

where i indexes individuals, t indexes time period, and y_{it} is the binomial and observed dependent variable measuring public health insurance coverage. The explanatory variables influencing participation in public health insurance include demographic characteristics (x_{it}), a nonlinear specification of the number of quarters since exit in order to reflect the observed time-varying pattern of coverage (Q_t , $Q_t^{\,2}$), and an indicator of the introduction of BadgerCare (BC_t). The error term (υ_{it}) is assumed to follow a normal distribution controlling for all observed independent variables:

$$\upsilon_{it} \mid x_{it}, Q_t, Q_t^{\,2}, BC_t \sim N(0,1)$$

Hence, the probability of having public health insurance is shown as:

$$\Pr(y_{it} = 1 \mid x_{it}, Q_t, Q_t^{\,2}, BC_t) = \Phi(\beta' x_{it} + \alpha_0 Q_t + \alpha_1 Q_t^{\,2} + \alpha_2 BC_t). \tag{2}$$

Our probit specification of the effect of BadgerCare, α_2, postulates that the probability that a woman will have public health coverage is related to a large number of independent variables that reflect

factors potentially related to this outcome. The estimates, made separately for the 1995 and 1997 cohorts, are consistent and asymptotically normal without any further assumptions. The variance of these estimates is obtained taking into account repeated observations of the same person over time.

The individual characteristics include demographic characteristics such as race, education, age and number of children, and earnings and welfare history. The general time effect is reflected in the number of quarters since the woman exited cash assistance, and is introduced as a quadratic, in order to allow for differential influence of time since cash welfare receipt. These are complemented by locality characteristics including the proportion of female-headed families in the woman's neighborhood, the current unemployment rate of each county of residence, and the proportion of jobs in large firms in each county. Finally, a dummy variable for whether or not BadgerCare was available captures the independent effect of the program.

Table 2 presents our estimates; the standard errors are adjusted for repeated observation of each individual. The first set of columns is for 1995, and the second set is for 1997.[20] In general, the sign and magnitude of the marginal effect of the control variables are as expected. The contemporaneous unemployment rate is positively and significantly related to having public health insurance coverage. The negative sign on quarters since exit and the positive sign on the square of quarters since exit are consistent with the patterns of enrollment we noted above. The effect of the introduction of BadgerCare is positive and highly statistically significant. It shows that BadgerCare increased public health coverage by 6 percentage points for the 1995 cohort, and by 8 percentage points for the 1997 cohort.

[20]The estimates for both cohorts use 15 quarters of data for each observation, 7 quarters prior to the introduction of BadgerCare and 8 quarters after from the 4th quarter of 1997 to 2nd quarter of 2001; the first 8 quarters of information on the 1995 cohort (from the 4th quarter of 1995 to 3rd quarter of 1997) are not used in the estimation.

Random Effects Estimates of the Effects of BadgerCare

Our probit estimate does not reflect the possibility that time-invariant unobserved individual characteristics may affect the decision to participate in public health insurance. Making distributional assumptions for such unobservable heterogeneity, we can decompose the error term from model (1) into its persistent and random components: $\upsilon_{it} = \theta_i + \eta_{it}$. In this case, the effect of BadgerCare, α_2, can be estimated controlling for these unobserved individual characteristics, θ_i, which we assume form a random variable that follows the conditional distribution, $\theta_i \mid x_{it}, Q_t, Q_t^2, BC_t \sim G(\cdot)$, where G is a cumulative density function of the normal distribution. With this distributional assumption on η_{it}, the likelihood function can be constructed and a random effects logit model can be estimated.[21]

The random effects model that we estimate is:

$$\Pr(y_{it} = 1 \mid x_{it}, Q_t, Q_t^2, BC_t, \theta_i) = \Lambda(\beta' x_{it} + \alpha_0 Q_t + \alpha_1 Q_t^2 + \alpha_2 BC_t + \theta_i). \quad (3)$$

where Λ is the cumulative density function of standard logistic. Given the large number of observations over which our model is fit, the maximum likelihood estimate of the random effects logit regression provides a consistent estimate of the effect of BadgerCare on health insurance coverage.

We estimated this model as a logistic regression over both the 1995 and 1997 cohorts; the results are shown in Table 3. The coefficient on the BadgerCare variable is positive and significant for both the 1995 and 1997 cohorts and of similar magnitude, again suggesting that the availability of BadgerCare is significantly associated with an increase in the probability of public health insurance coverage for this group of low-skilled single mothers, after controlling for both observed and unobserved potential factors likely to be associated with health insurance coverage.

[21]We have estimated, but do not present, a fixed effects model; the results of the two estimates are very similar. We prefer the random effects parameter estimates for a binary dependent variable, as the fixed effect estimates are not consistent when T is finite. [Heckman (1981)]

Because both the probit and the random effects estimates are from a nonlinear model, it is difficult to perceive the quantitative importance of the availability of BadgerCare on the probability of public health insurance coverage. In Table 4, we present the results of a simulation of this probable effect, holding other variables in the estimates at their actual values. Simulated effects are presented for the simple probit results without individual unobserved effects, and for the random effects estimates with individual unobserved effects that do not vary over time.

The first two columns of Table 4 indicate the effect of BadgerCare on public health insurance coverage from the probit model estimates shown in Table 2. Holding all other variables at their actual levels, the probability of having public coverage with BadgerCare in place (compared to not having BadgerCare) is increased by six percentage points for the 1995 cohort (from .21 to .27) and eight percentage points (from .57 to .65) for the 1997 cohorts. The final two columns of Table 4 present analogous results from the random effects model shown in Table 3. Again the estimated effect of BadgerCare for the 1995 cohort is six percentage points (from .21 to .27) while for the 1997 cohort, it is eight percentage points (from .57 to .65). These estimates consistently suggest that the introduction of the BadgerCare program raised the probability of having public health insurance coverage by 6 percentage points for the 1995 cohort and 8 percentage points for the 1997 cohort.[22]

Difference-in-Difference Estimations

Our first difference-in-difference estimate treats the introduction of BadgerCare as a quasi-experiment to which the 1997 leavers, but not the 1995 leavers, are exposed. It exploits the similar

[22]For both the probit and random effects estimates, the with/without BadgerCare differences were generally similar for subsamples arrayed by education (less than 12 years, 12 years, and more than 12 years of education), suggesting that the effect of BadgerCare on the probability of having public health insurance was approximately equal across the education distribution.

patterns of public health insurance coverage[23] in the first seven quarters after leaving welfare for both cohorts, when neither cohort experienced BadgerCare; Figure 4 shows these similar, pre-BadgerCare trajectories.[24] At the 8th quarter after leaving, only the 1997 cohort experienced BadgerCare, and at this point its coverage levels begin to deviate from that of the 1995 cohort, unlike the similar patterns in the pre-BadgerCare period. Thus, we obtain our difference-in-difference estimate by comparing the coverage pattern in quarters 8–15 since leaving welfare for the 1997 cohort (during which time they experienced the BadgerCare program) with the coverage pattern in the analogous 8 quarters since leaving for the 1995 cohort (during which time the program did not exist). During quarters 8–15 since leaving, the 1997 cohort serves as the "treatment" group and the 1995 cohort is the "control" group. This estimate controls for several unobserved changes that occur over the relevant period of observation, such as the willingness to visit the welfare office to establish eligibility for public health insurance or preferences for work and welfare. [25]

Table 5 shows the results of our difference-in-difference estimate of the effect of BadgerCare on public health care coverage using the comparison between the 1995 and 1997 cohorts. The coefficient on the BadgerCare variable in this "quasi-experiment" model indicates that the effect of BadgerCare is 23

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[23]Public health insurance coverage encompasses MA coverage and (during the period that it was in force) BadgerCare coverage.

[24]These first seven quarters since exit cover the period from 1995/4 to 1997/2 for 1995 cohort and from 1997/4 to 1999/2 for 1997 cohort. Since BadgerCare went into effect in 1999/3, only 1997 cohort experience BadgerCare in their 8th quarter since exit.

[25]This difference-in-difference approach relies on the following facts; 1) in the absence of BadgerCare, the 1995 and 1997 leavers have a similar pattern of health insurance coverage, and 2) the 1997 cohort experienced the introduction of BadgerCare in their 8th quarter after exit, while the 1995 cohort did not have BadgerCare until their 16th quarter after exit. (Hence, we use a total of 15 quarters of data for both cohorts in the analysis.) If both cohorts are similar, and only one of them experienced policy change at some point during the first 15 quarters, we can obtain difference-in-difference estimates by comparing the outcomes between before and after the introduction of BadgerCare, and between 'treatment' and 'control' groups. This procedure assumes that before BadgerCare, when only the MA program existed for both cohorts, the cohort difference in take-up reflects differences in the overall propensity of the two groups to take up public health insurance, such as differences in tastes or socioeconomic characteristics of the groups or differences in the opportunities they face, and that these basic differences persist after BadgerCare is introduced.

percentage points.[26] In an alternate specification of this model, we included the quarters since exit as a set of dummy variables rather than as a quadratic.[27] This estimate suggests that the increase in coverage due to the introduction of BadgerCare is 25 percentage points. Both of these estimates then suggest a much greater increase in coverage due to the introduction of BadgerCare compared to the estimates based on the probit and random effects models.

A caveat of this first difference-in-difference approach is that two cohorts face different calendar periods, although the time since exit is equivalent. It is possible that the different environments may influence or bias our estimate of the effect of the introduction of BadgerCare. Thus, we use a "within cohort" difference-in-difference approach to control for unobserved, time-varying differences between the two cohorts not reflected in their differing use of Medicaid in their first 8 quarters after exit from cash assistance. This approach identifies those women who are newly eligible for public coverage due to the introduction of BadgerCare as the "treatment" group, whereas those who were continuously eligible for public coverage serve as a "control" group. The result is a within-cohort, with-without estimate of the effect of BadgerCare on public health insurance coverage, conducted separately for the 1995 and 1997 cohorts.

The second difference-in-difference estimate is also a "quasi-experimental "approach, but in this case based on a within-cohort comparison. In this estimate, we compare those continuously eligible for public coverage to those newly eligible for public coverage via the introduction of BadgerCare. This approach enables us to focus on the effect of BadgerCare on those most likely to be influenced by the implementation of the program—those newly eligible for public coverage via the introduction of this

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[26]An effect of this magnitude is hinted at in Figure 4. By quarter 15 after leaving, the between cohort predicted difference is about 14 percentage points (about 36 percent less 22 percent), and the difference between the actual level of coverage for the 1997 cohort and the predicted level of coverage for the 1995 cohort (if they had the characteristics of the 1997 cohort) is about 21 percentage points (57 percent less 36 percent).

[27]In this alternative specification of the general time effect, a series of dummy variables for time since exit are included so that equation (1) is specified as $y_{it}^{*} = \beta' x_{it} + \sum \alpha_{1j} q_j + \alpha_2 BC_t + \upsilon_{it}$, where q_j is a dummy variable indicating *j*th quarter since exit

program. This estimate controls for the effects of changes in the economy and in program administration not captured in the probit and random effects estimates.

We make this difference-in-difference estimate separately for the 1995 and the 1997 cohorts and report the results in Table 6. Again, public health insurance coverage is the dependent variable. Those who were continuously eligible for public coverage serve as the controls in this approach while those newly eligible are the "treated."[28] These results, which suggest that BadgerCare led to an increase in coverage of 21 percentage points for the 1995 cohort and 17 percentage points for the 1997 cohort, are consistent with the first difference-in-difference approach.

Taken together, the two difference-in-difference estimates suggest a larger effect of BadgerCare on the health insurance coverage of these low-income welfare leavers than do the probit and random effects estimates. We are generally more persuaded by the difference-in-difference estimations. The probit and random effect models do not take into account the probability that coverage would have decreased in the absence of the introduction of BadgerCare, as the earnings of leavers rose and as eligibility for Medicaid fell over time among those eligible. They also lack controls for unobserved characteristics that are likely to vary over time.

VI. CONCLUSION

The enactment of the BadgerCare program in Wisconsin provided a major expansion of health insurance availability, offering coverage to adults in low-income families with children, and increasing the income levels under which coverage is available. In this study, we examined the effects of

[28]The base periods for this are also 15 quarters from 1997/4 to 2001/2, where BadgerCare was introduced at the 8th quarter. However, we also obtained estimates using only a truncated period from four quarters before through five quarters after the introduction of BadgerCare, in order to reduce the effect of any other unmeasured changes in a leaver's opportunities for coverage.

BadgerCare on the health insurance coverage of low-income women who left cash assistance using several estimation approaches.

Table 7 summarizes the results of our analyses. All of our estimates indicate that BadgerCare substantially increased public health care coverage for mother-only families leaving welfare. This conclusion seems robust using different estimation approaches. The probit and random effects approaches show that BadgerCare increased coverage by 6–8 percentage points, and the difference-in-difference approaches suggest that BadgerCare increased public health insurance coverage by 17–25 percentage points. Because we have more confidence in the difference-in difference estimates, we believe the actual increase is closer to the top of the 6–25 percentage point range than to the bottom.

APPENDIX 1
Sample and Variable Definition

We use merged administrative data from the state of Wisconsin, including: 1) the Client Assistance for Reemployment and Economic Support (CARES) system, which includes information collected in administering AFDC, W-2, and related means-tested programs, 2) the Computer Reporting Network (CRN) system, the precursor of CARES, providing earlier AFDC administrative data useful for constructing an AFDC history for each case, and 3) the Unemployment Insurance (UI) system, which includes quarterly information on earnings and employers. We extracted data from the CARES database for all women receiving assistance under the AFDC-Regular or W-2 programs in September of 1995, 1997, and 1999. Among them, those who did not live with the father of any of the children also listed on the case, who had minor children in the case, and who were at least 18 years old and no older than 65 were listed as the "case head." We selected from these participants those women who exited cash assistance within three months of our initial observation and remained off the welfare caseload for at least two consecutive months. Our samples included those who returned to welfare within the next calendar year as well as those who stayed off.

Demographic Variables

The demographic variables were taken from the CARES database and reflect family characteristics. Some of the variables such as mothers' education, welfare and work history, and the county of residence are as of September 1995, 1997, and 1999. Other variables such as the number of children, number of other adults in the household, and the age of the youngest child are updated in each quarter. The analyses were done at the county level. Counties were grouped as follows: Milwaukee County; other urban counties (Brown, Calumet, Chippewa, Dane, Douglas, Eau Claire, Kenosha, La Crosse, Marathon, Outagamie, Ozaukee, Pierce, Racine, Rock, St. Croix, Sheboygan, Washington, Waukesha, and Winnebago); and rural counties (the other 52 counties in Wisconsin).

Employment and Earnings Variables

Employment and earnings information came from the Wisconsin Unemployment Insurance database. We have information on quarterly earnings from July 1993 through December 2001 for all the mothers in our sample. These data were used to calculate quarterly earnings of each working adults and their eligibility for Medicaid and BadgerCare programs. In addition, this database provides information about employers whether they provide any health insurance.

Geographic Variables

The percentage of female-headed households by ZIP code was taken from the 1990 census zip code-level database STF3B.

Monthly county-level unemployment rates are from the Wisconsin Department of Workforce Development, Local Area Unemployment Statistics. It can be found at http://dwd.wisconsin.gov/oea/unemploy_rates_labor_stats.htm

County firm size, a proxy for the opportunity to be offered private coverage, are reported as the percentage of employees in each county employed at firms with at least 50 employees. The data on the number of employees in each county by firm size "Wisconsin Covered Employment by Size of Reporting Unit by Industry and by County," Madison: WI, 1997, 1998, 1999, and 2000.

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Table 1
Characteristics of AFDC-Regular Caseload and Leavers in Wisconsin
(cases active in September 1995, September 1997, and September 1999)

	1995		1997		1999	
	Total[a]	Leavers[b]	Total[a]	Leavers[b]	Total[a]	Leavers[b]
Total (N)	49,605	8,042	20,608	8,162	7,363	2,997
Region						
Milwaukee	54.6	38.8	74.9	55.3	82.3	77.2
Other urban	29.6	36.7	17.7	30.8	13.0	17.1
Rural	15.8	24.5	7.4	13.9	4.7	5.7
Case Head's Age						
18–24	36.0	32.2	37.3	37.9	39.7	41.4
25–29	23.8	24.0	22.4	23.3	20.3	23.16
30–39	32.1	34.9	30.7	30.3	28.9	26.9
40+	8.1	9.0	9.6	8.5	11.1	8.5
Education						
<11 years	24.3	18.9	29.4	24.7	29.6	27.4
11 years	19.3	14.9	25.0	21.7	28.1	28.0
12 years	42.1	47.9	36.0	40.8	34.1	35.5
>12 years	14.3	18.4	9.6	12.8	82.2	9.1
Race						
White	40.4	53.6	22.2	34.8	17.5	19.6
African American	42.1	30.3	57.1	43.9	64.4	62.5
Hispanic	7.0	6.8	8.4	8.6	6.5	5.9
Other	4.4	3.8	4.2	5.2	1.4	1.7
Unknown	6.0	5.5	8.1	7.5	10.1	10.3
Number of Own and Foster Children						
1	39.0	46.8	33.1	35.3	37.0	35.8
2	29.7	30.2	29.0	29.8	29.3	29.4
3+	31.3	23.0	37.9	34.9	33.6	34.7
Age of Youngest Child						
<1 year	18.5	14.7	23.5	26.8	30.6	38
1 year	17.1	14.0	17.7	17.0	13.9	12.7
2 years	13.1	12.6	11.2	10.2	9.9	9.1
3–5 years	24.1	25.9	21.7	20.9	17.6	16.2
6–11 years	19.4	22.4	18.6	18.3	19.7	17.1
12–18 years	7.8	10.4	7.3	6.9	9.3	6.9
Other Household Members						
Other children only	2.6	1.8	4.0	3.0	6.1	6.6
Other adults only	21.0	23.3	18.6	19.7	17.7	16.8
Other adults and other children	7.5	8.2	7.5	7.7	6.3	6.8

(table continues)

Table 1, continued

	1995		1997		1999	
	Total[a]	Leavers[b]	Total[a]	Leavers[b]	Total[a]	Leavers[b]
Child on SSI	9.1	6.3	11.6	8.7	11.6	10.2
Start of Current Spell[c]						
0–3 months ago	14.8	27.7	17.0	20.7	34.0	36.4
4–6 months ago	6.8	10.3	9.8	11.6	19.1	22.1
7–9 months ago	5.2	6.6	6.8	7.7	9.9	10.7
10–12 months ago	4.4	5.4	5.3	6.0	6.3	6.1
13–18 months ago	7.1	7.0	6.4	6.7	6.3	6.4
19–24 months ago	6.1	5.1	4.6	4.7	3.6	3.2
> 24 months ago	55.7	37.9	50.2	42.5	20.8	15.2
Number of Months Received Welfare in the Two Years Prior to September 1995 and 1997[c]						
6 months or less	10.0	16.3	8.5	12.4	27.3	32.1
7–12 months	9.1	13.3	9.4	11.7	28.1	19.6
13–18 months	12.0	16.9	14.4	16.2	19.4	20.3
19–24 months	68.9	53.5	67.7	59.6	35.3	28.0
Number of Quarters with Earnings in the Two Years Prior to September 1995 and 1997[c]						
None	29.0	14.5	22.4	13.8	18.8	11.8
1–3 quarters	31.9	29.0	34.4	33.9	31.8	29.6
4–7 quarters	29.1	37.2	33.9	38.7	39.1	44.5
8 quarters	10.0	19.2	9.4	13.6	10.3	14.1
Total Earnings in the Two Years Prior to September 1995 and 1997[c]						
<$500	39.3	20.7	33.4	22.5	29.4	20.8
$500–$2,499	18.7	15.5	21.7	21.4	20.0	19.7
$2,500–$7,499	20.8	25.5	24.0	28.0	22.8	24.8
$7,500 or more	21.3	38.4	20.9	28.1	27.7	34.7

[a]Recipients in September.

[b]Left in the last quarter of the year.

[c]Sample in the first two columns includes case heads who were 18 or older in October 1995 (N=46,047 and 7,608); the third and fourth columns include those 18 or older in October 1997 (N=18,689 and 7,434); the fifth and sixth columns include those 18 or over in October 1999 (=7,363 and 2,997).

Table 2
Probit Estimation of Public Health Insurance Coverage

	1995 Cohort		1997 Cohort	
	dF/dx	Std. Err.	dF/dx	Std. Err.
Age of case head	-0.003	0.001**	0.018	0.001**
Age if case head squared	0.000	0.000	0.000	0.000**
Unrelated children in household	-0.022	0.004**	-0.036	0.005**
Child on SSI	0.008	0.005	-0.027	0.005**
Other adult in household	-0.006	0.003*	-0.009	0.004*
More than 1 spell on AFDC	0.008	0.003**	-0.017	0.004**
Case head's education = 12 years	-0.023	0.003**	-0.032	0.003**
Case head's education => 12 years	-0.051	0.003**	-0.059	0.005**
Black	0.008	0.004*	-0.038	0.004**
Hispanic	-0.045	0.005**	-0.074	0.006**
Other race/ethnicity	0.000	0.007	-0.035	0.009**
Unknown race/ethnicity	0.042	0.006**	0.001	0.006
Had earnings in 4–7 of prior 8 quarters	0.033	0.003**	0.035	0.003**
Had earnings in all 8 quarters	0.011	0.004**	0.025	0.005**
On AFDC 7–12 months	0.008	0.005	0.069	0.005**
On AFDC 13–18 months	0.054	0.005**	0.080	0.005**
On AFDC 19–24 months	0.075	0.004**	0.138	0.005**
Rural	0.054	0.004**	0.017	0.006**
Milwaukee	0.000	0.004	0.011	0.005*
Female-headed households in county	0.109	0.012**	0.145	0.012**
Age of youngest child	-0.006	0.000**	-0.006	0.000**
Number of quarters since exit	-0.015	0.003**	-0.072	0.002**
Number of quarters since exit squared	0.001	0.000**	0.003	0.000**
Two children in household	0.123	0.004**	0.095	0.004**
Three or more children in household	0.194	0.004**	0.158	0.004**
Quarterly Unemployment rate in county	0.003	0.001**	0.004	0.001*
BadgerCare available	0.062	0.005**	0.082	0.006**
% county employees in large firms	0.000	0.000	-0.001	0.000**
Number of observations (Individuals)	118,185	7879	117,420	7826
Pseudo R squared	0.065		0.057	
Log Likelihood	-61176		-73829	

*Significant at the 5% level.
** Significant at the 1% level.
Standard errors adjusted for clustering.

Table 3
Random Effects Estimates of Public Health Insurance Coverage

	1995 Cohort		1997 Cohort	
	Coef.	Std. Err.	Coef.	Std. Err.
Age of case head	-0.068	0.020**	0.225	0.017**
Age if case head squared	0.000	0.000	-0.004	0.000**
Unrelated children in household	-0.200	0.085*	-0.245	0.093**
Child on SSI	0.138	0.107	-0.211	0.096*
Other adult in household	-0.054	0.056	-0.044	0.065
More than 1 spell on AFDC	0.104	0.058	-0.182	0.064**
Case head's education = 12 years	-0.234	0.056**	-0.256	0.057**
Case head's education => 12 years	-0.523	0.069**	-0.468	0.084**
Black	0.092	0.074	-0.285	0.074**
Hispanic	-0.438	0.107**	-0.524	0.111**
Other race/ethnicity	0.091	0.140	-0.278	0.147
Unknown race/ethnicity	0.330	0.110**	0.069	0.108
Had earnings in 4–7 of prior 8 quarters	0.303	0.054**	0.232	0.058**
Had earnings in all 8 quarters	0.145	0.067*	0.136	0.085
On AFDC 7–12 months	0.103	0.083	0.515	0.101**
On AFDC 13–18 months	0.520	0.083**	0.578	0.102**
On AFDC 19–24 months	0.714	0.066**	0.976	0.083**
Rural	0.427	0.073**	0.186	0.098
Milwaukee	0.012	0.080	-0.013	0.088
Female-headed households in county	0.917	0.227**	1.127	0.211**
Age of youngest child	-0.026	0.004**	-0.015	0.004**
Number of quarters since exit	-0.156	0.021**	-0.555	0.010**
Number of quarters since exit squared	0.006	0.001**	0.024	0.001**
Two children in household	1.077	0.052**	0.643	0.062**
Three or more children in household	1.429	0.055**	1.098	0.066**
Quarterly Unemployment rate in county	0.025	0.011*	0.035	0.012**
BadgerCare available	0.641	0.041**	0.626	0.034**
% county employees in large firms	-0.002	0.004	0.000	0.006
Constant	-1.370	0.470**	-1.745	0.463**
Number of Observations (individuals)	118,185	7879	117,420	7828
Wald chiSq(28)	3316**		5569**	
Log likelihood	-40289		-53529	

*Significant at the 5% level.
** Significant at the 1% level.

Table 4
Predicted Probability of Public Health Insurance Coverage:
Based on Simple Probit and Random Effects Probit

	Probit		Random Effect logit	
	1995 Cohort	1997 Cohort	1995 Cohort	1997 Cohort
At the actual values	0.243	0.614	0.246	0.614
BC is available; other variables at mean	0.274	0.653	0.274	0.647
BC is not available; other variables at mean	0.212	0.571	0.213	0.569
Education is <12; other variables at mean; BC is available	0.294	0.676	0.295	0.667
Education is <12; other variables at mean; BC is not available	0.232	0.594	0.231	0.591
Education is 12 years; other variables at mean; BC is available	0.271	0.638	0.271	0.636
Education is 12 years; other variables at mean; BC is not available	0.209	0.556	0.210	0.558
Education is > 12 years; other variables at mean; BC is available	0.244	0.617	0.242	0.610
Education is > 12 years; other variables at mean; BC is not available	0.182	0.535	0.185	0.531

Table 5
Difference in Difference Estimates Comparing 1995 and 1997 Cohorts, 15 Quarters

	dF/dx	Std. Err.
Age of case head	0.013	0.002**
Age if case head squared	0.000	0.000**
Unrelated children in household	-0.038	0.010**
Child on SSI	-0.017	0.011
Other adult in household	-0.009	0.007
More than 1 spell on AFDC	-0.005	0.007
Case head's education = 12 years	-0.022	0.006**
Case head's education => 12 years	-0.043	0.008**
Black	-0.019	0.008*
Hispanic	-0.057	0.012**
Other race/ethnicity	-0.025	0.016
Unknown race/ethnicity	0.015	0.012
Had earnings in 1–3 of prior 8 quarters	0.069	0.010**
Had earnings in 4–7 of prior 8 quarters	0.100	0.010**
Had earnings in all 8 quarters	0.098	0.011**
On AFDC 7–12 months	0.056	0.010**
On AFDC 13–18 months	0.097	0.010**
On AFDC 19–24 months	0.143	0.008**
Rural	0.048	0.009**
Milwaukee	-0.005	0.008
Female-headed households in county	0.137	0.025**
Age of youngest child	-0.007	0.001**
Number of quarters since exit	-0.089	0.001**
Number of quarters since exit squared	0.004	0.000**
Two children in household	0.090	0.008**
Three or more children in household	0.161	0.007**
Quarterly Unemployment rate in county	0.002	0.002
Dummy indicating after 8 quarters	-0.100	0.006**
1997 cohort	0.137	0.006**
BadgerCare effect	0.234	0.007**
Number of Observations	235,605	
Wald ChiSq(30)	10482.12**	

*Significant at the 5% level.
** Significant at the 1% level.
Standard errors adjusted for clustering.

Table 6
Within Cohort Difference in Differences Estimate

	1995 Cohort		1997 Cohort	
	dF/dx.	Std. Err.	dF/dx	Std. Err.
Age of case head	-0.016	0.005**	-0.006	0.004
Age if case head squared	0.000	0.000**	0.000	0.000
Unrelated children in household	-0.024	0.013	-0.034	0.014*
Child on SSI	-0.003	0.015	-0.031	0.014*
Other adult in household	-0.013	0.009	-0.014	0.009
More than 1 spell on AFDC	0.006	0.009	-0.017	0.009
Case head's education = 12 years	-0.005	0.009	0.004	0.008
Case head's education => 12 years	-0.011	0.012	0.010	0.012
Black	0.014	0.012	-0.039	0.011**
Hispanic	-0.044	0.016**	-0.065	0.016**
Other race/ethnicity	-0.011	0.020	-0.024	0.021
Unknown race/ethnicity	0.042	0.019*	-0.001	0.016
Had earnings in 1–3 of last 8 quarters	0.069	0.014**	0.072	0.013**
Had earnings in 4–7 of last 8 quarters	0.115	0.013**	0.114	0.013**
Had earnings in all 8 quarters	0.139	0.017**	0.134	0.014**
On AFDC 7–12 months	0.010	0.015	0.064	0.014**
On AFDC 13–18 months	0.069	0.015**	0.081	0.014**
On AFDC 19–24 months	0.097	0.011**	0.145	0.012**
Rural	0.060	0.013**	0.006	0.014
Milwaukee	0.016	0.014	0.035	0.014**
Female-headed households in county	0.085	0.036*	0.089	0.031**
Age of youngest child	-0.005	0.001**	-0.003	0.001**
Number of quarters since exit	-0.013	0.003**	-0.071	0.002**
Number of quarters since exit squared	0.001	0.000**	0.003	0.000**
Two children in household	0.114	0.011**	0.081	0.011**
Three or more children in household	0.172	0.011**	0.122	0.011**
Quarterly Unemployment rate in county	0.000	0.002	0.002	0.003
indsize	0.001	0.001	-0.001	0.001
After BadgerCare introduced	-0.005	0.007	0.036	0.006**
Newly eligible for coverage	-0.244	0.009**	-0.358	0.009**
BadgerCare effect (for newly eligibles)	0.210	0.011**	0.173	0.009**
Number of observations	101,040		111,435	
Wald ChiSq(31)	1749.41		3383.71	

*Significant at the 5% level.
** Significant at the 1% level.
Standard errors adjusted for clustering.

Table 7
Comparison of Estimates of Role of BadgerCare on Public Health Insurance Coverage

Cohort	1995	1997	Overall
Marginal Increase in Probability of Having Public Coverage			
Probit	.06	.08	
Random Effects	.06	.08	
Difference in Difference			
Across Cohorts			.23
Within Cohorts	.21	.17	