Measuring Private and Public Health Coverage:
Results from a Split-Ballot Experiment on Order Effects[1]

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1. INTRODUCTION

Health insurance coverage is generally measured by asking respondents a series of questions on specific types of health plans, first covering different types of private plans, then asking about government-affiliated plans. More specifically, in the Current Population Survey (CPS, used by the federal government to make official estimates of health insurance coverage), and several other major national surveys that mimic the CPS, respondents are asked eight separate questions, in this order: employer-based plans, privately-purchased plans, coverage from someone outside the household, Medicare, Medicaid, non-Medicaid state-sponsored government coverage, military/Indian Health Service plans, and "other" plans. Two separate lines of research have suggested that the order in which plan types are asked about could affect the estimates. The first area of research concerns potential respondent confusion between public and private plan types; the second focuses on the more general cognitive demands of the series as a whole.

Over the past decade or so, Medicaid beneficiaries have been shifted increasingly from traditional fee-for-service arrangements into commercial managed care plans. In 1991 only 9.5% of Medicaid recipients were enrolled in managed care plans nationally; by 1999 the figure rose to 56% (HCFA, 1999). As part of this shift, many Medicaid products now bear the name of commercial managed care organizations (e.g.: "BlueFirst" in Vermont). Some researchers are concerned that individuals enrolled in Medicaid plans that are serviced by commercial HMOs may mistakenly report their government coverage as private insurance and then fail to report their Medicaid coverage. Indeed, some have speculated that recent declines in the Medicaid rolls (as measured through surveys) could reflect this potential mis-reporting and not actual declines in enrollment. Given these concerns, survey design -- particularly the order in which questions on health insurance are asked -- could be an important factor in measurement error. Because the item on Medicaid is preceded by three questions on private coverage (and by the question on Medicare if anyone in the household is age-eligible), it's possible that Medicaid recipients who are unclear about the source of their Medicaid could be reporting it at any one of those earlier items, rather than the Medicaid item. In order to explore whether respondents mis-report their Medicaid as private insurance, a split-ballot test was conducted in which half the sample was asked the standard series of questions (the "control" instrument), and the other half was asked the same questions but in a different order; questions about coverage through government health plans were asked prior to private coverage questions (the "test" instrument).

Somewhat coincidentally, a separate line of research motivated this same split-ballot experiment. Earlier research on a similar battery of health insurance questions (Pascale, 1999) suggested that the sequencing of plan types in the series could be partially responsible for apparent underreporting of employer-based health plans. That research compared a household-level CPS-style set of questions to a similar set of questions asked at the person-level. Under the household-level approach, "screener" questions (one for each plan type) were asked to determine if anyone in the household was covered by each plan type (e.g.: At any time during 1998 was anyone in this household covered by a health insurance plan provided through their current or former employer or union?). A "yes" response initiated follow up questions to identify individuals covered. The person-level approach, on the other hand, asked a simpler (but perhaps more tedious) series of questions about each household member, one at a time (e.g.: At any time during 1998 was NAME covered by a health insurance plan provided through their current or former employer or union?). Under this approach, all items in the survey were asked about one person in the household, then the entire survey was repeated for the next person in the household, and so on.

Findings from this research indicated that the person-level version picked up far more employer-based plans than the household-level version (73% versus

64%). One hypothesis which might explain this finding is task complexity combined with an order-effect. The question on employer-based coverage poses several cognitive challenges to respondents (e.g.: a 12-month reference period, a double-barreled question about both labor force status and health coverage). It was theorized that the added complexity of the household-screener (vs. the simpler person-level version) taxed some respondents to the point of failing to report relevant coverage. If indeed the complexity of the employer-based question was a problem for respondents, it was suggested that moving that item -- from first in the series of items on health plan types to third or fourth -- may improve reporting of employer-based coverage because it would give respondents the chance to adjust to the general topic of health insurance and better focus on the complexities of employer-based coverage. It was further suggested that the series could begin with plan types that are more easily recognized, such as Medicare and Medicaid. Thus, the series was reordered as described above in order to test whether reporting of job-based coverage improves when it is not the first question in the series, and to test whether reporting of Medicare and Medicaid suffers by being first in the series.

This paper will present results from that split-ballot test, conducted as part of the Census Bureau's 2000 Questionnaire Design Experimental Research Survey (QDERS). Analysis will first focus on whether there is support for the concern that Medicaid is mistakenly reported as private coverage, and then investigate whether the first in the series of eight items asked about suffers underreporting.

2. METHODS

This experiment was embedded in the Census Bureau's QDERS survey conducted in August and September of 2000. QDERS is a research vehicle developed by Census Bureau staff for the sole purpose of experimentally testing survey methods for general research purposes (vs. survey-specific applications). The 15-minute omnibus telephone survey included questions on various topic areas, with health insurance starting off the survey. A single household respondent was asked to report for himself/herself and up to eight other household members. The survey was administered by telephone from the Census Bureau's Hagerstown, MD, telephone interviewing facility, using RDD sampling procedures (covering the continental United States), and a CATI instrument. The interview staff consisted of 24 experienced telephone interviewers, split randomly into two groups. (See Rothgeb at al, 2000a and 2000b, for details on training procedures.) Interviews were conducted over a 4-week period. For the first two week session, one group of interviewers

was trained on and administered only the control instrument, while the other group was trained on and administered only the test instrument. At the two-week mark interviewers switched questionnaire formats. Interviewing on the first half of the sample stopped, a new half-sample was released, interviewers were re-trained on the other interview format, and they administered that type of interview exclusively for the remainder of the field period. In addition to the health insurance experiment, various methods tests were incorporated into the other topic areas. However, because health insurance was the first topic to be administered within both the control and test instrument, no confounding effects from these other experiments are expected. In all, interviewers completed interviews in 1,862 households, through which data were collected on 4,794 people. The 1,862 interviews represent a response rate of 42-52% – the lower figure includes in the denominator cases of unknown eligibility (never-contacted cases whose status as working residential telephone numbers is uncertain); the higher figure excludes cases of unknown eligibility. The numerator includes both completed and partial interviews (AAPOR, 2000). Response, nonresponse, and refusal rate differences between the two instrument treatments were trivial and non-significant.

3. RESEARCH DESIGN

The basic structure of the questions across both treatments in this experiment was a calendar year household-level question -- e.g.: At any time during the past 12 months was anyone in this household covered by [plan type]? Within both the control and test instruments there were essentially two different series of health insurance questions: one which did not ask about Medicare (since no one was age-eligible) and one which did (because someone in the household was age-eligible). Within the control version, this difference was fairly subtle with regard to sequencing -- the three items on private coverage were asked first, then Medicare (if applicable), then Medicaid, military, and other plans were asked about. In the test version, however, the difference was integral to the experiment. If no one in the household was eligible for Medicare, then the Medicare item was skipped altogether and the Medicaid item came first. If someone in the household was age-eligible, then the Medicare item came first, followed by the Medicaid item. Because of this sequencing difference, the test and control instruments were essentially administered to two different subgroups: people in households that were not asked the Medicare question (n = 3,971), and those living in households that were asked the Medicare question first (n = 823). For convenience, these subgroups have been named

"Subgroup A" and "Subgroup B," respectively. Figure 1 displays the sequencing of items for each of these subgroups.

Figure 1: Health Insurance Item Sequencing

SUBGROUP A (Medicare not asked)		SUBGROUP B (Medicare asked)	
Control	**Test**	**Control**	**Test**
Job-based	Medicaid	Job-based	Medicare
Purchased	Military	Purchased	Medicaid
Out hh	Job-based	Out hh	Military
Medicaid	Purchased	Medicare	Job-based
Military	Out hh	Medicaid	Purchased
Other	Other	Military	Out hh
		Other	Other

4. RESULTS

4.1 Mis-reporting of Medicaid as Private Coverage

First, the question of whether Medicaid enrollees are being mistakenly reported as having private coverage will be explored. If indeed this were the case, then we would expect the control version of the instrument (in which questions on private coverage came first) to pick up more job-based, directly-purchased and/or plans provided by someone outside the household, relative to the test instrument. Furthermore, we would expect the Medicaid estimates in the control version to be lower than the test version. Results from the experiment provide no evidence in support of these expectations. Table 1 shows that among Subgroup A *(not* asked the Medicare question), the results for private coverage were mixed, but there was no significant change in the percentage of Medicaid enrollees (using a significance threshold of $p < .10$). In fact, the control version picked up *more* Medicaid enrollees than the test version (by 1.1 percentage points), but the difference was not significant. Among the three types of private coverage asked about, the control version picked up significantly *fewer* people covered by job-based insurance (by 2.8 percentage points; $p = 0.052$; chi-square $= 3.72$), but *more* people covered by someone outside the household (by 2 percentage points; $p = 0.001$; chi-square $= 11.455$). The control version also picked up more people covered by directly-purchased plans (by 1.1 percentage points), but the difference was not significant.

These results leave open the possibility that respondents double-report their Medicaid coverage more in the control version than in the test version. That is, because in the control version the questions on directly-purchased plans and coverage from someone outside the household came before the Medicaid item, respondents may have reported their Medicaid as directly-purchased or as coverage from someone outside the household, and then also reported their Medicaid coverage at the Medicaid item. Again, a closer look at the data do not support this. In both the test and control versions, the percentage of respondents covered by a directly-purchased plan who also report Medicaid is the same in both treatments (4.4%; data not shown); and the percentage reporting coverage through someone outside the household and Medicaid is roughly the same in both treatments (6.7% in the control version; 6.1% in the test version; data not shown). Finally, overall results indicate that the uninsured rate across treatments is very similar (11.4% on the control side; 10.9% on the test side -- an insignificant difference). So for households *not* asked the Medicare question, it appears that the design difference did not affect the overall percentage of people covered by insurance, but that the order in which health insurance items are asked had some effect on reporting of job-based plans and coverage provided by someone outside the household.

A slightly different picture emerges for Subgroup B (households where the Medicare screener *was* asked), but still provides no evidence of Medicaid (or Medicare) being mis-reported as private coverage (see Table 1). When questions on private coverage were asked *first,* reporting of both Medicare and Medicaid was significantly *higher* -- by almost 7 percentage points and 3 percentage points respectively -- than when private coverage questions are asked *after* questions on government-affiliated plans. This suggests that, like Subgroup A, respondents in households with at least one person age 65+ do not mistake their government plans for private coverage. These findings are consistent with qualitative research (Loomis, 2000) in which cognitive interviews were conducted using a similar split-ballot protocol designed to identify sequencing effects. That research concluded: "We found no evidence that Medicaid recipients who receive services through private health insurance providers were reporting their Medicaid assistance at the questions about private health insurance coverage."

Unlike Subgroup A, however, for Subgroup B the control version picked up far fewer uninsured (6.6%) than the test version (10.1%), a difference of 3.4 percentage points that is significant ($p = 0.08$; chi-square $= 3.066$). The control version also picked up more plans overall, relative to the number of insured people (1.75 plans per insured person in the control version vs. 1.60 plans per insured person in the test version). The overall higher reporting on the control side was driven by more

reports of coverage for three plan types -- job-based, Medicare, and Medicaid. For two of these plan types (job-based and Medicare), which are the most common plan types for this population, the magnitude of the difference was sizable – 6 percentage points and 6.8 percentage points respectively -- and significant. For Medicaid the difference was also significant but the magnitude was not as great (2.8 percentage points). It's unclear why the control version would stimulate so many more reports of health plans among households where at least one person was eligible for Medicare. One possibility that would explain higher reports of job-based coverage in the control version could be that respondents report more Medigap and supplemental plans in the control version than in the test version. Since those plan types often are obtained through employment, when the job-based item comes first in the series respondents may well report their supplemental plans and then later also report Medicare. In contrast, when the Medicare item is asked first respondents may report their Medicare coverage and then somewhat deliberately withhold reporting their Medigap or other supplemental plans, believing those plans don't "count" since they have already reported their main source of coverage. The finding that Medicare is underreported in the test version by almost 7 percentage points could be explained by its position (first) in this series, as discussed below. If indeed the general cognitive demands of the series contribute to respondents' failure to focus on the first item in the series, some respondents may fail to report their Medicare and then later get misclassified as uninsured -- which could explain the difference in the uninsured rate for this population (6.6% in the control version vs. 10.1% in the test version).

4.2 Underreporting of Job-based Coverage

The second research question motivating this experiment -- whether respondents underreport job-based coverage when it is presented first in the sequence -- will be explored next. Subgroup A offers some evidence for this hypothesis (see Table 1). The control version, which presented the job-based question first, picked up significantly fewer people (by 2.8 percentage points) covered by job-based insurance than the test version, in which the job-based question came third (after Medicaid and military coverage). Reporting of Medicaid in the test version may have been similarly affected by its position (first in the sequence) -- the control version did pick up more people covered by Medicaid (by 1.1 percentage points) -- but the difference was not significant. As noted above, the only other plan type that showed a significant treatment effect was coverage through someone outside the household. For this type of coverage, the control version picked up significantly more coverage (by 2 percentage points)

than the test version. For all other plan types, differences across treatments were small and not significant. It appears, then, that placing the job-based question third, rather than first, in the series of items on health insurance may improve reporting for that type of coverage and that placing the Medicaid item first in the series does not result in significant Medicaid underreporting.

Results for Subgroup B do not necessarily lead to the same conclusions. Reporting of job-based coverage is actually higher -- by a sizable magnitude (6 percentage points) -- for this population when the job-based item is sequenced first. As mentioned above, this could be the results of more reports of Medigap and other supplemental plans in the control version relative to the test version. Reporting of Medicare, however, does seem to suffer due to its placement; when Medicare comes first in the series it is underreported by a substantial (and statistically significant) 6.8 percentage points.

5. DISCUSSION

The findings on health plan item sequencing may, ironically, relate to prevalence. Employer-based insurance is the most common type of plan, covering almost 63% of the insured population (Mills, 2000), so it was deliberately placed first in the series in the CPS, under the assumption that respondents would have an easy time recognizing this common plan type. However, the approach may have "backfired" in a way, because respondents were provided with a very minimal introduction to the series and then presented with a rather complex set of questions that may not map very well on to their own way of thinking about health insurance coverage. Given the structure of these items, respondents may actually have an easier time answering questions about common health plans when those health plans are placed later in the series, once the gist of the series has become clear to respondents. Consider the complexities and associated cognitive challenges to the respondent embedded within the health insurance series:

a. Introduction: there was only a brief introduction to the series on health coverage ("The next questions are about health insurance coverage"). Then, rather than being asked a general question about health insurance status (e.g.: are you covered by any type of health insurance plan) respondents were presented with a complex question on a specific type of health plan, as detailed below.

b. "At any time during 1998..." Respondents were interviewed in April and May and were asked to report on health coverage at any time throughout the previous calendar year. This required respondents to think back over 15-16 months but "subtract out" the last 4-5-months. Furthermore, they were asked to think about

coverage *at any time* during the calendar year -- so they were asked to focus on even brief periods of coverage that may have occurred more than a year prior to the interview.

c. "...was anyone in this household..." This phrase asks respondents to think about all household members at once, without being provided a list of household members' names. This global approach may have been particularly challenging for certain individuals, e.g., those living in large households or households where the respondent's relationship to other household members was somewhat tenuous.

d. "... covered by a health insurance plan..." The past decade has witnessed sweeping changes in the health care system, such as the increase in managed care penetration noted above, mergers and acquisitions of health care companies, and health plans' decisions to drop and/or pursue large numbers of enrollees in certain markets. What was once a fairly straightforward and stable concept -- health insurance coverage -- is now extremely complex and dynamic for many people. This increasingly complex situation may pose reporting problems for respondents.

The job-based question, when it was first in the series, added the following complexity:

e. "...provided through your/their current or former employer or union?" The relationship between employment and health insurance has been in flux in recent years (Marquis, 1998), as employers change health plan providers and/or change policies regarding the number and type of employees eligible for job-sponsored insurance.[2] Given these kinds of changes, in order to accurately answer questions about other household members' health insurance, respondents must be knowledgeable about not only health coverage status but, in some cases, details about their employment situation.

The mechanism, then, could be that whichever health plan type comes first in the series is likely to suffer the most underreporting. Furthermore, when the first health plan type in the series also happens to be the most prevalent type of insurance for the population in question, the effect on the estimates is rather pronounced. Findings from both Subgroup A and Subgroup B support this theory. In Subgroup A (those living in households where no one was 65 years old or older), job-based coverage is the most common plan type for this population. When job-based coverage was asked first in the series, it suffered underreporting of 2.8 percentage points relative to the test treatment, which asked about this plan type third in the series. Similarly, in Subgroup B (those living in households where at least one person was 65 years old or older), household members were much more likely to be covered by Medicare. For these households, when Medicare was asked first (in the test version) it was underreported by 6.8 percentage points relative to the control version, where Medicare was asked fourth in the series.

6. CONCLUSIONS

Like most research of this type, conclusions are somewhat compromised by survey conditions. In this case, the low response rate and relatively small sample size are causes for concern. However, preliminary findings seem to indicate that Medicaid recipients do not mistakenly report their coverage as some type of private plan. Furthermore, there is evidence that, given the structure of the standard battery of health insurance questions, the plan type that is presented first in the series may suffer underreporting, relative to plan types that are asked later in the series. These findings suggest areas for future research on a revised structure of health insurance questions. For example, a more elaborate introduction to the series could help orient respondents to the complex topic of health insurance. Another more radical approach could be to redesign the series using a "funneling" technique, where respondents are first asked if they are covered by any type of health insurance. If yes, follow up questions would first determine the general type of coverage (government-affiliated, job-based, etc.) and then proceed with more detailed questions where necessary (e.g.: distinguish Medicare and Medicaid, identify policyholders and dependents on job-based plans, etc.). Perhaps the most useful line of research, however, would focus on validation of respondents' reports of their health insurance source. Such research (e.g.: record check studies) would shed some light on the validity of respondents' survey reports (notwithstanding measurement error associated with records and matching administrative record data to respondents' survey data).

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Table 1: Coverage Estimates by Plan Type

Plan Type	SUBGROUP A (Medicare Not Asked)					SUBGROUP B (Medicare Asked)				
	Control (n = 1999)		Test (n = 1972)		Difference	Control (n = 376)		Test (n = 447)		Difference
	n	%	n	%	%	n	%	n	%	%
Job	1402	70.1%	1438	72.9%	-2.8%*	180	47.9%	187	41.8%	6.0%*
Purchase	114	5.7%	91	4.6%	1.1%	85	22.6%	88	19.7%	2.9%
Outside	89	4.5%	49	2.5%	2.0%*	10	2.7%	9	2.0%	0.6%
Medicare	NA	NA	NA	NA	NA	257	68.4%	275	61.5%	6.8%*
Medicaid	217	10.9%	193	9.8%	1.1%	30	8.0%	23	5.1%	2.8%*
Military	70	3.5%	64	3.2%	0.3%	10	2.7%	26	5.8%	-3.2%*
Other	67	3.4%	55	2.8%	0.6%	41	10.9%	37	8.3%	2.6%
Uninsured	228	11.4%	214	10.9%	0.6%	25	6.6%	45	10.1%	-3.4%*

* $p < 0.10$