ADJUSTING FOR NONRESPONSE AMONG MEDICAID HOUSEHOLDS THAT COULD NOT BE LOCATED OR WERE LOCATED BUT DID NOT PARTICIPATE IN THE MINNESOTA MANAGED CARE SURVEY

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I. Overview of the Study Objectives and Survey Methods

Medicaid is a jointly funded, federal-state health insurance program for certain low-income and impoverished people. Nationally, it covers approximately 36 million individuals, including children, the aged, blind, and/or disabled, and people who are eligible to receive federally assisted income maintenance payments. The rising cost of Medicaid has become a serious problem for both federal and state governments, with the use of managed care becoming a way to control such costs.

We conducted the Minnesota Managed Care study in two cohorts. For cost efficiency, we conducted the study by telephone, using MPR's computer-assisted telephone interviewing (CATI) system. The survey questionnaire took 37 minutes to administer. Cohort 1 was conducted in 1998, cohort 2 in 2000. The sample was drawn from Minnesota's Medicaid records, combined with the Minnesota care files. For cohort 1, we completed 2,757 (4,078) household (person) interviews at an unweighted response rate of 69.7 (67.7) percent. For cohort 2, we completed 1,209 (1,805) households (person) interviews at an unweighted response rate of 69.6 (68.2) percent.

In both cohorts, the primary analytical focus was to compare outcomes under Medicaid managed care (PMAP) to outcomes under Medicaid fee-for-service (FFS) separately for adults and children and for adults and children combined. In March 1998, six rural counties had begun enrolling Medicaid recipients into managed care plans. About 60 other rural counties were shifted to managed care during the rest of 1998 and 1999. The first cohort supported a matched-county design by comparing outcomes under PMAP in 6 rural counties in the northeast part of the state with outcomes under FFS in 18 counties in the northwest part of the state (identified collectively as FFS1 counties). Cohort 1 also included 35 southern FFS counties (identified collectively as FFS2 counties).

We originally intended for cohort 2 to parallel cohort 1 in design, but transition did not occur as planned. We assumed the 18 northwest counties and the 35 southern counties would support a pre-post analysis; however, by the time of cohort 2, none of the 18 northwest counties had adopted a managed care system. Therefore, for cohort 2, the study was limited to the 35 southern cohort 1 FFS2 counties, which did experience some transition. By wave 2, 17 of the 35 southern counties had changed over to the PMAP care system and 18 remained under FFS.

In our study of the Medicaid population, we investigated response by considering (a) whether a telephone number could be found for a sample member, and (b) the response among sample members for whom we obtained a telephone number. In cohort 1, we were able to obtain a phone number for 76 percent of the 6,019 sampled enrollees. After phone numbers were obtained, response to the survey was high, with 4,099 (89.3 percent) of the 4,588 people with locatable phone number completing the survey. Cohort 2 was similar: we attempted 1,742 (2,651) households (people), of which 1,337, 76.8 percent (2,007, 75.7 percent) households (people) were locatable. Among the locatable, 1,209 (90.4 percent) (1,805, 89.9 percent) households (people) completed the survey. Table 1 presents a breakdown of the call results on both a person and household (household) basis among those attempted for cohorts 1 and 2.

We accounted for survey nonresponse using an adjustment to the survey weights. These adjustments took the form of the product of two propensity scores: we modeled the propensity to identify a telephone number for an enrollee, then the propensity to respond for enrollees with a telephone number. The independent variables used in the modeling were data from the state Medicaid files and included information on the person's age, education level, race, sex, and managed care program affiliation. We found that, for estimating the locating adjustment factor, the factors that were useful were MN membership, race, education level, stratum membership, number of recipients in the household, and, to a lesser degree, age. For estimating the nonresponse adjustment factor, we found that the factors that were useful were primarily race related.

II. Sample Design

In both cohorts, we designed the sampling procedures to support analytical comparisons of adults and children, separately and combined under the two health care systems. As such, the samples

were designed to yield equal statistical precision among these subgroups. In both cohorts, the sample design consisted of a stratified two-stage selection process. For the first stage, we selected a stratified sample of households using nine (cohort 1) or six (cohort 2) sampling strata defined based on the health care system in place in the county (FFS [FFS1 or FFS2 in cohort 1] or PMAP) and by three household membership situations (adults only, children only, and both adults and children). We selected the household samples using a sequential sampling method that selected the households in proportion to the number of adults (adult-only and adult and child households) or the number of children (children-only households) in the household. For the second stage of selection, we selected one adult and one child from each selected household (if any were present). This methodology maximized the statistical precision in the estimates by basically providing an equal within stratum sampling rate for adults in both the adult-only, and adult and children strata, and children in the children-only strata. Since we selected children in the adult and children strata based on the number of adults, we selected a larger sample of children overall to compensate for unequal child probabilities of selection in this stratum. These methods produced relatively equal effective interview sample sizes across subgroups.

III. Comparison of the Populations in Each Cohort

The sampling frames provided fairly extensive information on the characteristics of the people, which were useful for comparisons of the populations at each cohort (discussed herein), and for examining and compensating for differential response patterns (see Sections 4 and 5). While characteristics were available for each person, parental information was not available for the households that only contained children recipients.[1] We present the comparison of the two populations in each cohort using person-level information, rather than household- or "case"-level characteristics. Furthermore, the comparisons presented in this paper are discussed for all people, adults and children combined.[2]

Overall, as expected, the profile of the FFS2 counties across the two cohorts were similar. The only noticeable differences relate to employment status[3], and to a lesser degree, ethnicity. While the FFS2 counties are comparable across cohorts, the northeast and northwest counties in cohort 1 showed some differences from their FFS2 southern counterparts. While the percentage of whites was similar in the northern counties to that in the south, the northern counties had a substantial portion of Native Americans and few Hispanics. The northern counties also had a higher portion of people in both adult- and children-recipient households, but the ratio of children to adults overall was consistent. For the rest of the available demographic profiles, the counties were quite comparable, with little differences on age, number of recipients, marital status, education level, and gender.

IV. Nonresponse Patterns by Cohort

We conducted a comparative analysis of the people with and without locatable phone numbers and among the people with locatable phone numbers, for respondents and nonrespondents. With this analysis, we could describe the person characteristics associated with our ability to locate a phone number for the sampled people and to use this information in developing the models to prepare an adjustment to the survey weights. Likewise, among the locatable people, we could determine which of these factors influenced participation in the survey. This enabled us to adjust the survey weights further for nonparticipation.

In conducting these comparisons, we had to balance the fact that survey response and phone locatability status are primarily household- or householder-based phenomenons with some of the unique aspects of the sampling frame information. The householder or another adult household member usually is the point of contact and, as such, decides whether to cooperate in the survey. Likewise, the adult household member characteristics are usually related to whether they have a working or unlisted phone number. We note, too, that in the households with both adult and children recipients, if the adult responded we obtained data for the child as well[4].

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[1] We discuss this situation and its impact on the nonresponse adjustment process in the following sections.

[2] We conducted several comparisons of the response patterns separately for adults and children, and for children from the children-only recipient households, to prepare the nonresponse adjustments. To keep the tables presented to a manageable length, we discuss the differences between the adults and children as they relate to the adjustments but present the comparisons in the tables for adults and children combined.

[3] Taking into account differences in the cases with missing unemployment rates, 63.2 percent were unemployed in cohort 2, compared to 74 percent in cohort 1, in the FFS2 counties among the cases with known employment status. In cohort 2, we observed a much higher rate of people with missing employment status.

[4] In most cases the adult either served as the respondent/proxy for the child's information. In some cases, if the

Hence, ideally, response patterns are examined at the household level. On the other hand, the availability of household-level information was limited. In the child-recipient-only households, we only had data on the child's characteristics. Finally, the planned analysis was person-based. As a result, we decided to examine the response patterns and to prepare the nonresponse adjustments on a person basis.[5]

Table 2 presents the percentage of people sampled (using the unweighted data) for whom we were able to locate a phone number by cohort for various person characteristics. For phone locatability, in both cohorts 1 and 2 we observed the largest difference by race, sampling stratum membership (with lower rates for households with both child and adult members), MA/MN membership, education level, and number of Medicaid recipients in the household. In both cohorts, Native Americans and Hispanics showed lowest phone location rate (53.4 and 50.6 percent), followed by low education levels (grades 1-6, 59.6 percent), and household size, ranging from 70 percent in the 4 or more recipient households to 82.8 percent in the one-recipient households. For the remaining demographics, like gender, and employment status, the differences in the locatability rates were not large.

For cohort 2, the locatability status patterns are similar to those in cohort 1 on race, MA/MN member status, and adult and child household recipient status. As in cohort 1, Hispanics were considerably less likely to be located than whites (52.3 versus 80.2 percent). Blacks had low locatability rates in both cohorts but faired better in cohort 2 (although the sample sizes are too small for meaningful comparisons). MN members showed higher locatability rates across both cohorts. People in adult- and child-recipient households were harder to locate across the three groups presented. Locatability rates also dropped as the number of recipients in the household increased (79.2 to 69.2 percent). For age, in cohort 1, people age 30 and older showed a higher locatability rate than the 21-29 year old group, but in cohort 2, both groups had a similar rate. For cohort 1, we observed a consistent increasing trend between locatability and education level, but in the FFS2 counties this breaks down. In both cohorts, the least educated (grades 1-6, 80.8 percent in cohort 1 and 73.5 percent in cohort 2) show a higher locatability rate than those in the middle grade ranges (grades 7-9, and 10-11 at 68.5 and 75.1 percent, respectively, in cohort 1, and 66.4 and 70.2 percent, in cohort 2) when confined to the FFS2 counties. For the remaining demographics like gender, and employment status, the differences in the locatablity rates were not large and as such showed few differences by cohort.

We also found some differences in cohort 2 by stratum membership (not presented).[6] Contrary to cohort 1, the completed some college people were harder to locate primarily as a result of a harder-to-locate rate in the child-only cases. Households with three or more recipients in the adult and children stratum appeared to be harder to locate than child-only households with three or more recipients. Hispanics appeared to be harder to locate in the adult-only stratum, but the sample sizes were small.

For participation rates, differences by the person profiles are in general small. In both cohorts, the largest differences are by race, but Hispanics seem to be responding better in cohort 2 than in cohort 1 in the FFS2 counties. Being in a household with a mix of adult and children recipients tends to reduce cooperation. In cohort 2 adult-only cases seem to cooperate better than child-only cases (at least in the FFS plans). No consistent trends are noted by education level or the number of recipients in the household across the two cohorts.

V. Nonresponse Adjustment Procedures

The results of nonresponse pattern analysis helped us develop two logistic regression models to predict locatable phone status among the sample cases and to predict survey cooperation or participation among the located cases. Each of these models ultimately produces a propensity score that are used as multiplier adjustments to the initial survey weights (based on the probabilities of selection). By applying the propensity scores to the weights, each respondent gets a different factor value, with higher/lower values given to respondents with characteristics that are similar/dissimilar to the

(continued)

child was over age 18 at the time of the interview, we conducted the interview with the child. In all joint adult- and child-recipient households, data were collected for both sampled recipients or for neither.

[5] As noted previously, we did examine differences in the response patterns by adults and children (or children limited to the child-only recipient strata) that are not presented in the tables and did find, in some cases, that the response patterns by demographic membership varied across the child-only, adult-only, and adult and child strata groups (discussed in this section).

[6] We evaluated these relationships using a Breslow Day Test (1980), which evaluated the consistency of the odds ratios between locate status and the demographic characteristic in question by stratum membership.

unlocatable (or noncooperating) people.[7] With this technique, the population profiles of both the locatable and unlocatable cases, and likewise the cooperating and noncooperating people are appropriately represented in the final weighted data.

To develop the models, we first needed to convert the categorical responses to a set of indicator variables, to ensure that a linear relationship exists between the final predictor variables and the dependent variable. Table 3 shows the variable categories used in the models.[8] For missing data items, we either developed a missing indicator variable for these characteristics or imputed values for the missing data. We developed the model in stages. We prepared an initial model using all the variables, then eliminated those with a p-value greater than 0.5. We then eliminated variables one at a time that were not significant at a p-value of .15. We decided to include nonsignificant main effects if the related interaction term was significant at 0.15.

Both models provided a reasonable fit for the data, and the results paralleled those from our prior analysis. For cohort 1 (cohort 2) locatability model, the Hosmer and Lemeshow goodness-of-fit statistic had a value of 13.3 (7.068) with a p-value of 0.1034 (0.5293). The cohort 1 model showed that adult and child cases were harder to locate than adult-only or child-only cases. Being employed improves the chances of locating a case, as does being white or Asian, married, or on the MN plan roster. Hispanics are less likely to be locatable, as is the under 30 age group and cases in the FFS1 counties. For cohort 2, the model indicated that those with MN membership are easier to locate, as are whites, and people age 40 or older. Hispanics with less of an impact on the adult-only stratum are the hardest to locate.

Similar findings resulted for the no-response models. For the cohort 1 (cohort 2) response model, the Hosmer and Lemeshow goodness-of-fit test statistic had a value of 13.9 (5.14) with a p-value of 0.0850 (0.5259). The results for cohort 1 show that whites and Asians are more willing to respond, followed by Native Americans. Being married and an increase in education level improve the participation rate. Being in the tail end of the age categories decreases the likelihood of participation in the study. For cohort 2, results show that whites and Hispanics are more willing than other ethnic groups to respond. Having an education level = 0 also shows a higher rate of response. The Hispanic-adult only interaction term also turned out to be significant in the model.

In both cohorts, the nonlocatability adjustments were created based on the inverse probability of locatability from the modeling process. We assigned a minimum value of 0.5 for this adjustment. This lower limit on the adjustment affected only a small portion of the cases in both cohorts. We prepared the nonresponse factor in a similar fashion; all adjustments were below 2, requiring no trimming.

VI. Conclusions and Comments

The results of our analysis show that unavailability of phone numbers for the sampled people was the primary obstacle in obtaining survey participation. After phone numbers were located, survey participation was generally quite high; had we not adjusted the survey weights for these circumstances, the final estimates would not have been representative of the population. In contrast, the adjustments increased the sampling precision in the final weights by no more than 5 percent in cohort 1 and no more than 7.3 percent in cohort 2. The adjustments compensate only for the difference between responding and nonresponding people, based on the available characteristics on the sampling frame. Other characteristics or circumstances could contribute to a person not having a locatable phone number or not cooperating.

[7] See Rosenbaum and Rubin, 1984; David et al., 1983; and Kalton and Kasprzyk, 1986.

[8] For cohort 2, we used the same variables as cohort 1 with some modifications based on some of the differences in response patterns. Here, the county group type was based on FFS and PMAP membership. Instead of categorizing the education variable into five classes, we used separate indicators for each level to account for a nonconsistent trend in the FFS2 counties. We prepared separate indicator variables for the number of people in the households and, finally, we considered three interaction terms : an interaction among Hispanics by adult-only status, an interaction between number of covered people in the household by child-only status, and finally interaction between education level and child-only status.

References

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TABLE 1 RESULTS OF CALL ATTEMPTS

Result of Call	Count Persons	Percent of Sample Persons	Household Count	Percent Households
Cohort 1				
Completes	4,078	67.7	2,757	69.7
Ineligibles	21	0.30	16	0.5
Located Phone Number But Did Not Respond	489	8.1	316	8
Total With Locatable Phone Numbers	4,588	76.2	3,087	78.1
Total With Unlocatable Phone Numbers	1,431	23.7	874	22.1
All Attempts	6,019	100	3,953	100
Cohort 2				
Completes	1,805	68.09	1,209	69.4
Ineligibles	6	0.23	4	0.22
Located Phone Number But Did Not Respond	196	7.39	124	7.12
Total With Locatable Phone Numbers	2,007	75.71	1,337	76.75
Total With Unlocatable Phone Numbers	644	24.29	405	23.25
All Attempts	2,651	100	1742	100

TABLE 2. LOCATABILITY RATES BY COHORT

	Cohort 1 Entire Population		Cohort 1 FF2 Counties		Cohort 2 Entire Population	
Characteristic	Total Attempted	Percent Located	Total Attempted	Percent Located	Total Attempted	Percent Located
FFS – Adult Only	266	82.0	131	84.0	154	85.1
FFS – Child Only	985	82.2	494	83.0	274	76.3
FFS – Adult and Child	2,804	71.7	1,358	76.0	900	71.1
PMAP – Adult Only	139	84.2	NA	NA	144	81.9
PMAP– Child Only	497	85.5	NA	NA	261	80.1
PMAP– Adult and Child	1,328	75.9	NA	NA	918	76.3
MA Member	5,471	74.5	1,817	76.8	2,445	74.1
MN Member	485	94.8	140	97.9	184	94.6
Both MA and MN	63	82.5	26	76.9	22	100.0
Not Employed	2,893	74.8	798	79.7	783	75.7
Employed	1,406	78.5	512	80.1	788	77.3
Missing Employment Status	1,729	76.3	673	75.2	1,080	74.5
Male	2,209	76.3	721	78.9	973	73.7
Female	3,810	76.2	1,262	77.9	1,678	76.9
White	5,044	79.5	1,629	82.3	2,016	80.2
Asian	64	87.5	40	87.5	48	72.9
Black	76	63.2	46	60.9	115	73.9
Native American	496	53.4	33	60.6	35	62.9
Hispanic	247	50.6	201	49.3	371	52.3
Missing Race	92	91.3	34	88.2	66	83.3
Not Married	5,467	75.8	1,775	77.9	2,316	75.4
Married	552	80.8	208	81.7	335	77.6
< 21 Years of Age	3,946	77.2	1,296	78.5	887	78.1
21-29 Years of Age	913	71.3	324	73.5	711	73.8
30-39 Years of Age	785	76.3	252	81.7	647	74.3
40 Years or More	375	77.6	111	82.0	406	75.9
One Recipient Households	882	82.8	317	83.6	485	79.2
Two Recipient Households	1,936	75.9	632	78.6	774	78.3
3-4 Recipient Households	2,401	76.2	782	77.0	1,009	74.5
Four Recipient+ Households	800	70.0	252	74.6	383	69.2
Education Level 0 or Missing	2,590	83.9	884	78.7	529	80.3
Grades 1-6	841	59.6	287	80.8	321	73.5
Grades 7-9	401	68.1	130	68.5	235	66.4
Grades 10-11	483	68.1	169	75.1	245	70.2
Completed High School	1,390	75.9	404	76.2	546	79.3
Completed Some College	314	82.2	109	91.7	775	75.5

TABLE 3. RESULTS OF WEIGHTED LOGISTIC REGRESSION ANALYSIS TO PREDICT LOCATABLE PHONE NUMBER STATUS

		Cohort 1 (n=6,019)		Cohort 2 (n=2,651)	
Variable	Description	Coefficients	Odds Ratio	Coefficients	Odds Ratio
INTERCPT	Intercept	-0.3331		0.695	2.00
FFS1	In FFS1 =1	-0.2229	0.8		
FFS2	In FFS2 =1	0.0756	1.078		
FFS (cohort 2)	FFS=1/PMAP=0			-0.212	0.81
AD_CLD	Both Ad/Child =1	-0.3862	0.68	0.101	1.11
ADULTI	Adult/Child, Child=1	0.2174	1.243	-0.06	0.94
MAEST	MN/MA Status, MN=1	0.8849	2.423	1.587	4.89
EMPST	Employment Status, Employed=1	0.3225	1.381		
RACEST	Wht/Asian=1	0.9291	2.532	0.435	1.55
NATIVE	Native American Status=1	-0.1326	0.876		
HISPX	Hispanic=1	-0.6049	0.546	-0.947	0.39
MARST	Marital Status	0.4671	1.595	0.229	1.26
AGE1	Oldest Member<21 Years Age	-0.2467	0.781		
AGE2	Oldest Member 21-29 Years Age	-0.4594	0.632		
AGE3	Oldest Member 40+ Years Age	-0.1045	0.901	0.365	1.44
NUMPER	# HHSD Members 1,2,3-4,5+	-0.0262	0.974		
NUMPER1	No. of persons: 1			0.309	1.36
NUMPER2	No. of persons: 2			0.342	1.41
NUMPER3	No. of persons: 3-4			0.21	1.23
EDUCAT	Education Level 1-5	0.0457	1.047		
EDUCZERO	Education Level=0	0.31	1.363	0.203	1.22
EDUC1	Education Level 1-6			0.033	1.03
EDUC2	Education Level 7-9			-0.162	0.85
EDUC3	Education Level 10-11			-0.29	0.75
EDUC4	Education Level (high school)			0.014	1.01
MISSEDC	Missing Education Info.	0.519	1.68		
HISPADLT	Hispanic status Adult Only			1.428	4.17
NUMCHLD	Number of recipients 3+ and Child Only			.538	1.71