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Participation in a Public Insurance Program: Subsidies, Crowd-Out, and Adverse Selection

This paper examines how varying the level of subsidies affects participation in a public insurance program, crowd-out of private insurance, and adverse selection. We study the experience in Washington's Basic Health program in 1997. Findings show that adverse selection is not a problem in voluntary public programs. Increasing subsidies have only modest effects on participation in subsidized programs, though the gains are not at the expense of the private market. Overall participation in the subsidized plan is also modest, even though participants benefit from it. The challenge to policymakers is to find program design characteristics, beyond subsidies, that attract the uninsured.

Almost one in six Americans under age 65 was uninsured in 1998, but about one in three people in families with incomes below 200% of poverty lacked insurance coverage (Hoffman and Schlobohm 2000). Moreover, there is convincing evidence that being uninsured adversely affects access to health care services (see for example, Marquis and Long 1995; Berk and Schur 1998; Hoffman and Schlobohm 2000). The problem of the uninsured is viewed as a significant policy issue by the American public and most—80% of the population—believe that government should take action to address it (Blendon, Young, and DesRoches 1999).

Many policymakers agree that steps need to be taken to increase coverage. While details of approaches vary, most policymakers favor incremental steps that involve voluntary programs with financial assistance—such as tax credits, vouchers, or subsidized insurance—to help families obtain coverage. Policymakers in a number of states have established subsidized state in-

surance programs to expand coverage of their populations. In 1996, such programs operated in 14 states (Lipson and Schrodel 1996). Most of these programs offer insurance in a managed care plan and provide for sliding-scale subsidies that depend on family income.

In designing these programs, policymakers confront several critical issues. Among them: What level of subsidy will attract sufficient enrollment among the uninsured? Will the public subsidy crowd out private insurance? Will participating plans experience adverse selection? The purpose of this paper is to present some new evidence, using data from Washington state, about these issues. First, we briefly summarize what is known from existing literature.

Role of Subsidies

Programs that offer limited subsidies are unlikely to substantially expand the purchase of insurance among the uninsured. About three-quarters of the uninsured mention high premium cost

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as a major impediment to the purchase of insurance, and over one-half say it is the most important factor in their decision not to be insured (Hoffman and Schlobohm 2000). Empirical evidence also suggests that large subsidies will be needed. Marquis and Long (1995) estimate that subsidies of 60% would induce only about one-quarter to one-third of uninsured working families to purchase nongroup insurance. Thomas (1994/95) also concludes that small subsidies will not encourage low-income families to voluntarily purchase private insurance. Experience in state programs indicates that participation depends on subsidy levels. For example, participation in Florida's Healthy Kids program increased substantially when premiums were reduced (GAO 1996), and enrollment in Washington's Basic Health responded to a lowering of premiums in 1995 that was intended to boost participation (Lipson and Schrodel 1996).

Crowd-Out

Health insurance subsidy programs are designed to help the uninsured obtain coverage. But if many insured individuals or families drop their current coverage to participate in the subsidy programs, the cost of the program may exceed policymakers' expectations and yet not achieve the goal of expanding coverage. The extent to which public programs crowd out private insurance is a topic of considerable debate. A number of studies have produced estimates of the magnitude of the crowd-out of private insurance resulting from the Medicaid-eligibility expansions for pregnant women and children (Cutler and Gruber 1996, 1997; Dubay and Kenney 1997; Holahan 1997; Blumberg, Dubay, and Norton 2000; Yazici and Kaestner 2000; Thorpe and Florence 1998/99). While the estimates span a wide range, the preponderance of evidence suggests that a modest amount of crowd-out existed. However, crowd-out from state-sponsored programs that contract with private plans may differ from crowd-out due to expansions of Medicaid, typically perceived as a welfare program. Crowd-out can be expected to increase with the amount of the subsidy and to increase as income eligibility expands because rates of private insurance coverage increase with income.

Adverse Selection

A third key issue in the design of new programs is the health of the population that enrolls in the program. If adverse selection occurs—that is, if those who elect to participate in the program are sicker than average—program costs may exceed expectations or premiums to participants may have to increase, and plans may be discouraged from contracting with the state. These events might lead to a collapse of the new program. Most research suggests that adverse selection does not occur with election into voluntary, subsidized programs (Kilbreth et al. 1998; Diehr et al. 1993; Bograd et al. 1997; Diehr et al. 1996; Martin et al. 1997; Swartz and Garnick 2000).¹ However, most of these evaluations were of state-sponsored programs that included waiting periods for pre-existing conditions and limited benefits (such as exclusion of mental health coverage) in an effort to control selection. More generous programs might achieve different results.

Washington's Basic Health Program

We examine the experience of Washington's Basic Health (BH) program with these issues. BH was the first state-subsidized insurance program in the country. Authorized in 1987 as a demonstration program, BH became a permanent program in 1993. The state contracts with managed care plans, which deliver services to participants for age-rated capitated amounts.² Individuals in families with incomes below 200% of poverty pay a sliding-scale premium that ranged from \$10 to \$100 in 1997. Individuals also pay small copayments for most covered services. Basic Health Plus is a special program for children that is administered by Basic Health and Medicaid. There are no premiums or copayments for services, and children in families with incomes below 200% of poverty are eligible to participate.

A number of earlier studies of BH investigated the role of subsidies and the extent of adverse selection in the program. These analyses concluded that higher premiums discouraged enrollment, but that there was no evidence of adverse selection (Madden et al. 1995; Diehr et al. 1993; Diehr et al. 1996; Martin et al. 1997). However, these studies all were conducted during the pilot phase of the program. Some fea-

tures of the pilot program that were designed to limit adverse selection—such as 12-month waiting periods for pre-existing conditions and exclusion of mental health coverage and pharmacy benefits—have been modified. Mental health and pharmacy benefits are now part of the standard benefits and the waiting period for coverage of pre-existing conditions has been shortened to three months. Furthermore, premiums were reduced in 1995 to encourage greater enrollment. Thus, our analysis presents new information on the BH experience subsequent to adopting and expanding it as a permanent, state-wide program.

As a result of state funding limitations, enrollment in the subsidized portion of BH was limited to 130,000 people between September 1996 and May 1998. A waiting list of applicants was created and they were enrolled as space became available. After the program was opened again to all applicants, however, enrollment remained stable for the next two years. Therefore, the presence of an enrollment cap did not appear to affect participation significantly during our study period.³

Data and Methods

Data

Data for our study come from the Robert Wood Johnson Foundation's Washington State Survey of the Uninsured conducted in 1997. The survey used a mixed-frame sample design including a random-digit dialing (RDD) sample component, a sample selected from Medicaid program lists, a sample selected from BH program lists, and a small geographically clustered sample of families without telephones.⁴ An initial screening interview to determine insurance status and basic demographic characteristics of the family and its members (total family income, age, gender, relationship, employment status, and race/ethnicity of family members) was completed with more than 5,000 families. A second-stage interview was administered to a stratified subsample of those in the RDD sample who completed the first-stage interview, as well as to all families in the Medicaid and BH list samples and to the personal interview sample members who completed the screening interview. In the second-stage interview, families with uninsured members, people enrolled in Medicaid or BH, and

low-income families (based on self-reported income in the screener) were oversampled from the RDD sample. The second-stage interview collected data about health care use and health status of family members, as well as more detail about insurance coverage and additional demographic information about the family. The second-stage interview was completed with more than 2,500 families. The overall response rate to the survey was 67%.

The data for our analysis are based on responses from families completing the second-stage interview. Individual- and family-level weights are used to correct for differential probabilities of selection and nonresponse. Our analysis focuses on BH participation and health care access for individuals in 1,362 respondent families with incomes below 200% of poverty—the income threshold for BH eligibility.

Methods

BH participation. We fit a conditional logit model to explain choice of insurance status to investigate the role of subsidies, adverse selection, and crowd-out in BH participation. Individuals are assumed to choose among BH, Medicaid, purchasing of private insurance, and remaining uninsured depending on the price of BH and the price of alternatives, as well as their demographic, health, and economic characteristics.

In order to participate in BH, individuals must be aware of the program. The Washington legislature authorized limited funds for marketing the program, though they did work with the participating plans to form a multi-carrier marketing committee to reach eligibles (Hoare, Mayers, and Madden 1992). However, some avenues for reaching this low-income population—such as through other state health programs for the medically indigent—were not used because of concerns by plans that this form of outreach might exacerbate any adverse selection. Our survey suggests that a majority of families with incomes below 200% of poverty were aware of the program; however, about 37% were not.⁵ In fitting our insurance choice model, the choice set varies for those who did and did not know of BH. For the former, the choice set includes the four insurance options; for the latter, the choice is restricted to Medicaid, private insurance, and being uninsured.⁶ We also include a

variable indicating whether the family was aware of the BH program.⁷ This specification allows the relative odds of the remaining choices to differ for those who were and were not aware of BH.⁸

The price for enrolling in BH for each individual is imputed based on the BH subsidy schedule.⁹ In our estimation model, the price of BH affects decisions about the likelihood of choosing each option for those who are aware of the BH option. However, the price of BH does not affect the choice of insurance for those who are unaware of the option. Formally, the price of BH is set to zero for those who are unaware of the option. In this way, the role of the subsidy price on choices is based only on those who were aware of the program and thus made trade-offs between the price of this option vs. other options. A variable measuring whether the family has access to employer-sponsored insurance coverage is an indicator for the price of private insurance because employer coverage typically is subsidized, while nongroup private insurance is not.¹⁰ As proxy indicators for the size of the employer subsidy, we include a measure of the size of the firm (fewer than 50 employees, 50 to 249, 250 to 999, or 1,000 and more) and a measure of industry (trade, services, and all other or missing).¹¹ Family members are identified as having access to employer-sponsored coverage if any family member works for an employer offering health insurance as a benefit.

All children in our sample are eligible for Medicaid; adults are eligible if they are related to a child in the family and have a family income below 45% of the federal poverty limit. We do not have direct measures of eligibility for Medicaid, but include family income as a percentage of poverty and family status (marital status and whether there are children in the family) as proxy indicators. Family poverty status is measured by comparing the family's self-report of income to 1996 federal poverty thresholds.¹²

Because the subsidy for BH is set on a sliding scale that depends on income, price also varies with income and poverty level. However, we identify price and income effects in our model in two ways based on the assumed functional form of our model. First, the subsidy schedule is not linear in income. Controlling for age, the

correlation between poverty level and premium varies between about .62 and .65. But premium and poverty each are assumed to linearly affect the odds ratios in our choice model. Thus, nonlinearities in the price schedule and the assumed linear choice model help to identify price from income effects. In addition, we assume that the effect of income on the odds of choosing the non-BH options are the same for those who are and are not aware of BH. This helps identify the income and price effects on choice of BH for those who are aware of it as an option because price effects do not enter the choices of the other group.

Other characteristics in the model include age and sex of the individual, education, race, and health status. The latter variable is self-perceived health status, measured on a scale of excellent, very good, good, fair, and poor.¹³ We also include two measures that characterize the BH program in the area. One indicates whether BH was operational in the residence area (county) prior to 1991; a second indicates the number of plans in the area that contracted with BH in 1996. Both of these characteristics, we hypothesize, would make BH more attractive to potential enrollees. In areas with a longer program history, greater awareness about the program and more information about experiences of other participants in BH might increase the likelihood of enrollment. With more participating plans, potential enrollees have a greater choice of product and provider, which most believe consumers value. A larger number of plans in an area also may lead to a greater marketing effort by plans. Because most plans that contract with BH also contract with Medicaid, the number of participating plans may make Medicaid more attractive relative to private insurance. The full list of explanatory variables and their means are given in Table 1.

For adults, our unit of analysis is the individual; there are 1,846 low-income adults under age 65 in our sample. Preliminary investigation revealed that in many families the adults do not make the same insurance choices. Thus, there is independent information in choices made by adults in one family. However, in most cases, families make similar insurance choices for all children in the family. Therefore, in investigating insurance choices for children, the unit of analysis is the family; our sample includes 746

Table 1. Means and standard deviations (SDs) for variables in choice models

Variable	Adult regressions		Child regressions	
	Mean	SD	Mean	SD
Indicators for poverty status (% of poverty level)				
0–49%	.205	.009	.181	.014
50–99%	.244	.010	.290	.017
100–149%	.229	.010	.194	.014
150–200% ^a	.321	.011	.334	.017
Indicator for access to employer coverage	.567	.012	.535	.018
Indicators for size of employer (0 if no access—sums to % with access)				
Fewer than 50 employees	.142	.349	.122	.328
50–249 employees	.102	.302	.108	.310
250–999 employees	.059	.236	.070	.255
1,000 or more employees ^a	.169	.375	.194	.395
Missing employer size	.095	.293	.041	.198
Indicators for industry (0 if no access—sums to % with access)				
Retail and wholesale trade	.080	.272	.068	.253
Services	.142	.349	.147	.354
All other (including missing) ^a	.344	.475	.320	.466
Indicators for aware of BH	.594	.011	.604	.018
Premium for BH coverage ^b	\$14.86	.621	\$19.62	1.128
Indicators for age and sex of adult				
Female, 18–24	.123	.008	NA	
Male, 18–24 ^a	.111	.007	NA	
Female, 25–34	.182	.009	NA	
Male, 25–34	.142	.008	NA	
Female, 35–44	.126	.008	NA	
Male, 35–44	.115	.007	NA	
Female, 45–64	.113	.007	NA	
Male, 45–64	.088	.007	NA	
Indicator for age of head of household (for child analysis)				
Age 18–24	NA		.184	.014
Age 25–34	NA		.377	.018
Age 35–44	NA		.316	.017
Age 45–64 ^a	NA		.123	.012
Indicator for age of youngest child				
Under age 6	NA		.544	.018
Age 6–11	NA		.302	.017
Age 12–18 ^a	NA		.155	.013
Indicator for race/ethnicity				
White, non-Hispanic ^a	.771	.010	.750	.016
White, Hispanic	.106	.007	.116	.012
Black	.041	.005	.037	.007
Other	.082	.006	.097	.011
Indicator for family type (adults)				
Single individual	.383	.011		
Single parent with children	.163	.009		
Married couple	.108	.007		
Family ^a	.346	.011		
Indicator for two-parent family (children)	NA		.544	.018
Indicator for number of children				
One ^a	NA		.382	.018
Two	NA		.329	.017
Three	NA		.289	.017

Table 1. (continued)

Variable	Adult regressions		Child regressions	
	Mean	SD	Mean	SD
Indicator for education (of head for children)				
Less than high school ^a	.162	.009	.169	.014
High school	.394	.011	.400	.018
Some college	.316	.011	.304	.017
College	.127	.008	.126	.012
Indicators for health status of adult				
Excellent ^a	.268	.010	NA	
Very good	.281	.010	NA	
Good	.284	.010	NA	
Fair	.127	.008	NA	
Poor	.040	.005	NA	
Any child in poor/fair health	NA		.106	.011
Indicator for non-English speaking	.045	.005	.035	.007
Indicator for residence in demo area	.689	.011	.650	.017
Indicator for three or fewer participating plans	.094	.007	.099	.011

Note: NA = not applicable.

^a Omitted category in model.

^b BH premiums if aware of BH, 0 otherwise.

low-income families with one child or more. Demographic characteristics (education and age) of the family head are assumed to factor into choices for the children. In addition, we include the number of children and the age of the youngest child as explanatory variables in the choice model for children. BH Plus is available at no premium cost for children with family incomes below 200% of poverty if the parent with whom the child lives is enrolled in the plan.¹⁴ Therefore, we hypothesize that the premium cost for parents to enroll in BH may affect choices about their children. Therefore, our measure of the price of BH for children reflects the subsidy schedule applicable to their parents.

We use our fitted models—which are given in Tables 2 and 3—to predict the marginal effects of price, income, and health status on insurance choices because coefficients from the conditional logit model are difficult to interpret directly. For each member of our sample, we predict or simulate choice assuming that all members of the sample have the same value for the attribute under study and estimate the percentage of the sample making each choice option. We then vary the attribute under study, and again simulate the choices that would be made. We report these predicted choices in the results to follow.

Access effects of BH. Because the goal of public insurance programs is to improve access to health care, we also explore whether those who participate in BH are better off in terms of access than those who remain uninsured. We examine two indicators of access: the percentage with a usual source of care and the percentage having one or more physician visits in the previous year. We compare each access measure for BH participants with otherwise similar uninsured people based on multivariate probit regression models. We fit separate models for low-income adults (people 18 to 64) and low-income children. The explanatory variables in our models include indicators for insurance status and the economic and demographic characteristics listed for our insurance choice model. We restrict our models to people whose insurance status remained unchanged during the previous year, so that our measures of insurance and use of services are contemporaneous.

The decision to participate in BH may be determined jointly with the decision to obtain a usual care provider or the decision to have a physician visit. Therefore, we also fit our access models using instrumental variables estimation to account for the endogeneity of BH participation. We use a two-stage approach for instrumental variable estimation; use of this method,

Table 2. Conditional logit model for insurance status: adults

Variable	Interactions with BH choice		Interactions with Medicaid		Interactions with private insurance	
	Co- efficient	Standard error	Co- efficient	Standard error	Co- efficient	Standard error
Intercept	.219	.644	-3.027	.581	-.903	.412
Indicator for aware of BH	NA		-.776	.205	-.278	.182
Premium for BH coverage ^a	-.027	.008	.004	.006	-.006	.003
Indicators for poverty status (% of poverty level)						
0-49%	-.871	.421	1.713	.340	-.949	.257
50-99%	-.598	.384	1.469	.330	-1.110	.237
100-149%	-.279	.355	.282	.354	-.694	.213
Indicator for access to employer coverage	.432	.355	.613	.365	3.419	.262
Indicators for size of employer (0 if no access)						
Fewer than 50 employees	-.367	.389	-.630	.433	-.034	.247
50-249 employees	-.956	.414	-.105	.404	-.713	.257
250-999 employees	-.969	.570	.223	.504	-.303	.324
Missing employer size	-1.306	.596	-.070	.501	.129	.318
Indicators for industry (0 if no access)						
Retail and wholesale trade	-.535	.405	-.553	.411	-1.215	.255
Services	.033	.361	-.406	.376	-.126	.232
Indicators for age and sex of person						
Female, 18-24	1.200	.457	1.752	.430	.521	.293
Female, 25-34	.900	.437	2.016	.413	.070	.296
Male, 25-34	.295	.464	1.509	.437	.222	.286
Female, 35-44	1.461	.440	.599	.461	.128	.315
Male, 35-44	.957	.455	1.567	.453	-.239	.314
Female, 45-64	1.489	.459	1.624	.472	.510	.322
Male, 45-64	1.597	.483	1.101	.514	.246	.351
Indicator for race/ethnicity						
White, Hispanic	-.539	.346	-.853	.330	-.863	.265
Black	1.489	.569	.606	.510	1.435	.450
Other	-.085	.367	-.240	.317	.741	.286
Indicator for family type						
Single individual	-1.132	.253	-1.112	.246	-.594	.200
Single parent with children	-.731	.293	.949	.252	-1.020	.268
Married couple	.181	.342	-.428	.400	.558	.292
Indicator for education						
High school	.059	.306	-.304	.244	.509	.238
Some college	.257	.308	-.484	.260	.352	.246
College	.467	.369	-.099	.352	.912	.294
Indicators for health status						
Very good	-.228	.255	-.192	.271	-.442	.198
Good	-.173	.256	.275	.253	-.505	.198
Fair	-.470	.340	.578	.297	-.937	.258
Poor	.297	.449	1.274	.427	-.463	.468
Indicator for non-English speaking	.125	.539	-1.831	.609	-.418	.405
Indicator for residence in demo area	-.108	.232	.492	.238	-.087	.183
Indicator for three or fewer participating plans	-.331	.365	.133	.343	.343	.259

Notes: Omitted categories are: income 150-200% of poverty; male 18-24; white, non-Hispanic; married with children; less than high school; excellent health status; size business 1,000 or more employees; industry is not trade or service. NA = not applicable.
^a BH premiums if aware of BH, 0 otherwise.

Table 3. Conditional logit model for insurance status: children

Variable	Interactions with BH choice		Interactions with Medicaid		Interactions with private insurance	
	Co- efficient	Standard error	Co- efficient	Standard error	Co- efficient	Standard error
Intercept	-.603	1.076	-1.006	.815	.882	.874
Indicator for aware of BH	NA		.298	.356	-.747	.407
Premium for BH coverage ^a	-.020	.009	-.019	.007	-.018	.006
Indicators for poverty status (% of poverty level)						
0-49%	-.134	.733	.802	.525	-2.178	.617
50-99%	-.130	.676	.834	.489	-1.699	.517
100-149%	.491	.623	.364	.489	-1.471	.487
Indicator for access to employer coverage	-1.074	.632	-.739	.493	1.610	.507
Indicators for size of employer (0 if no access)						
Fewer than 50 employees	1.091	.672	.563	.581	.213	.555
50-249 employees	.367	.695	.464	.549	-.026	.536
250-999 employees	-.148	1.096	1.327	.797	1.236	.780
Missing employer size	.437	.821	.784	.642	.474	.624
Indicators for industry (0 if no access)						
Retail and wholesale trade	.693	.703	.702	.609	-.996	.615
Services	.444	.619	.361	.495	-.647	.482
Indicator for age of head of household						
Age 25-34	.327	.561	.835	.418	.264	.497
Age 35-44	1.265	.605	.596	.487	.294	.550
Age 45 or older	.836	.762	.490	.624	.926	.732
Indicator for number of children						
Two children	.663	.473	.521	.384	.584	.422
Three or more children	.144	.493	.077	.386	.035	.433
Indicator for age of youngest child						
Under age 6	.708	.618	1.242	.519	.125	.574
Age 6-11	-.353	.589	-.092	.483	.265	.528
Indicator for race/ethnicity						
White, Hispanic	.568	.758	.898	.591	.449	.699
Black	.875	1.085	.554	.785	-.789	.925
Other	.591	.708	.500	.594	1.153	.625
Indicator for two-parent family	.427	.454	-.378	.358	.404	.408
Indicator for education of head of household						
High school	-.705	.544	-.127	.385	-2.933	.761
Some college	.371	.424	.210	.352	-.089	.379
College	.433	.675	.888	.597	.791	.586
Any child in poor/fair health	-.271	.664	.345	.461	-.606	.588
Indicator for non-English speaking	-1.308	1.255	-1.148	.738	^b	
Indicator for residence in demo area	.357	.432	.590	.348	.037	.373
Indicator for three or fewer participating plans	-.291	.643	.064	.488	.481	.548

Notes: Omitted categories are: income 150-200% of poverty, male 18-24; white, non-Hispanic; married with children; less than high school; excellent health status; size business 1,000 or more employees; industry is not trade or service. NA = not applicable.

^a BH premiums if aware of BH, 0 otherwise.

^b No non-English speaking privately insured.

Table 4. Effects of premium on percentage of adults and children participating in insurance programs

	Premium for BH coverage		
	\$50 (%)	\$25 (%)	\$10 (%)
Adults			
Public program	24.9	28.0	30.3
BH	6.8	11.0	14.1
Medicaid	18.1	17.0	16.2
Private insurance	39.9	39.8	39.5
Uninsured	35.2	32.2	30.2
Children			
Public program	54.2	56.5	57.7
BH	10.9	11.3	11.5
Medicaid	43.3	45.2	46.2
Private insurance	32.9	33.3	33.4
Uninsured	12.9	10.2	8.9

when outcome of the second stage is dichotomous, has been considered by others (see, for example, Maddala 1983; Achen 1986). Our first stage is a linear probit model for the choice of BH vs. remaining uninsured.¹⁵ The explanatory variables are those defined earlier for our model of insurance choice. The instrumental variables—those measures which are assumed to affect choice and not the access measures—include BH premiums, knowledge of BH, access to employer coverage, and local market characteristics of BH operations (number of plans available, whether an early BH site).¹⁶ Predicted values for insurance status then are used in the second-stage probit models of access.

We use the fitted models to estimate the likelihood of having a usual care source and the likelihood of having a physician visit for each member of the sample as if the person were in BH, and then as if the person were uninsured, and compare the sample average predictions for these two insurance states.

Results

Program Participation

The role of price. Changes in the out-of-pocket premium charged for the BH program have a significant effect on participation rates. Among adults, a decrease in monthly premiums from

Table 5. Price elasticity and crowd-out as premium is varied

	Change in monthly premium for BH coverage	
	\$50 to \$25	\$25 to \$10
Adults		
Arc elasticity of BH participation	-.7	-.3
Crowd-out (%) ^a	3	13
Children		
Arc elasticity of BH participation	-.05 _b	-.02 _b
Crowd-out ^a		

^a Change in private coverage as a percentage of change in public coverage.

^b Estimated change in private coverage is slightly positive as premium falls; therefore no crowd-out is estimated.

\$50 to \$25 leads to an increase in the likelihood of BH participation of about four percentage points—from 7% to 11%. A decrease from \$25 to \$10 leads to a further increase of about three percentage points in participation (Table 4). These changes suggest an arc elasticity of participation of about $-.3$ for a premium change of \$10 to \$25, and one of about $-.7$ for a premium change of \$25 to \$50 (Table 5). These estimates are consistent with extant literature about the role of price in insurance demand. For example, estimates from the demonstration phase of the BH indicated that a premium decrease from \$25 to \$10 would increase participation rates by three percentage points (Madden et al. 1995).¹⁷ Marquis and Long (1995) estimate the price elasticity of demand for low-income families to be between $-.4$ and $-.6$.

The increase in BH participation induced by the premium change, however, is not matched by an equal increase in the percentage of the population that is covered by public programs. This is because lowering BH premiums leads some adults who otherwise would enroll in Medicaid to select BH coverage.¹⁸ As a result, the increase in coverage in public programs accompanying a BH premium decrease is only about 75% as large as the increase in BH participation. A decrease in BH premiums from \$50 to \$25 is estimated to increase public program participation by about three percentage

points, and a decrease from \$25 to \$10 increases it by about two percentage points.

We estimate that only a very small and statistically insignificant number of privately insured adults would shift to public programs (including both Medicaid and BH) if BH premiums were reduced. That is, crowd-out induced by changing the subsidy is modest—only about 3% to 13% of the change in public program coverage is due to a shift from private coverage (Table 5). Thus, increases in public program participation in response to BH premium changes are matched largely by decreases in the uninsured rate.

While having a statistically significant effect on program participation, increasing the subsidy (decreasing premiums) would not substantially eliminate the problem of the uninsured in Washington. Even if premiums for all eligible adults were decreased to the minimum \$10, we estimate that total BH participation would increase only about 2.4 percentage points (from 11.7% of eligible adults to 14.1%), and the uninsured rate for this low-income group would fall only from 31.8% to 30.2%.

BH premium decreases for parents also are estimated to lead to statistically significant increases in the number of children enrolled in public programs and to a decrease in the uninsured rate. Similar to the findings for adults, we estimate that a BH premium decrease from \$50 to \$25 would decrease the uninsured rate among children by almost three percentage points. However, our findings suggest that this primarily is due to an increase in enrollment of children in Medicaid, rather than enrollment in BH, hence the very low estimated elasticities shown in Table 2. Most children enrolled in BH are enrolled in BH Plus, which BH and Medicaid administer jointly. Thus, some BH enrollment of children may be reported as Medicaid enrollment in the interview. Lower BH premiums may lead some parents to investigate the program and lead them to enroll their children in Medicaid, even if they do not themselves decide to enroll in BH. We do not estimate any crowd-out of private insurance for children as the BH premium is reduced and public program participation rises.

Health selection. Health status is not a factor in enrollment in BH among adults, controlling for other demographic characteristics (Table 6).

The participation rate of adults in fair or poor health (11%) is not greater than that of those in very good or excellent health (12%). Thus, our results confirm findings of other studies that publicly subsidized private insurance programs do not experience adverse selection. However, the likelihood of enrolling in Medicaid is higher for those in fair or poor health than others. This is probably because health status is a factor in Medicaid eligibility for some population groups—the severely mentally retarded, the physically disabled, the blind, and the medically needy. Health status is also a factor in purchase of private insurance, even after controlling for the availability of insurance through an employer group. The likelihood of enrolling in a private insurance plan is about 10 percentage points lower for adults in poor health than those in excellent health. Children are about seven percentage points less likely to be covered by private insurance if any of the children in the family are in poor or fair health. The lower participation in private plans among those in poorer health may reflect health underwriting.

Though BH has not experienced selection on the basis of health, there are observable factors that are related to BH participation that also affect use of health care services. Older adults (those age 35 and over) are more likely to enroll in BH than younger people, as reported in analyses of the demonstration phase of BH (Madden et al. 1995). Overall, people over age 45 are more likely to be enrolled in some public program and less likely to be uninsured than their younger counterparts.

Health status is also not a factor in BH participation among children. However, children in fair or poor health are more likely to be enrolled in Medicaid and less likely to have private health insurance coverage than other children.

Other factors related to participation. Income is positively related to participation in BH and negatively related to participation in Medicaid for adults—the latter probably reflecting eligibility rules (Table 6). Overall, higher-income adults are less likely to be in public programs than those with lower incomes. However, income is associated with a greater likelihood of purchase of private insurance. Similarly, lower-income children are more likely to be enrolled in Medicaid than higher-income children, even though all chil-

Table 6. Predicted marginal effects of health and demographic factors on insurance status from choice model

	Public program total (%)	BH (%)	Medicaid (%)	Private insurance (%)	Uninsured (%)
Adults					
Health status					
Excellent	25.8	12.2	13.6	44.8	29.4
Very good	25.4	11.9	13.5	40.2	34.4
Good	29.3	11.9	17.4	38.2	32.5
Fair	32.4	10.2	22.2	32.5	35.1
Poor	41.1	13.9	27.2	33.9	25.0
Age					
18–24	23.4	9.2	14.2	42.4	34.2
25–34	29.4	8.5	20.9	39.3	31.3
35–44	28.3	15.0	13.3	37.2	34.5
45–64	30.9	15.7	15.2	40.9	28.2
Income					
0–49% poverty	35.2	8.4	26.8	32.1	32.7
50–99% poverty	34.6	11.0	23.6	30.7	34.7
100–149% poverty	24.6	14.3	10.3	39.3	36.1
150–200% poverty	22.6	15.2	7.4	48.0	29.4
Education					
Less than high school	31.5	11.0	20.5	34.1	34.4
High school	27.0	10.8	16.2	41.0	32.0
Some college	27.8	12.9	14.9	38.9	33.3
College	28.9	12.5	16.4	44.5	26.6
Children					
Health status					
No child fair/poor	55.7	11.5	44.2	33.3	11.0
Any child fair/poor	62.6	8.5	54.1	26.2	11.2
Age of youngest child					
0–5	64.3	12.1	52.2	27.9	7.8
6–11	46.0	9.5	36.5	38.5	15.5
12–17	49.5	12.2	37.3	34.9	15.6
Income					
0–49% poverty	70.6	10.6	60.0	16.2	13.2
50–99% poverty	67.1	9.7	57.4	20.7	12.2
100–149% poverty	61.8	17.9	43.9	25.1	13.1
150–200% poverty	40.9	10.0	30.9	47.8	11.3
Education					
Less than high school	66.9	9.5	57.4	10.6	22.5
High school	53.9	11.3	42.6	35.4	10.7
Some college	57.6	13.3	44.3	32.5	9.9
College	56.6	8.7	47.9	37.6	5.8

dren in our study sample are eligible for Medicaid. Children in higher-income families are more likely to be privately insured.

Controlling for income, those with less than a high school education are more likely to enroll themselves or their children in Medicaid and less likely to purchase private insurance than those with higher education. However, education is not a factor in decisions by adults to

enroll in BH, and does not show a consistent pattern with enrollment decisions for children.

Few other factors differentiate those who enroll in BH from other low-income families. In particular, we did not find that participation was higher among people living in areas in which BH was introduced initially as a demonstration (Table 7). Participation was only modestly higher in areas in which participants had a greater

Table 7. Predicted marginal effects of market factors on insurance status from choice model

	Public program total (%)	BH (%)	Medicaid (%)	Private insurance (%)	Uninsured (%)
Adults					
Number participating plans in county					
1-3	24.0	8.6	15.4	44.9	31.1
4 or more	27.1	12.1	15.0	40.0	32.9
Early service area	27.9	11.5	16.4	39.9	32.2
Not early service area	24.5	12.4	12.1	42.0	33.5
Children					
Number participating plans in county					
1-3	50.3	9.1	41.2	38.3	11.4
4 or more	53.1	11.5	41.6	34.0	12.9
Early service area	55.4	11.1	44.3	33.1	11.5
Not early service area	48.5	11.6	36.9	36.4	15.1

choice among health plan (four or more plans) than in areas with few participating plans; these differences were not statistically significant.

Access Effects

If policymakers adopt policies to increase BH participation, are participants better off? Those in BH have substantially better access to care than would have been expected if they were uninsured (Table 8). Low-income adults in BH are about twice as likely to have a usual care source as their uninsured counterparts. Children are about 1.5 times as likely to have a usual source of care. About 60% of adults enrolled in BH use some physician care in a year; in contrast, less than one-third of uninsured adults see a

physician. Similarly, almost 70% of children in BH receive physician care, in contrast to only about one-third of uninsured children.

We obtain similar results using the simple probit estimation and instrumental variables estimation. So we conclude that the access differences that we observe in the simple probit are not due to endogeneity of the insurance decision.

Discussion

Our results support the conclusions of previous studies that unobservable (to the plan) adverse selection has not been a problem for BH. Among adults, BH participants were older than nonparticipants. Because age is related to health

Table 8. Access to care for low-income adults and children, BH participants and uninsured

Type of insurance	Observed status		Instrumental variables	
	Has usual source of care (%)	Had physician visits in past year (%)	Has usual source of care (%)	Had physician visits in past year (%)
Adults				
BH	93	59	91	60
Uninsured	45	29	42	29
Children				
BH	96	68	95	63
Uninsured	67	35	65	42

status and use, the BH population may be in poorer health and more likely to use health care than the eligible population. But health differences related to observable factors such as age can be factored into cost estimates and plan payments. After controlling for observable demographic characteristics, health status is not related to participation decisions as others have found (e.g., Kilbreth et al. 1998; Swartz and Garnick 2000).

The amount of the subsidy is a factor in decisions of low-income families to participate in a publicly sponsored health insurance plan. However, even with substantial subsidies, participation is modest. Only about 11% of eligible people participated in BH in 1997. Decreasing premiums to the minimum of \$10 would lead to a small increase in participation. Yet almost one-third of eligible adults and almost 10% of children would continue to be uninsured.

Most proposals to expand insurance coverage rely on financial incentives; tax credit proposals are an example. Yet our estimates of price response suggest that such initiatives may be less successful in expanding coverage than policymakers hope. A key question then for policymakers seeking to expand insurance coverage is how to attract more participants to subsidized programs similar to BH. Participants are better off in the program than remaining uninsured. They have substantially improved access to care and are more likely to use health care services when they are covered than when they are not.

Why then don't more eligible people enroll? Better marketing and outreach may be a part of the answer to improving participation. However, characteristics that we expect are related to the availability and use of information—such as the length of time the program had operated in an area and the individual's education—did not have large effects on participation. Moreover, uninsured rates remained high even among eligible people who said they knew about BH—about 30% for adults and 12% for children.

A design feature that appears to have only modest effects on participation decisions is the extent of choice of plans available to participants. Providing choice can be costly to public programs—to implement, to administer, and to inform beneficiaries. Our results suggested only modest differences in participation when the of-

fered choice included four or more plans vs. fewer plans. However, we had insufficient observations to examine whether offering any choice made a difference.

While seeking ways to attract more uninsured people to the program, policymakers also want to avoid inducing a shift from the private sector to the public sector. Our results suggest that expanding the subsidy resulted in little crowd-out of private insurance coverage. However, the crowd-out effects at the margin may be quite different than the initial crowd-out. Some research has suggested that initial crowd-out effects may be substantial, especially as the income threshold for eligibility increases (Kronick and Gilmer 2002). Furthermore, the crowd-out effects of other policies designed to enhance enrollment may differ from the crowd-effects of small subsidy changes.

Our results also suggest that adults appear to be willing to pay somewhat more to enroll in the subsidized program than to participate in Medicaid. About one-quarter of the increased adult enrollment in BH occurring after a subsidy increase was the result of a substitution of BH for Medicaid participation. This suggests that subsidies to the purchase of private insurance may make greater inroads in the uninsured rate than further expansions of Medicaid eligibility. However, the expansion of BH among parents appears to have led to an increase in Medicaid participation among children.

The challenge to policymakers is to find program design characteristics, beyond subsidies, that will attract the uninsured and not disrupt the existing private market. While there are many hypotheses about why people fail to participate in insurance programs, even when the program is essentially without cost, there is little research about personal preferences and nonfinancial barriers that result in nonparticipation (Blumberg and Nichols 2001). Recent studies of participation in the State Children's Health Insurance Program have begun to identify some of these factors—including administrative hassles and lack of perceived need for insurance (Kenney and Haley 2001). Further research about these intangible factors is needed to help policymakers design programs that will reach and enroll more uninsured people.

Notes

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- 1 In contrast, there is a substantial literature, not reviewed here, that suggests adverse selection among types of insurance plans when people are offered a choice of type of plan.
- 2 In general, the plans with which the state contracts to offer coverage in BH are the same plans available to Medicaid enrollees.
- 3 However, it is possible that the presence of a cap and waiting lists discouraged potential applicants even after they were lifted, and so did negatively affect participation.
- 4 For details about the sample design, see Carlson and Ramani (1998).
- 5 The survey question was: "Have you heard of Washington's Basic Health, a state health insurance plan available to people who do not have health insurance coverage?"
- 6 We fit a conditional logit model to allow for this variation in the choice set. Our model would be equivalent to a multinomial logit model if all people faced the same number of choices.
- 7 People also must be aware of Medicaid in order to enroll in that program. We do not have a measure of knowledge of Medicaid and assume that all people know of the program. While that will introduce some error, we believe it is likely that many more low-income people were familiar with Medicaid than with the much newer BH program.
- 8 This means that we assume that awareness of the BH plan as a fourth option may alter the relative odds of other choices. However, use of the conditional logit assumes that the independence of irrelevant alternatives otherwise applies and that introducing another alternative would not affect the relative odds of choosing among the current options.
- 9 For each person, we calculate a premium for each BH plan, which depends on age and income, using the Basic Health Premium Calculation Disk provided by the Washington Health Care Authority. The characteristics that determine premiums are measured in the survey. An expected premi-

um, used in our estimation model, then is calculated weighting plan-specific premiums, by plan shares of subsidized BH enrollees.

- 10 Our indicator measures whether insurance benefits are offered by the employer; we do not know whether the family was eligible to participate in the employer plan.
- 11 Industry type was missing for about 20% of the analysis sample, or about 35% of those in the analysis sample who were employed.
- 12 The thresholds vary by family size, number of children, and age of the family head. See www.census.gov/hhes/poverty/threshld/thresh96.htm.
- 13 We tested for interactions between awareness of BH and health status and between awareness of BH and the indicator of access to employment-based insurance; however, these interactions were not significant and were not included in our final estimation model.
- 14 Children with incomes below 200% of poverty will be enrolled in BH rather than BH Plus if the enrolling parent does not live in the household or if the parents prefer to enroll them in BH rather than a Medicaid linked program. But the majority of children in BH are enrolled in BH Plus.
- 15 We restrict our analysis to these two groups because our interest centers on whether BH participants have better access than they would if uninsured. In addition, fitting the selection model is facilitated when we have a binary outcome in the first-stage choice. The model for the choice of BH vs. remaining uninsured includes all of the variables in the full conditional logit choice model.
- 16 These variables were jointly significant in the choice of BH relative to remaining uninsured for both adults and children. The parameter estimates in the bivariate model used for the selection analysis are quite similar to the parameter estimates for the odds of choosing BH vs. remaining uninsured given in Tables 2 and 3.
- 17 This was calculated from the odds ratio reported for a \$10 premium, and assuming participation rates at the level observed in our data.
- 18 People eligible for Medicaid were not barred from enrolling in BH if they chose to do so and to pay the premium. State officials reported to us that some residents will not enroll in Medicaid because of stigma effects and prefer to "pay their own way."

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