Exploring the Effects of Secondary Coverage on Medicare Spending for the Elderly

A study conducted by staff from Direct Research, LLC, for the Medicare Payment Advisory Commission

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EXECUTIVE SUMMARY

This research looks at the effects of secondary insurance on health care use and spending for elderly non-institutionalized Medicare beneficiaries. Do those who pay Medicare deductible and coinsurance amounts out-of-pocket use less care than those who do not? If so, how much less care is used, and what types of care are most strongly affected by out-of-pocket payments?

The main source of data is the Medicare Current Beneficiary Survey (MCBS) cost and use files, pooling the years 2003 to 2005. The analysis consists of a series of contrasts between elderly fee-for-service beneficiaries with private secondary insurance and those with no secondary insurance.

The first part of the analysis looks at service use in the aggregate, and focuses on a narrow issue relating to elderly military veterans' and military retirees' use of care. A recently published work suggested that prior research overstated the impact of secondary insurance by failing to account for services in veterans' administration (VA) and military facilities (Lemieux et al., 2008). That work found that secondary insurance was associated with a quite modest increase in Medicare spending, contrary to much of the prior literature on this topic.

Our results show that secondary insurance has a substantial impact on Medicare spending, consistent with the prior literature in this area. After removing beneficiaries with any VA use and adjusting for differences in health status, income, education, and demographics, individuals with Medigap coverage had Medicare costs 33 percent higher than those with no secondary insurance (Table ES-1). Other private secondary insurance was associated with smaller increases in spending. There was no statistically significant difference in Part A spending, but a large and statistically significant increase in Part B spending. Contrary to the results of Lemieux et al, the treatment of VA coverage made little difference in our estimates of the impact of secondary insurance.

Table ES-1: Regression-Adjusted Increase in Medicare Spending Associated With Secondary Insurance

Elderly Medicare Fee-for-Service Beneficiaries With No VA Use

	Total		**Part A**		**Part B**	
	Total spending	Stat. Signif.	Part A spending	Stat. Signif.	Part B spending	Stat. Signif.
Memo: Per Capita Spending for Those with Medicare Only	$4,015		$2,335		$1,680	
Percent increase associated with secondary insurance coverage:						
Employer sponsored	17%	*	9%		30%	***
Employer + Individual	25%	*	9%		48%	***
Individual Purchase	33%	***	18%		54%	***

Source: Analysis of MCBS 2003-2005 cost and use files, pooled.
Notes: * = p < .05, ** = p < .01, *** = p < .001

Essentially all of the additional spending by those with secondary insurance came from beneficiaries with first-dollar or nearly-first-dollar coverage. Within each secondary insurance type, we divided beneficiaries into those paying less than 5 percent of total Part B costs out-of-pocket, and those paying more than 5 percent. Those paying less then 5 percent of the total averaged 68 to 83 percent higher total Part B spending than the Medicare-only group. Those paying more than 5 percent, by contrast, averaged 0 to 23 percent higher spending relative to the Medicare-only group, a difference that was not statistically significant. This was formally confirmed via regression analysis: Adding a flag for near-first-dollar coverage to the regression explaining Part B spending reduced the flags for secondary insurance to statistical insignificance.
Stratified by income, the lack of secondary insurance had a modestly larger impact on poorer beneficiaries. Results were similar whether we used Medicare claims data (payment for Medicare-covered services only) or survey-reported payments from all sources (total payment for all hospital and physician events).

This research also looks at detailed service use data to determine what types of services are most strongly affected by secondary insurance. There is no single way to split Medicare spending and services into discrete categories, so the analysis looks at spending along various dimensions of service use.

Table ES-2 summarizes the services that appeared least and most affected by the presence of private secondary insurance. Out-of-pocket payment reduced spending largely by suppressing elective care (broadly defined) as opposed to emergency care. In particular:

- Emergency care (ambulance use, emergency room visits, emergency and urgent hospitalizations) appeared unaffected by the presence of secondary insurance.
- Elective admissions, preventive care, minor procedures and endoscopies were strongly affected by secondary insurance coverage, with substantially higher use among those with private secondary insurance.

Table ES-2: Largest and Smallest Medicare Spending Differences Between Those With No Supplemental Insurance and Private Supplemental Insurance		
Dimension	**Smallest Difference**	**Largest Difference**
All outpatient spending by category	Ambulance use, emergency visits, eye procedures (cataract surgery	Preventive services, minor procedures, endoscopy, Part B drugs
Physician spending by specialty	Primary care	Medical specialists
Inpatient admissions by type	Emergency admissions	Elective admissions
Physicians' service by place	Inpatient	Office
Decedents and those with diagnoses for the leading causes of death (cardiovascular, cancer, diabetes), non-decedents with none of these conditions.	Part A spending for decedents and persons with these illnesses	Part B spending for non-decedents with none of these conditions.
Notes: Includes aged fee-for-service beneficiaries with no use of Veterans' Administration services. Analysis included regression adjustments for health status, income, education, and demographics.		
Source: Analysis of 2003-2005 Medicare Current Beneficiary Survey Cost and Use files.		

It is not possible to use observational (non-experimental) data to prove *beyond a doubt* that a causal relationship exists between secondary insurance and spending. For several reasons, however, this analysis strongly suggests secondary insurance (reduced out-of-pocket costs) genuinely *causes* higher spending, and is not merely *associated with* secondary insurance due to some other factors affecting both insurance demand and health care use. The following factors suggest that this is a causal relationship. First, beneficiaries themselves report that out-of-pocket costs are a significant reason for delaying care. Nearly 20 percent of beneficiaries without secondary insurance reporting delaying care due to concerns over cost, versus 5 percent of beneficiaries with private secondary insurance. Thus, survey data provide direct evidence that out-of-pocket cost is a mechanism by which secondary insurance increases demand for care.

Second, there was a clear dose-response relationship between depth of insurance coverage and increased spending. Those with first-dollar or nearly first-dollar coverage had much higher spending than others, regardless of secondary insurance status.

Third, only the depth of coverage mattered, not the type of secondary insurance. When a flag for (nearly) first-dollar coverage was included in the regression, the individual types of secondary insurance were no longer statistically significant determinants of spending. Low out-of-pocket cost was a *sufficient* explanation for all of the observed increase in demand, regardless of the source of the secondary insurance.

This finding of a universal effect of first-dollar coverage regardless of insurance type weakens any alternative explanation based on the specifics of insurance ownership (described below). Ultimately, it did not matter whether beneficiaries chose to purchase coverage or not, or earned coverage as a retirement benefit or not. The only factor that mattered was whether or not their Part B care was free or nearly free. There are two

generic counter-arguments that can be used to explain the results of a regression analysis as something other than a causal relationship. The first is omitted variables bias. This is the possibility that some *unobserved* factors are strongly correlated with insurance and are strong determinants of spending. This could be some unobserved difference in health status, or merely a systematic difference in beneficiaries taste for or preference for health care use. If such factors exist, then the apparent relationship between insurance and spending shown by the regression is merely proxying for these unobserved factors. The second counter-argument is self-selection, for the types of insurance that are individually purchased. If beneficiaries bought secondary coverage in anticipation of having higher spending, then the causality runs from spending causing insurance coverage, and not the other way around.

Unobserved health status differences cannot plausibly explain these results. Any hypothesized health status differences would have to be highly selective and secretive. They would only affect the need for Part B services but not Part A, only require elective care but not emergency care, and would only affect those who have near-first-dollar coverage and not others. Such factors would also have to be undetectable both by physicians (reporting diagnoses used in risk adjustment) and by beneficiaries (in their own self-reported health and functional status). to be strongly correlated with ownership of secondary insurance. That combination is implausible enough that we can reasonably dismiss it from consideration.

Unobserved differences in taste and preference for health care are impossible to rule out as an alternative explanation of the results. It is possible that, on average, beneficiaries who ended up with nearly-complete secondary coverage, regardless of the source of that coverage, had developed a taste for higher levels of health care use prior to becoming eligible for Medicare. Whereas beneficiaries with the same class of coverage, but paying at least 5 percent of costs, did not. We could think of no obvious mechanism that would generate such a strong correlation across all types of secondary coverage. But tastes and preferences are idiosyncratic and unobservable, so there is no obvious data-driven way either to rule that out or to test it as an alternative.

Self-selection as an alternative hypothesis could only apply to individual purchase insurance, not to employer-sponsored coverage. If self-selection is offered as an alternative explanation, it has to be paired with some alternative explanation of higher costs for those with employer-sponsored coverage. Moreover, any self-selection of insurance based on *observable* factors – observed health status, income, education, or demographics – should largely be accounted for by the regression analysis. For example, any connection between good health and unwillingness to purchase secondary insurance should be captured by the presence of health status measures in the regression analysis.

Finally, we appeal to Occam's Razor to argue that the lack of copayment causes the higher spending by those with secondary insurance. On the one hand, one simple explanation – those who receive nearly free care use much more of it – provides a simple, universal explanation for the higher spending by beneficiaries with all types of private secondary insurance. On the other hand, alternative explanations are a hodgepodge of

factors that only apply to some types of insurance (self-selection) and unobservable taste and preference factors that (through some unexplained mechanism) apply only to a subset of persons with secondary insurance (those with near-first-dollar coverage). Clearly, lack of copayment is the simpler explanation of what we have observed.
In summary, the evidence is reasonably clear that secondary insurance raises Medicare costs. After eliminating persons with VA use and adjusting for covariates (health, income, education, demographics), beneficiaries with secondary insurance use much more health care than those who have no secondary insurance. The effect is due solely to those with near-first-dollar coverage (defined here as paying less than 5 percent of Part B costs). Beneficiaries without such coverage, by contrast, appear no different from those with no secondary insurance. The differential impact by service type – more on Part B than Part A, more on elective care than emergency care – also suggests that the out-of-pocket cost causes the lower use of care. When asked, beneficiaries themselves say exactly that – those without secondary insurance are far more likely to report having delayed care due to cost. Taken together, this provides a coherent picture that out-of-pocket costs matter significantly to Medicare beneficiaries, and that eliminating those costs raises health care spending.

This analysis does not address whether the increased spending is desirable or undesirable, or whether reduced spending leads to poorer outcomes. That question -- whether the value of additional care exceeds its cost – cannot be answered from the analysis of spending data alone, if it can be answered at all. Instead, this analysis merely shows that beneficiaries in fee-for-service Medicare will tend to use much more health care when each additional service is free (to them) than they would if they had to pay a significant portion of the cost of each additional service.

1 INTRODUCTION AND BACKGROUND

Most Medicare beneficiaries have some form of secondary insurance that pays part or all of the deductible and coinsurance liabilities incurred on Medicare-covered services. Excluding Medicare Advantage beneficiaries, 89 percent of non-institutionalized Medicare fee-for-service beneficiaries had some form of secondary coverage in 2005 (calculated from MedPAC 2008).

Both research and practice have long suggested that deductibles and coinsurance reduce the use of services. In particular, this was the conclusion of separate analyses by the Physician Payment Review Commission (PPRC) and Congressional Budget Office (CBO) staffs (PPRC 1997; Christensen and Shinogle, 1997). Using all (elderly and disabled) beneficiaries on the Medicare Current Beneficiary Survey, the PPRC estimated that costs for beneficiaries with no secondary insurance were 20 percent below the all-Medicare average, while costs for those with Medigap were 8 percent above average, after adjustment for health status and demographic differences (PPRC 1997). That works out to a 35 percent increase in Medicare spending associated with Medigap ownership compared to no secondary insurance, for all non-institutionalized Medicare beneficiaries combined. The CBO analysis, by contrast, used the National Health Interview Survey, and estimated significant differences in crude measures of service use that were associated with ownership of secondary insurance (Christensen and Shinogle,1997). Both analyses suggested that most of the difference in spending was for Part B services, not for hospitalizations.

This current research was undertaken at the request of the Medicare Payment Advisory Commission (MedPAC). There are two main tasks. First, we examine a recent re-analysis of this issue that showed a much smaller impact of secondary insurance on spending (Lemieux et al 2008). Second, we look more closely at which services appear most strongly affected by out-of-pocket spending, as well as whether the impact of insurance differs by beneficiary characteristics such as income and health status.

Section 2 of the paper examines the recent analysis suggesting that secondary insurance has a much smaller impact than had previously been estimated (Lemieux et al., 2008). A new set of MCBS-based estimates is presented that addresses the issues raised in the Lemieux et al. work and finds that secondary insurance has a large impact on Medicare beneficiaries' spending, consistent with the prior literature on this topic. The section ends with a brief critique of the Lemieux et al. results in light of this new set of estimates.

Section 3 of the paper looks in detail at differences in the mix of services used by those with no secondary insurance and with private secondary insurance.

2 Methods and Results for Aggregate Medicare Spending

This section of the paper begins with a discussion of methods and univariate tables showing spending and covariates of spending, tabulated by type of secondary insurance. The next section puts together regression analyses to explain variation in Medicare spending as a function of secondary insurance status and other factors likely to affect spending. The final section is an analysis of the Lemieux et al. results, including detailed background on VA and military retiree spending for the elderly.

2.1 Methods for this analysis.

This section outlines the methods in detail. In particular, we outline which segments of the Medicare population are included and excluded, and what types of statistical (regression) adjustments are made.

2.1.1 Sample and statistical tests.

The research pools three years of MCBS cost and use files (2003-2005). Unless noted otherwise, tables show the average annual experience over those three years. That is, we divided the MCBS cross-sectional survey weights by three before tabulating the data. Any statistical tests are based on SAS PROC SURVEYMEANS, but ignoring the fact that roughly half of the MCBS panel overlaps across the years. Thus, tests are corrected for MCBS design effects, but are not as conservative as they should be due to the overlap of the persons from year to year.[1]

2.1.2 Target population.

This analysis is restricted to Medicare beneficiaries on the MCBS who meet the following criteria, discussed below.

- Elderly (age 65 or older).
- Not institutionalized.
- Enrolled in the fee-for-service program (no Medicare Advantage enrollment for the year).
- Answering the MCBS questions on secondary insurance status.
- Enrolled in both Part A and Part B for every month enrolled.
- With and without evidence of VA-paid services during the year.
- We do not screen for military retirees.
- We do not screen for persons with Medicare secondary payer claims.

[1] The statistical issue with the panel overlaps is that the datapoints are no longer completely independent. If we have 10,000 person-years of observations in two years, we would only have about 7,500 persons in the sample. Statistically, the worst case would arise if beneficiaries had the exact same use and spending from year to year. In that case, the additional 2,500 person-years of data contribute no new information. If so, we would overstate the standard errors on the coefficient estimates by about 15% (1/(.75^.5)). The actual calculation – for three successive years of data, and accounting for the fact that an individual's data do change from year to year – would be far more complex. But the point remains that ignoring the effect of the panel overlap will understate the standard errors by a relatively modest amount.

Elderly: Restricting the analysis to the elderly has significant implications for the methods and findings. First, the disabled are less likely to have Medigap coverage and far more likely to have no secondary insurance of any type. If all beneficiaries are pooled, the disabled account for one-third of beneficiaries with no secondary insurance, but just 3 percent of beneficiaries with individual-purchase (Medigap) insurance (calculated from the 2003 – 2005 MCBS). This occurs in part through more limited opportunities for insurance purchase. While the elderly have a guaranteed open enrollment period in which to buy a Medigap policy upon entering Medicare, the disabled have a Medigap open enrollment period in just 22 states (CMS undated). Second, most prior studies, including the PPRC study, used all Medicare beneficiaries including the disabled. Thus, results from those studies had a large component attributable to the disabled. This analysis, by contrast, excludes the disabled in order to make it more comparable to the Lemieux et al. analysis. Results from this analysis will not be directly comparable to earlier studies.[2]

Non-institutionalized: MCBS does not obtain secondary insurance information (other than Medicaid) from institutionalized beneficiaries. These persons have to be excluded because their secondary insurance status is unknown. As a result of this, the sample will under-weight the oldest old relative to the entire Medicare population, and it may or may not show increasing average cost with age, as the most ill are selectively removed from this sample by this screen.

Fee-for-Service. Beneficiaries have to be enrolled in fee-for-service Medicare in order to generate the claims data used in the analysis.

Part A/Part B enrollees. Beneficiaries without Part A and Part B will generate artificially low Medicare spending, will have incomplete data for risk adjustment, and would not be eligible for some types of secondary insurance.

VA users. Presence of VA coverage was inferred by any reported VA spending on behalf of the beneficiary, using the service summary (SS) record on the MCBS file. This is not an ideal way to assess coverage. For example, this only counts individuals who used some care during the year, which might bias the results by selectively excluding only high-cost (high-service-use) beneficiaries. That is, all VA-eligible beneficiaries who use no care remain in the sample. This is, however, the only way in which use of VA services is reported on the MCBS. MCBS collects information on service-related disability, but there is no necessary connection between partial service-related disability and use of VA services. We flagged VA users based on any use of VA services, and separately based on any services other than prescription drugs. We separated out the drugs-only users because they account for a large portion of all VA users and drugs are largely irrelevant to the analysis of Part A/Part B costs.

[2] For example, the fraction of beneficiaries with Medicare only will be lower here than in other studies due to the exclusion of the disabled from the study. Health status of the Medicare-only population will also be higher, for the same reason.

To assess our measure, we benchmarked against VA data. The VA-Medicare Data Merge Initiative is the definitive source of information on VA use by Medicare beneficiaries. This project used social security number matching to merge VA and Medicare administrative data. Of persons alive on 1/1/1999, they found 2.1 million fee-for-service Medicare beneficiaries with VA eligibility. Of these, 64.5 percent used some VA health care (excluding pharmacy and long-term care) in 1999 (VIREC 2003).

The MCBS provides a near perfect match for the count of VA users, compared to the VA-Medicare matched data. Based on the matched data, we should expect to see 4.1 percent of elderly Medicare fee-for-service beneficiaries with some non-pharmacy VA use during the year. (There were roughly 33 million fee-for-service enrollees in 1999 (39 million enrollees, 84% fee-for-service, (Trustees' Report 2005). The VA-Medicare counts would amount to 4.1 percent of 1999 fee-for-service population.) In fact, VA users averaged 4.3 percent of our elderly non-institutionalized Medicare fee-for-service population, based on the pooled 2003-2005 MCBS. Both the administrative data and the survey data suggest that just over 4 percent of Medicare elderly fee-for-service beneficiaries have some non-pharmacy VA use during the year.

Several studies have captured the nature of typical VA use among Medicare beneficiaries. A 1994 study by the US GAO shows that beneficiaries used the VA primarily for prescription drugs, secondarily for outpatient care, and relatively rarely for inpatient care (GAO 1994). This appears reasonable, as the VA only operates 181 inpatient facilities (US VA, 2006).

The MCBS matches these benchmarks well. In addition to matching the overall acute-care VA user count, the MCBS shows roughly an additional 2 percent of Medicare elderly fee-for-service beneficiaries used the VA exclusively for pharmacy services. Thus, the VA served primarily as a pharmacy benefit and only secondarily as an acute care benefit, for Medicare-covered elderly.

No screen for military retirees. Lemieux et al. attempted to screen indirectly for military retirees' use of military facilities. To do so, they removed any person with three or more hospital days but less than $200 per day in Medicare hospital payments. After-the-fact, however, Lemieux et al. concluded that this screen had no additional impact after imposing the screen on VA users.

This screen was unnecessary. Military retirees can be directly identified from the MCBS data, and they are all classified as having employer-sponsored secondary insurance. The 2001 inception of Tricare for Life means that Tricare (the umbrella DOD health care plan) acts as secondary insurer for all elderly Medicare-eligible military retirees. The MCBS health insurance and charge/payment questionnaires specifically ask about Tricare coverage in several places. By cross-tabulating the plan-level survey responses and the insurance summary data, it is clear that MCBS classifies all elderly military retirees as having employer-sponsored health insurance. In this period, we found an average of 1.65 million elderly beneficiaries annually with some self-reported Tricare coverage. This compares reasonably well to the roughly 1.4 million military retirees, dependents, and

survivors whom the US DOD counts as being over the age of 65 and presumably eligible for Medicare (Tricare 2001). These individuals account for roughly 12 percent of all persons whom the MCBS counts as having employer-sponsored health insurance.

The MCBS appears to identify roughly the correct number of military retirees. Military retirees would therefore fall into the Medicare-only group only by mistake. If use of military facilities had any effect, therefore, it would reduce the apparent cost difference between those with and without secondary insurance.

Although military facility use might bias the results downward, I chose not to use this screen because the likelihood of significant use of military facilities for acute care was remote. As with the VA, elderly military retirees use military facilities largely as a prescription drug benefit, and only to a very small degree as an acute care benefit. The US Department of Defense spent roughly $1.3B in 2006 for Medicare-eligible retirees' and dependents' care in military facilities, but almost all of that was for outpatient prescription drugs (DOD 2006). The prescription drug use would not affect measured Medicare acute-care spending. This seems a sensible result, as Medicare-eligible elderly military retirees may seek care in military treatment facilities only on a space-available basis (Tricare undated). Further, they have guaranteed complete insurance coverage in any Medicare-certified facility, and thus have no financial incentive to use a military facility.

No screen for Medicare secondary payer. We flagged persons with any claim showing primary payer amounts (i.e., where Medicare was secondary payer). From the physician file, we found about 2 percent of elderly beneficiaries had some claim during the year with some primary payer other than Medicare. These were fairly evenly divided across insurance classes, however, so we did not screen out beneficiaries with Medicare secondary payer claims.

No screen for end-stage renal disease. We considered dropping all ESRD beneficiaries due to their high average costs and to the limitations on some of their enrollment options. Under 0.5 percent of persons in our final sample were ESRD, and these were distributed fairly evenly across the insurance categories. We did not drop ESRD beneficiaries.

No screen for MCBS "ghosts". MCBS "ghosts" are individuals who are new enrollees during the survey period, which spans the year prior to and the year of the nominal year of the MCBS file. Generally, they have complete Medicare claims data, but some survey-reported cost data will be imputed, and some survey data may be missing depending on when they enrolled (HCFA 1994). Because the focus here is on Medicare spending, it seemed reasonable to keep the ghosts in the sample. Over this period, ghosts accounted for roughly 11 percent of the file but were fairly evenly distributed across the insurance categories.

2.1.3 Secondary insurance status.

Medicare fee-for-service beneficiaries are typically placed into just a few secondary insurance categories, including:

- None (Medicare only)
- Medicaid
- Employer-sponsored coverage
- Individual purchase (Medigap) coverage
- Both employer-sponsored and individual purchase coverage.
- Other public insurance.
- Unknown

Health insurance coverage may change over the course of a year. Placing individuals into these discrete supplementary insurance categories therefore requires some judgment regarding individuals who change coverage status during the year.

For this analysis, we are interested in the contrast between those with no supplementary insurance and those with employer-sponsored or individual purchase supplementary insurance. (Medicaid and other public insurance are not of interest because the Medicaid population contains a large "spend down" component: Individuals who have Medicaid coverage precisely because they are ill or institutionalized.)

We tried two reasonable rules for assignment of beneficiaries to categories. First, we took a simple approach to assigning individuals, using the annual summary flags provided on the MCBS. These flags show the presence of any coverage by Medicaid, private employer-sponsored coverage, private individual-purchase coverage, HMO coverage, and other coverage. After excluding beneficiaries with any Medicare managed care enrollment, we made the following assignments, done in the order listed:

- Medicaid and other: Any Medicaid or other coverage during the year.[3]
- Employer-sponsored: Any employer sponsored (with no individual purchase).[4]
- Individual purchase: Any individual purchase (but no employer sponsored).
- Both employer plus individual: Both employer sponsored and individual purchase.
- Medicare only: No evidence of any secondary coverage during the year.

Others, including MedPAC staff, have made the assignment based on the plurality of months of coverage, literally counting the months of coverage and assigning each beneficiary to the category with the greatest number of months (Dan Zabinski, personal communication, 2002). Compared to my simple approach, the MedPAC method increases the number of elderly "Medicare only" beneficiaries by about 20 percent, and

[3] Following the approach used by MedPAC staff, self-reported Medicaid coverage was counted as Medicaid even if CMS administrative data did not show Medicaid coverage. This also includes a handful of beneficiaries with self-reported Medicare HMO coverage but no administrative record of Medicare Advantage enrollment. The Medicare administrative data capture traditional Medicaid as well as qualified Medicare beneficiary (QMB) and specified low income Medicare beneficiary (SLMB) enrollees.

[4] Following the approach used by MedPAC staff, private HMO secondary insurance was combined with employer-sponsored coverage.

raises the average Medicare spending for the "Medicare only" group by about 7 percent. That occurs due to inclusion of persons with a few months of secondary coverage during the year.

Although the simpler method provided a "purer" Medicare-only group (they never had any insurance during the year), the MedPAC approach will provide a more conservative (smaller) estimate of the impact of secondary insurance on spending. It would also seem to be closer to the research standard for making this assignment. For this analysis, I adopted the MedPAC methodology for assigning beneficiaries' secondary insurance status.

2.1.4 Measures of spending.

The aggregate analysis uses two separate measures of health care spending. First, we use Medicare payments under Part A and Part B (separately and combined). This measure is based on Medicare claims, and is subject to the critique that it will not capture total costs when other payers substitute for Medicare. Second, we also use the survey-reported total spending for Medicare-type services (all services other than drugs and institutionalization). On a dollar-weighted basis, this is roughly the same basket of services covered by Medicare, but includes all payments for all services. This payment measure is not subject to the criticism that it may understate costs for persons substituting non-Medicare payment sources for Medicare payment, and serves as a check on the Medicare claims-based measure.

2.1.5 Health status and other covariates.

Health status. Health status and risk were measured several ways. First, the Hierarchical Condition Category (HCC) model was calculated from the MCBS claims data. We followed the most recent CMS guidance for including and excluding claims, and only included hospital inpatient, hospital outpatient, and physician claims that were not for imaging and tests.

Several factors make the HCC risk adjuster a methodological problem. First, the HCC model is a problem in this context because it is a prospective model. Running it properly requires using prior-year diagnoses to predict current-year spending. But that would mean merging successive years of MCBS data, losing roughly half the sample with each merge and generating a non-representative sub-sample of beneficiaries (those that were in both of two successive years). Further, the published HCC model is calibrated for total Medicare spending, and the scores are not meant to be used to predict Part A and Part B separately. We can resolve both of these in a technical sense by entering the individual HCC disease categories as predicting variables and, in effect, calibrate a concurrent HCC model separately in each regression.

Second, the inclusion of a concurrent HCC risk score is an issue because of potential endogeneity with respect to health care use. Is the low HCC score for the Medicare-only population endogenously determined by the low service use? The HCC model can be

thought of as taking censored, conditional data as the input. The data are censored because no information is known for the population that has no health system contacts during the year.[5] In this case, roughly 20 percent of the Medicare-only population has no (missing) diagnosis data for the HCC model, versus about 5 percent for the population with supplementary insurance. Ideally, you would like to know the medical conditions of the entire population, not just the population with health system use during the year. The data are conditional because they show the average cost of treatment in a year, conditional on the beneficiary receiving some care for that condition during the year. Ideally, you would want that to be conditional on the beneficiary having the condition, not on the beneficiary getting treated. Both of these aspects of the concurrent HCC model raise the question of whether or not the HCC score reflects only differences in health status, or is partially contaminated by (is endogenously determined by) patterns of service use. In other words, a population might get a low HCC score because it is healthy, but might also get a low(er) score because the probability of treatment, conditional on the presence of disease, is lower (e.g., the population is underserved or faces barriers to access).

This is a difficult call. If we restrict the analysis to persons with some health system contact, the roughly 20 percent difference in HCC scores shown in Table 3 shrinks to a roughly 10 percent difference. So, persons with no health system use explain part, but not all, of the difference in HCC scores. On the other hand, all other indicators of risk, including risk of mortality, suggest that the Medicare-only population is no healthier than, and probably in worse health than the population with secondary insurance.

On net, including the HCC risk score should give us a more conservative estimate of the impact of secondary insurance. That is, our risk here is that we may (mistakenly) attribute part of the lower health care use of the Medicare-only population to their better health status. When in fact, the causality may be reversed (the low concurrent HCC score reflects in part their lower propensity to seek treatment conditional on having a disease). So, to the degree that it over- or mis-states the good health of the Medicare-only population, it will "explain" their low spending, and result in attributing a smaller portion of the spending differential solely to the effects of insurance coverage. Including the concurrent HCC therefore should result in a conservative test of the impact of insurance. If anything, we should understate the true impact.

A second risk adjuster is self-reported general health status (from Excellent to Poor), which has been shown to be a very good risk adjuster in many different contexts. In particular, the strong association between income and self-reported health status required inclusion of this variable in the regressions in order to get "sensible" income effects in the regression (i.e., all other things equal, beneficiaries with higher income should consume more health care).

[5] The same criticism was applied to CMS's prior risk adjustment system that was based solely on inpatient data. That is, the diagnosis data were censored (missing) for about 80 percent of the Medicare population. The HCC model was preferred because the censoring issue was much smaller, not because the censoring issue was eliminated. In this context, we have a differential degree of censoring across the insurance categories.

Additional risk adjusters included a count of Activities of Daily Living (ADL) limitations, and a flag for whether or not the beneficiary was still employed, and a flag for death during the year. The ADL count tends to capture the frail elderly who have more acute care problems. The employment flag (based on MCBS interview) should capture a healthier-than-average segment of the beneficiary population. The flag for decedents captures a segment known to have high average costs.

Income: Income was based on MCBS reported income. This was divided by two where the subject person was married, as suggested by the MCBS documentation.

Age, race, other information: Regressions also include information age, sex, race and other demographic characteristics, including highest educational level attained.

No location information other than urban/rural: Given the regionalized nature of Medigap insurance, we were worried that (e.g.) average price per service would not be the same across all insurance segments. If this were true, the spending data would reflect both differences in service use and differences in prices. To test this, we matched the CMS physician fee schedule GPCIs to the MCBS data by ZIP code, and took averages by secondary insurance type. The GPCIs differed by less than one percent across insurance segments. We concluded that there was no need to address the issue of price differentials in the data via geographic adjustment.[6]

2.2 Descriptive Statistics

2.2.1 Decomposition of the Medicare population and initial analysis of costs.

The first task is to show how we got from the entire MCBS sample to the population in the analysis. Table 1 shows the population counts in a "nested" fashion, showing how many beneficiaries are dropped for each screen. In all, about one third of the Medicare population is excluded by these restrictions.

[6] We also looked directly at the urban/rural mix of beneficiaries by insurance status. For those remaining in the sample, MCBS showed 73 percent in urban areas. For Medicare only the figure was 67 percent, for Medigap purchasers it was 68 percent. Even if there were substantial average urban/rural price differences, these relatively small differences in urbanicity would result in only small differences in average price level.

Table 1: Persons Dropped from the Analysis		
	Average Annual Weighted Number of Persons	Percent
All Observations	42,847,931	100.0%
1:Institutionalized	2,612,945	6.1%
2:Some Medicare Advantage enrollment	5,657,626	13.2%
3:Unknown Secondary Insurance	32,326	0.1%
4:Some A-only or B-only enrollment	2,695,735	6.3%
5:Under age 65	4,989,268	11.6%
Remaining in the analysis	26,860,031	62.7%
Source: Analysis of MCBS 2003-2005 Cost and Use files, pooled		

Table 2 shows the remaining beneficiaries by insurance status, separating those with VA coverage from the remainder of beneficiaries. The Medicare spending is so labeled, and is based on claims data. All-Payer spending is MCBS survey data, summarizing all payment from all sources (including out-of-pocket) for hospital inpatient, hospital outpatient, and physician/practitioner spending. For clarity, the Medicaid population is omitted from the table.

Because Table 2 captures the gist of the analysis, it is worthwhile to spend some time examining it in detail. The top sets of lines on Table 2 provide the mean spending data. We will discuss the bottom two sections of the table which show VA-using population in isolation and show the impact of removing the VA-using population.

First, Lemieux et al. were correct in stating that beneficiaries with no secondary insurance were more likely to be VA users. VA users (for any type of services, including use for outpatient prescription drug only) amounted to 14 percent of those with no reported supplemental insurance, but just a few percent of the other categories (Table 2, last set of data lines).

Second, the inclusion or exclusion of the VA users makes little difference in the average Medicare spending (Table 2, next-to-last set of lines). Removing the VA beneficiaries raised total Medicare per-capita total spending by about 3 percent for the Medicare-only population, and by one percent or less for the other populations.

Third, the small effect of the VA beneficiaries is true both because they are a relatively small fraction of the population, and because the VA users still spend significant amounts of Medicare dollars. On average, the VA users tend to have higher total (all-payer) spending, and lower Medicare only spending. Thus, the VA dollars are not simply a substitute for Medicare. Instead, they both raise the spending total and substitute for Medicare. In particular, for the Medicare-only population, total Medicare spending for VA users was 78 percent of the average. Consistent with the literature on VA use, most

of that effect was on Part B (outpatient) use, not on inpatient use (Table 2, last set of data line).

Finally, the Memo line mid-table shows the increased spending associated with secondary insurance, after removal of all beneficiaries with VA use (Table 2, single "memo" line). These numbers show that Medicare spending is much higher for those with secondary insurance that it is for the Medicare-only population. The univariate tabulation does not account for other factors such as income and health status. Even without that, the differences are so large that this effectively foreshadows the final analysis. Even after removing those with VA use, secondary insurance is associated with significantly higher Medicare spending.[7],[8]

[7] Modifying the insurance and VA definitions did not materially change the results. This analysis takes any VA use, including the roughly one-third of VA users who only used the VA for outpatient prescription drugs. It also uses the MedPAC insurance definitions based on the plurality of months of coverage during the year. We re-ran the analysis restricting this to non-drug VA users, or changing the definitions so that Medicare-only meant zero insurance months during the year. The quantities changed somewhat but the overall picture of much higher Medicare spending by those with private secondary insurance was unchanged.

[8] Finally, the data shown here may be different from other studies that use all beneficiaries, not just the elderly. The disabled are strongly concentrated among those with no secondary insurance. If the results were re-run including the disabled, the 51 percent increase in Medicare spending (Table 2, Memo line), would fall to a 33 percent increase.

Table 2: Beneficiaries and Average Costs by Secondary Insurance and VA Use							
					Medicare Spending		
	Secondary Insurance	MCBS Obs. (2003-5)	Estimated US Bene's. (Millions)	All Payer Spending IP,OPD, PHY	Total	Part A	Part B
All Eligible Beneficiaries							
	Medicare Only	1,818	2.27	$ 4,774	$ 3,841	$ 2,289	$ 1,553
	All Private Secondary Ins.	17,535	21.40	$ 7,851	$ 6,120	$ 3,029	$ 3,091
	Employer Sponsored	8,959	11.19	$ 7,960	$ 5,980	$ 3,008	$ 2,971
	Employer + Individual	1,453	1.83	$ 7,238	$ 5,524	$ 2,528	$ 2,997
	Individual purchase	7,123	8.38	$ 7,839	$ 6,437	$ 3,165	$ 3,271
Beneficiaries With NO VA Use							
	Medicare Only	1,550	1.95	$ 4,649	$ 3,975	$ 2,313	$ 1,662
	All Private Secondary Ins.	16,947	20.71	$ 7,810	$ 6,131	$ 3,041	$ 3,091
	Employer Sponsored	8,734	10.92	$ 7,920	$ 5,975	$ 3,002	$ 2,974
	Employer + Individual	1,416	1.79	$ 7,227	$ 5,563	$ 2,548	$ 3,015
	Individual purchase	6,797	8.01	$ 7,791	$ 6,471	$ 3,204	$ 3,267
Memo: Percent Increase, All Private Secondary Ins. Over Medicare Only, NO VA Use							
				68%	54%	31%	86%
Beneficiaries with ANY VA use							
	Medicare Only	268	0.31	$ 5,552	$ 3,014	$ 2,139	$ 875
	All Private Secondary Ins.	588	0.69	$ 9,075	$ 5,772	$ 2,666	$ 3,106
	Employer Sponsored	225	0.27	$ 9,587	$ 6,155	$ 3,270	$ 2,885
	Employer + Individual	37	0.04	$ 7,688	$ 3,962	$ 1,718	$ 2,244
	Individual purchase	326	0.38	$ 8,867	$ 5,705	$ 2,338	$ 3,367
Memo: Change Due To Removal of Beneficiaries With VA Use							
	Medicare Only			-3%	3%	1%	7%
	All Private Secondary Ins.			-1%	0%	0%	0%
	Employer Sponsored			-1%	0%	0%	0%
	Employer + Individual			0%	1%	1%	1%
	Individual purchase			-1%	1%	1%	0%
Memo: VA as Percent of All							
	Medicare Only		14%	116%	78%	93%	56%
	All Private Secondary Ins.		3%	116%	94%	88%	100%
	Employer Sponsored		2%	120%	103%	109%	97%
	Employer + Individual		2%	106%	72%	68%	75%
	Individual purchase		4%	113%	89%	74%	103%
Source: Analysis of MCBS 2003-2005 files							
Note: Beneficiaries with Medicaid and other coverage not shown.							

In short, the simple tabulation of the data without risk adjustment plainly shows two facts.

- **The Medicare-only population has a high concentration of VA users.**
- **This does not materially affect the differences in Medicare costs between those with and without secondary insurance.**

Individuals with secondary insurance have much higher average Medicare costs than those without, measured either by excluding the VA users, or by including all costs for all persons.

Table 3 shows the demographics, income, and health status factors for the various populations, as a way of preparing for the regression analysis in the next section. In general, compared to those with secondary insurance, beneficiaries with Medicare-only coverage:

- Had much higher out-of-pocket costs as a percent of spending, for Medicare-covered Part B services. Based on the survey data, they paid just under 30% of the total cost of those services, compared to around 8 percent for those with private secondary coverage.[9]
- Were far more likely to have no Medicare Part B services during the year. One in five of those with no supplemental insurance had zero Part B spending.
- Had modestly lower Part A spending, and had Part B that was roughly half the level of those with supplemental insurance.
- More likely to be male, single, and non-white.
- Possibly somewhat less healthy, based on self-reported general health status, but with no more limitations on activities of daily living than those with supplemental insurance.
- Much healthier, based on the HCC risk score.[10]
- Were significantly more likely to die during the year, with roughly 50 percent excess mortality compared to those with secondary insurance. There are several methodological caveats, and this finding may be an artifact of screening institutionalized from the sample.[11]

[9] One might expect a figure closer to 20 percent for the Medicare-only population. The main reason that this appears as 30 percent is that the (then) $100 deductible raises the out-of-pocket percent, and that this is an average of the out-of-pocket percent calculated for each beneficiary. The large number of beneficiaries with low spending (and hence very high out-of-pocket percent due to the deductible) raises this average. In other words, this is not the fraction of the average dollar paid out-of-pocket, but instead shows what fraction the average beneficiary paid out-of-pocket.

[10] This is not surprising given that 20 percent of the population had no services and hence no diagnosis information for the HCC model. The roughly 20 percent difference in HCC score shown here narrowed to a roughly 10 percent difference if the persons with no service use were excluded. Either way, the HCC scores show that the Medicare-only population was treated for a much narrower array of diseases, on average, than the population with secondary insurance.

[11] The mortality data seem inconsistent with the other findings. We considered two ways in which this might be an artifact of the methods. First, we were worried that persons who died early in the survey cycle might disproportionately be classified as having no secondary insurance, if next-of-kin might have poor recall for actual secondary insurance status. But we found higher mortality in both halves of the year,

- Had lower incomes and were more likely still to be working. About 43 percent had incomes under $10,000, versus 16 percent of those with secondary insurance.

The survey-reported coinsurance data (for Medicare-covered Part B services) shows that those with individual-purchase Medigap plans had the most generous coverage. If we focus on those paying the least (less than 5 percent of spending paid out-of-pocket), more than 60 percent of those with Medigap fell into the most generous coverage category, compared to about half of those with the other types of private insurance. For the Medicare-only population, the corresponding figure was less than 3 percent.

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suggesting that missing direct survey data was not generating this result. Second, this result may be an artifact of the screen for institutionalized. Lower incomes for the Medicare-only population may translate into less money available for assisted living and other smooth transitions to institutional status prior to death. In other words, more of the population with secondary insurance may die in nursing homes (and be excluded here), resulting in more "missing" deaths for those with secondary insurance than for those without. We could think of no direct way to test for that, given the limits of the MCBS data.

Table 3: Health Status, Spending, and Risk Factors, by Supplemental Insurance Status																
Elderly Medicare Fee-for-Service Beneficiaries With No VA Use, 2003-2005 Pooled																
		Medicare Only			Any Private Supplemental			Employer Sponsored			Employer + Individual			Individual Purchase		
	Observations	1,493			16,366			8,518			1,374			6,474		
	Est. Persons	1,882,653			20,035,447			10,644,398			1,742,181			7,648,869		
Survey-Reported Out-of-Pocket on Part B Services																
	Average out-of-pocket %	29.7%			7.7%	*		8.2%	*		8.4%	*		6.7%	*	
	'At least 20%	60.9%			8.2%	*		8.6%	*		9.4%	*		7.4%	*	
	'10-20%	17.6%			13.3%	*		15.2%	*		16.6%	*		9.7%	*	
	'5-10%	1.8%			19.5%	*		21.6%	*		20.3%	*		16.5%	*	
	'0-5%	2.8%			55.3%	*		49.9%	*		52.2%	*		63.5%	*	
	'No survey Part B reptd.	16.9%			3.7%	*		4.7%	*		1.5%	*		2.8%	*	
Spending																
	Part A reimbursement	$2,335			$3,000			$2,976			$2,495			$3,149	*	
	Part B reimbursement	$1,680			$3,064	*		$2,959	*		$3,019	*		$3,220	*	
	Had zero Part A spending	85.4%			80.3%	*		80.5%	*		84.6%	*		79.1%	*	
	Had Zero Part B spending	19.9%			5.1%	*		6.2%	*		2.8%	*		4.1%	*	
	Has zero survey phy/opd $	13.1%			2.3%	*		2.7%	*		0.5%	*		2.1%	*	
Demographics																
	Age	73.9			75.3	*		74.7	*		74.8			76.3	*	
	Male	47.8%			40.1%	*		44.6%	*		42.5%	*		33.3%	*	
	Married	43.9%			59.8%	*		63.7%	*		64.0%	*		53.4%	*	
	Race_White	77.3%			92.5%	*		90.8%	*		93.5%	*		94.7%	*	
	Race_African_American	16.9%			5.0%	*		6.4%	*		4.0%	*		3.2%	*	
	Race_All_Other	5.9%			2.6%	*		2.9%	*		2.6%	*		2.1%	*	
Education																
	High_School_Dropout	45.5%			20.7%	*		19.2%	*		8.2%	*		25.6%	*	
	High_School_Graduate	41.8%			56.0%	*		56.1%	*		53.8%	*		56.4%	*	
	College_Graduate	12.1%			23.0%	*		24.3%	*		37.9%	*		17.8%	*	
Health Status Indicators																
	Service Related Disability	0.9%			1.7%			2.1%	*		2.5%			0.9%		
	Avg. ADL limitations	0.51			0.53			0.52			0.35	*		0.57		
	Health excellent/very good	49.7%			49.1%			48.1%			58.5%	*		48.3%		
	Health fair or poor	20.9%			18.0%	*		18.3%	*		12.3%	*		18.8%	*	
	HCC risk score	0.917			1.091	*		1.098	*		1.010			1.100	*	
	Died during year	4.4%			3.1%	*		2.9%	*		2.2%	*		3.6%	*	
	Died, first half of year	2.5%			1.7%	*		1.7%	*		1.3%	*		1.8%	*	
	Died, second half of year	1.9%			1.4%	*		1.2%	*		0.9%	*		1.8%		
Income																
	Currently_Working	17.4%			12.8%	*		12.8%	*		12.1%	*		13.0%	*	
	Income per Adult	$14,711			$22,676	*		$23,450	*		$28,981	*		$20,163	*	
	<$5K	9.6%			3.1%	*		2.7%	*		1.8%	*		3.9%	*	
	$5K-$10K	32.9%			12.6%	*		9.9%	*		4.9%	*		18.0%	*	
	$10K-$20K	41.9%			41.2%			41.3%			29.0%	*		43.9%		
	$20K-$40K	12.7%			32.6%	*		35.2%	*		47.4%	*		25.5%	*	
	>$40K	2.8%			10.5%	*		10.8%	*		16.9%	*		8.7%	*	
Source: MCBS 2003-2005 Pooled. "*" indicates p < .05, adjusted for MCBS design effects.																

In short, the population without supplemental insurance (after eliminating those with any VA use) is quite different from the population with supplemental insurance. On average, they are poorer, less well-educated, more likely to be minorities, and more likely to be single. Their self-reported health status is only modestly different from those with secondary insurance, but they are substantially more likely to have no physician or outpatient services during the year. They are also substantially more likely to die during the year, although, as noted above, that higher observed mortality rate may be an artifact of the elimination of institutionalized beneficiaries from the sample.

2.2.2 A Further Look at Excess Mortality in the Medicare-Only Population.

For two reasons, the apparent excess mortality in the Medicare-only population requires further investigation. First, the mortality differential is substantial. The Medicare-only population has an average annual mortality rate that is one-third to one-half larger than the populations with private secondary coverage. The combination of much lower spending and much higher apparent mortality raises a possible concern about the quality of care for this population. Second, the finding of a substantial excess mortality is at odds with the other health status data. On all other measures, the health status of the Medicare-only population appears at least as good as that of the other populations.

First, we estimated the mortality rate differences separately by year, as a way to check the robustness of the results. There is statistically significant excess mortality only in 2003. For 2004 and 2005 pooled, there is no excess mortality. Thus, the results are not consistent across years, but instead are the result of the 2003 mortality experience.

Second, we used logistic regression to demonstrate that the excess mortality was not explained by differences in demographics and other factors. We regressed death on age, sex, race, health status, disability, income, and education measures. These factors did not explain the excess mortality. After regression-based adjustment, beneficiaries with private secondary insurance were about two-thirds as likely as the Medicare-only beneficiaries to die during the year.

Third, we guessed that the excess mortality might have been an artifact of the survey methods. If next-of-kin or other proxy interviewees had poor recall for actual secondary insurance status, then persons who died early in the survey cycle might disproportionately be classified as having no secondary insurance. But we found higher mortality for the Medicare-only population in both halves of the year, suggesting that missing direct survey data was not generating this result.

Fourth, we considered (but could not directly test) that the excess mortality might be an artifact of removing the institutionalized from this analysis. Lower incomes for the Medicare-only population may result in less money available for assisted living and other smooth transitions into institutional status prior to death. In other words, a larger fraction of those with higher incomes may die in assisted living facilities and nursing homes (and thus would be excluded here as “institutionalized”), resulting in more “missing” deaths

for those with secondary insurance than for those without. We could think of no direct way to test for that, given the limits of the MCBS data.

Instead, we looked for indirect evidence of this effect by examining deaths by age, site, and presence of dementia. If the excess Medicare-only decedents were persons who would have been institutionalized in a wealthier population, we would expect them to be older, more likely to have dementia, and more likely to die at home. In fact, compared to the population with private secondary insurance, we found no statistically significant differences, and found that the Medicare-only population was:

- slightly younger at time of death (79.8 versus 80.3 years);
- slightly more likely to have some dementia diagnosis (12 percent versus 11 percent);
- slightly more likely to die "at home", that is, not enrolled in hospice and not in an acute-care (hospital or SNF) setting (31 percent versus 26 percent).

None of this provided any strong evidence to suggest that the higher death rate of the Medicare-only population was an artifact of removal of the institutionalized from the analysis.

Fifth, we found that the slightly lower average age of the entire Medicare-only population was numerically consistent with the observed difference in mortality. If the excess mortality reflected the actual experience of those populations (instead of being an artifact of methods), the difference in average age should be consistent with the difference in mortality rate. We started from the Centers for Disease Control US life tables.[12] We calculated the average age of persons age 65 and older based on the CDC's estimated annual mortality at each age. We then increased the mortality rate in each year by 42 percent (to mimic the observed excess mortality of the Medicare-only population) and re-calculated mean age. The result was a 1.5 year drop in the average age of the elderly population. Thus, the observed 1.4 year age difference between the Medicare-only and private secondary insurance populations seems consistent with the observed mortality difference.

In summary, the importance of this finding comes down to a judgment. On the one hand, the finding of excess mortality is based on a single year's experience, and is inconsistent with the other measures of population health status. On the other hand, it is not explained by demographic or other factors, and it is not obviously an artifact of the methodology used. Finally, excess mortality would be a reasonable outcome from deficiencies of care, for example, from the lack of preventive care for this population.

On net, we believe that the mortality finding is not strong, given the limits of the MCBS. It is not consistent across years, it is not consistent with the other health status measures, and it depends on fewer than 100 deaths in the Medicare-only population. Given the seriousness of the conclusions that would be drawn from the excess mortality finding, we believe that more evidence should be gathered to investigate this further. This could be done either by pooling far more years of MCBS data, or by using some alternative data that would allow for a more individuals to be observed over a longer period of time.

[12] http://www.cdc.gov/nchs/products/pubs/pubd/lftbls/decenn/1999-2001.htm

2.3 Regression Analysis

This section uses regression analysis to get a more complete estimate of the effect of insurance on spending. The univariate tables above show that many factors that may strongly affect health care use are also correlated with secondary insurance coverage. Failing to account for these factors may give a misleading impression of the effect of insurance on spending.

The regressions therefore include all of the demographic, education, health status, and income variables from the prior table. Results are only shown for the key health insurance variables. In each case, the Medicare-only population is the omitted population, and the regression coefficients show each secondary insurance population relative to the Medicare-only population.

Table 4 shows the estimated impact of insurance on spending. The omitted (reference) group is individuals with no supplemental insurance. The full regression results are not shown. Each regression included all of the demographic and health status factors. The individual HCC diagnosis categories were entered (but are not shown on the table). All individuals with any VA service use during the year have been omitted. The results show a strong impact of insurance on Part B spending, and essentially no impact on Part A spending. This is the same finding that most of the literature has shown.

Table 4: Regression Analysis of Medicare Spending and Secondary Insurance										
Elderly Medicare Fee-for-Service Beneficiaries Excluding Any With VA Use										
		Total			**Part A**			**Part B**		
		Coeff	t	p	Coeff	t	p	Coeff	t	p
	Intercept	$1,257	1.1		$437	0.5		$819	1.8	
Secondary Insurance (Reference category = Medicare Only)										
	Employer sponsored	$698	2.4	*	$202	0.8		$496	5.2	***
	Employer + Indiv.	$1,018	2.6	*	$205	0.6		$813	4.3	***
	Individual Purchase	$1,343	4.7	***	$428	1.9		$915	8.9	***
	Medicaid	$1,330	3.3	**	$193	0.6		$1,137	6.6	***
Other Covariates Other Than HCCs										
	Age	-$27	-2.0	*	-$19	-1.7		-$8	-1.6	
	Male	-$324	-2.0	*	-$227	-1.9		-$97	-1.1	
	Married	$261	1.5		$23	0.2		$238	2.6	*
	African American	$497	1.4		$567	2.0	*	-$69	-0.5	
	All Other Races	$388	0.8		$500	1.3		-$112	-0.6	
	High School Graduate	$299	1.4		$166	1.0		$133	1.4	
	College Graduate	$708	2.4	*	$351	1.6		$357	2.9	**
	Service Disability	$959	1.1		$623	0.9		$336	1.1	
	Count of ADLs	$824	6.9	***	$562	6.0	***	$261	5.7	***
	Health excellent vgood	-$736	-4.9	***	-$186	-1.6		-$549	-7.9	***
	Health fair poor	$1,607	5.3	***	$759	3.3	**	$848	6.4	***
	Currently working	-$768	-4.5	***	-$354	-2.8	**	-$414	-4.9	***
	Income $5K-$10K	$755	2.0	*	$553	1.9		$202	1.1	
	Income $10K-$20K	$997	3.0	**	$685	2.5	*	$312	1.9	
	Income $20K-$40K	$1,144	3.1	**	$707	2.4	*	$437	2.7	**
	Income >$40K	$1,096	2.7	**	$588	1.9		$509	2.6	**
	died	$9,676	8.8	***	$8,902	10.0	***	$774	2.3	*
	Memo: R-squared	0.39			0.32			0.35		
	Note: Regressions also included dummy variables for HCC disease categories. * = p < .05, ** = p < .01, *** = p < .001.									

Table 5 expresses the estimated effect of secondary insurance as a percent of spending for persons with no secondary insurance. After adjustment for the factors shown above, Medicare outlays for those with individual-purchase secondary insurance are about 33 percent higher than outlays for those with no secondary insurance. There is no statistically significant impact on Part A spending, but there is a large and statistically significant impact on Part B spending. This analysis, focusing on elderly non-VA-eligible beneficiaries, gives results that are roughly similar to the prior PPRC analysis.

Table 5: Regression-Adjusted Increase in Medicare Spending Associated With Secondary Insurance						
Elderly Medicare Fee-for-Service Beneficiaries With No VA Use, 2003-2005 Pooled						
	Total		**Part A**		**Part B**	
	Total spending	p	Part A spending	p	Part B spending	p
Memo: Per Capital Spending for Those with Medicare Only	$4,015		$2,335		$1,680	
Percent increase associated with secondary insurance coverage:						
Employer sponsored	17%	*	9%		30%	***
Employer + Individual	25%	*	9%		48%	***
Individual Purchase	33%	***	18%		54%	***
Source: Analysis of MCBS 2003-2005 cost and use files, pooled.						

Although the sample size in any year is small, the results are reasonably consistent when run separately by year (Table 5A). Part B spending is always statistically significantly higher for the populations with private secondary insurance. Total spending is statistically significantly higher in 2004 and 2005, but not when 2003 is run in isolation.

Table 5A: Regression-Adjusted Increase in Medicare Spending Associated With Secondary Insurance, by Year					
Elderly Medicare Fee-for-Service Beneficiaries With No VA Use, 2003-2005 Pooled					
2003		Total Spending	P value	Part B Spending	P Value
	Memo: Spending, Medicare Only	$4,857.92		$1,730.97	
	Employer sponsored	3%		26%	**
	Employer + Individual	14%		41%	**
	Individual Purchase	6%		30%	***
2004					
	Memo: Spending, Medicare Only	$3,225.92		$1,522.52	
	Employer sponsored	25%	*	22%	*
	Employer + Individual	40%	*	51%	**
	Individual Purchase	37%	***	46%	***
2005		$3,938.25		$1,730.97	
	Memo: Spending, Medicare Only				
	Employer sponsored	32%	***	40%	***
	Employer + Individual	34%		57%	***
	Individual Purchase	66%	***	85%	***
Source: Analysis of MCBS 2003-2005 cost and use files, pooled. Notes: * = < .05, ** = < .01, *** = < .001.					

We can examine whether income and secondary insurance interact when determining spending. In general, insurance has roughly the same percentage impact on spending for both lower-income and higher-income beneficiaries. But the effect is consistently

somewhat higher for the lower-income beneficiaries (Table 6). Putting that differently, the lack of secondary insurance has a more profound impact on poorer beneficiaries.

Table 6: Regression-Adjusted Increase in Medicare Spending Associated With Secondary Insurance						
Elderly Medicare Fee-for-Service Beneficiaries With No VA Use, 2003-2005 Pooled						
By Beneficiary Income						
	Total spending	p	Part A spending	p	Part B spending	p
Beneficiaries With Incomes Under $10,000						
Memo: Spending, Medicare Only	$ 3,530		$ 1,962		$ 1,569	
Memo: MCBS observations, Medicare Only	631		631		631	
Percent increase associated with:						
Employer sponsored	10%		-4%		28%	*
Employer + Individual	55%		82%		20%	
Individual Purchase	39%	**	19%		63%	***
Beneficiaries With Incomes over $10,000						
Memo: Spending, Medicare Only	$ 4,372		$ 2,611		$ 1,762	
Memo: MCBS observations, Medicare Only	862		862		862	
Percent increase associated with:						
Employer sponsored	18%	*	11%		28%	***
Employer + Individual	22%	*	4%		48%	***
Individual Purchase	31%	**	17%		50%	***
Source: Analysis of MCBS 2003-2005 cost and use files, pooled.						
Notes: '* = p < .05, ** = p < 0.01, *** = p < .001						

We ruled out any significant interaction between the insurance effects and regional variations in the cost of care by adding dummy variables for region and rural location to the analysis. Only the dummy variable for rural location was statistically significant ($p < .05$) in the Part B and total spending regressions. More importantly, the coefficients on the insurance coverage variables were essentially unchanged, being within plus or minus 3 percent of the values obtained without rural and regional dummies in the regression. These changes were not statistically significant.

We did not apply traditional methods for correction of potential self-selection. The population with individual-purchase health insurance may have bought that in anticipation of higher spending. In such cases, where the selection is observed but possible endogenous, textbooks suggest constructing a statistical instrument, then using the instrument instead of the original variable to eliminate the potential for endogeneity bias. We did not explore this, for four reasons. First, Medicare beneficiaries typically purchase policies during the guaranteed enrollment period at the start of their Medicare enrollment. Any assumption of significant endogeneity bias requires the improbable assumption that most beneficiaries can accurately forecast their own lifetime health care

expenditures at the time of Medicare enrollment. Second, this problem applies only to individual-purchase insurance, not to employer-sponsored insurance, making this non-standard from the viewpoint of the statistical analysis. It is a polychotomous choice situation where some but not all of the choices are potentially endogenous, and one of the choices (employer-sponsored plus Medigap) has both exogenous and potentially endogenous parts. Standard textbook models do not readily apply to this situation. All things considered, it did not seem reasonable to develop the ad-hoc methods for treating this specific case.

2.4 First-dollar coverage and spending increases.

In this section, we separate beneficiaries by the apparent depth of their insurance coverage. For those with some Part B covered spending during the year, we measure the reported fraction of total spending that was paid directly out-of-pocket. If moral hazard is the cause of the higher spending for those with insurance, we would expect to see higher spending by those with first-dollar coverage, and lower spending by those who pay part (but not all) of their Medicare coinsurance and deductible amounts. In other words, we look for a dose-response relationship within each type of secondary insurance, looking for greater spending response from those with near-first-dollar coverage than from those who report paying a larger share of total costs directly out-of-pocket.

The MCBS does not gather information on the depth of insurance coverage (e.g., coinsurance rate within the secondary insurance policy). If it had done so, we would have used the reported coverage to identify individuals with complete or nearly complete coverage. This would have been the preferable approach, because the depth of coverage would have been known for all individuals and could have been measured against some common standard (average out-of-pocket based on the average distribution of Medicare-covered spending).

Instead, the only information we have is the *observed* depth of coverage, that is, the fraction of spending paid out-of-pocket, conditional on each beneficiary's actual Medicare-covered spending. Using the MCBS survey data, we can find the total out-of-pocket costs for Medicare-covered services paid by each beneficiary.

Using *observed* depth of coverage to classify beneficiaries has some inherent methodological drawbacks because it is partially endogenous with respect to an individual's actual spending. First, the observed depth of coverage is only observed for those with spending. For example, this approach ignores any effect that first-dollar coverage has on the likelihood of having no part B spending during the year (because depth of coverage information is missing if there is no Part B spending.) At the minimum, the censored nature of the data means that we cannot directly interpret the coefficients from the regression as elasticities. Censoring of the zero-spending observations means that the coefficients will understate the true impact of depth of coverage on spending.

Second, even for non-zero spending, observed depth of coverage may be sensitive to the level of spending. We are particularly concerned that persons with total spending below the Part B deductible might have high apparent out-of-pocket costs (even if fully covered above the deductible), leading to a spurious correlation between observed depth of coverage and spending. A cross-tabulation of observed insurance coverage by Part B spending reveals that this is not a significant concern. There is no large cluster of individuals at or below the Part B deductible (Table 7). From this, we can be assured that any effect of the observed depth of coverage on spending is (largely) not an artifact of the interaction of the Part B deductible with the observed coverage variable. Any artifact would be limited to the few additional percent of population observed at the lowest spending level for beneficiaries with shallow observed coverage.

Table 7: Distribution of Individuals by Insurance Coverage, Observed Depth of Coverage, and Part B Spending

	Secondary Insurance and Observed Depth of Coverage					
Part B Spending	**Employer Sponsored**		**Employer + Individual**		**Individual Purchase**	
	<5% out-of-pocket	**>5% out-of-pocket**	**<5% out-of-pocket**	**>5% out-of-pocket**	**<5% out-of-pocket**	**>5% out-of-pocket**
Under $100	6%	8%	4%	7%	5%	9%
$100-$250	5%	9%	4%	7%	3%	10%
$250-$500	7%	13%	6%	15%	7%	15%
$500-$1000	12%	19%	11%	18%	13%	21%
$1000-$5000	47%	41%	55%	43%	49%	36%
>$5000	24%	9%	20%	10%	24%	9%
Total	100%	100%	100%	100%	100%	100%
Note: Excludes individuals with no Part B spending						
Source: Analysis of Medicare Current Beneficiary Survey files, 2003-2005						

Finally, in order to dismiss entirely the potential issues with low-spending beneficiaries, we ran the estimation twice: Once using all beneficiaries, and then again using only those beneficiaries with at least $1000 in spending. Censoring the dataset at that high level of spending will substantially bias the estimated coefficients toward zero. we looked at all beneficiaries, then looked again at beneficiaries with at least $1000 in Part B covered spending. If we still get significant differences by observed depth of insurance, we can be sure that they are not influenced by any interaction between spending near the Part B deductible and the observed depth of insurance coverage.

The censoring of the observed depth of coverage means that the regression results will under-estimate the actual elasticity of spending with respect to coverage. Because few beneficiaries with secondary insurance have zero Part B spending, we expect the level of bias for that analysis to be relatively modest. But with the $1000 Part B spending cutoff, we should expect substantial downward bias in the coefficients. The regression with $1000 censoring is shown to demonstrate that the effect of depth of insurance is not an artifact of measuring depth of coverage when spending is near the Part B deductible.

Table 8 shows that, within each insurance class, beneficiaries with apparent near-first-dollar coverage (defined here as paying less than 5 percent of cost of Medicare Part B services) have much higher spending than others. In each case, there is no statistically significant difference between those who have second insurance but paid at least 5 percent of Part B spending, and the Medicare-only population. This is after risk adjustment (as done above), and holds true both for all beneficiaries, and for beneficiaries with more than $1000 in total Part B spending.

Table 8: Part Spending by Insurance and Revealed Out-of-Pocket Share

Regression-adjusted Part B spending relative to Medicare-only Individuals

		All Individuals Regardless of Spending			Individuals with at Least $1000 in Part B Spending.		
	Percent of Part B Spending Out-of-Pocket	**% of Persons in Insurance Category**	**Increased Spending Relative to Medicare Only**		**% of Persons in Insurance Category**	**Increased Spending Relative to Medicare Only**	
Employer-Sponsored							
	No survey Part B $	5%	N/A		N/A	N/A	
	<5%	50%	68%	***	61%	24%	***
	>5%	45%	0%		39%	-6%	
Employer+Individual							
	No survey Part B $	1%	N/A		N/A	N/A	
	<5%	52%	77%	***	61%	21%	***
	>5%	46%	23%		39%	6%	
Individual Purchase							
	No survey Part B $	3%	N/A		N/A	N/A	
	<5%	63%	85%	***	75%	30%	***
	>5%	34%	12%		25%	4%	

Notes: N/A no relevant data. By construction, these individuals have zero Part B spending. Coefficients should not be used to provide a quantitative estimate of the elasticity of spending with respect to coverage. See text for discussion of statistical bias issues.

* = p < .05, ** = p< .01, *** = p < .001

Source: Analysyis of 2003-2005 MCBS files, pooled

These findings suggest that, to a reasonable approximation, the entire effect of secondary insurance on spending is attributable to those who have first-dollar or nearly-first-dollar coverage. By contrast, beneficiaries with secondary coverage who paid at least 5 percent of Part B costs had spending that was not significantly different from the Medicare-only population.

We tested that formally by including dummy variables for apparent depth of coverage alongside variables for secondary coverage in a regression explaining Part B spending. When we flag those who paid under 5 percent of Part B costs, the coefficients on the secondary insurance coverage became small and not statistically significant. That is, once we account for the presence of near-first-dollar coverage, the actual type of secondary coverage and the presence of secondary coverage that is not first-dollar

coverage are both irrelevant. The entire secondary insurance effect for all types of private secondary coverage can be explained by a single variable that flags beneficiaries who get free or nearly free Part B care.

2.5 Review of the Lemieux et al. paper in light of these results.

Lemieux et al. focused on VA-covered beneficiaries to explain why their estimate of the impact of secondary insurance is much smaller than prior estimates. Yet, removal of VA-covered beneficiaries appears to have little impact in the current analysis. This section briefly examines the Lemieux at al. analysis and results.

The Lemieux et al. paper concludes that the prior estimates of the impact of secondary insurance were too high, based on five main points:

- Individuals with VA and military retiree coverage constitute a high proportion of the MCBS population with no reported secondary insurance.
- These individuals have lower Medicare spending, to the extent that use of VA facilities substitutes for Medicare-paid care.
- This substantially inflates the estimated impact of secondary insurance on Medicare outlays.
- Failure to remove VA-covered beneficiaries explains why prior analyses by the Congressional Budget Office and the Physician Payment Review Commission found a large impact of secondary insurance on Medicare spending.
- Finally and separately, purchasers of Medigap insurance appear substantially less healthy than average, based on claims submitted to three Medigap insurers.

The current analysis suggests that only the first of those five points is substantively correct. Our results either contradict the remaining points of that argument or suggest that the empirical impact is minimal.

First, it is true that individuals using VA services during the year are largely concentrated in the group with no reported secondary insurance. We found that about 14 percent of the Medicare-only group had some VA use during the year, compares to 2 or 3 percent of those with some private secondary insurance (Table 2).

Second, the individuals with VA use have *modestly* lower Medicare spending. This occurs because VA spending does not simply substitute for Medicare spending, but instead appears to add to the total spending per beneficiary from all sources. For the Medicare-only population, the population with VA coverage had total spending 16 percent above average and had Medicare spending that was 22 percent below average (Table 2).

Third, the overall effect of the VA population is small, because it is (roughly) equal to the product of these two factors (22 percent lower costs in 14 percent of the population). The net effect is that including the VA population lowers the average cost of the Medicare-only population by about 3 percent (and lowers costs elsewhere by a much smaller amount). That is small relative to the overall estimated impact of insurance on spending.

It is not clear how Lemieux et al. obtained such large changes in average per-capita spending by screening out those with VA use.

Fourth, the inclusion of VA-covered beneficiaries does not explain the higher estimated impact of secondary insurance in the older PPRC and CBO studies. As shown here, using 2003-2005 pooled MCBS data, the inclusion or exclusion of the VA-covered beneficiaries makes little difference in average Medicare costs. We excluded VA beneficiaries and obtained results similar to the prior PPRC analysis. (In addition, CBO work used National Health Interview Survey (NHIS) data, not Medicare claims data (Christensen and Shinogle, 1997). Criticism based on incomplete Medicare spending data would not apply to that study.)

Finally, the MCBS data show little to suggest that elderly Medigap purchasers are less healthy than average. Looking at Table 3, the self-reported health status and functional status for Medigap owners appear similar to other beneficiaries. The the claims-based risk index is much higher for these beneficiaries than for the Medicare-only population, but as discussed above that may largely reflect the differences in claims volume.

In short, VA users constitute a significantly higher fraction of the Medicare-only population than they do of the rest of the Medicare population. But this has only a small effect on average costs, and does not explain the discrepancy between the prior PPRC and CBO work and the Lemieux et al. results. After excluding those with VA coverage, the results from this analysis are consistent with the older PPRC and CBO work.

2.6 Discussion and interpretation.

The prior section demonstrated a large difference between beneficiaries with and without secondary insurance, in terms of total and Part B spending. In round numbers, compared to those with no insurance, beneficiaries with individual-purchase insurance use one-half more Part B care, those with employer-sponsored coverage used one-third more Part B care.

These results were obtained after a reasonable attempt to remove many factors that may affect health care use and may be correlated with insurance status. As a reminder, those results apply to elderly non-institutionalized fee-for-service beneficiaries with full Part A and Part B coverage and no use of VA facilities. The results were obtained with adjustment for diagnoses reported during the year (concurrent HCCs), other self-reported health status indicators, income, education, and demographics.

We believe that the most plausible interpretation of the data is that the insurance coverage is the primary factor causing the higher use of care. Any self-selection of insurance based on *observable* factors – observed health status, income, education, or demographics – should be largely accounted for by the regression analysis.

At this point (before looking at service use in detail), the only way to assert that insurance is not the primary cause of higher spending is to appeal to some large, *unobserved* factor.

These results could be unrelated to the demand inducement effects of insurance only if there were some unobserved factor that is both strongly correlated with secondary insurance ownership and is a strong determinant of Part B spending.

One possible explanation is that a true-yet-unobserved difference in health status that accounts for the Part B spending differences. This seems highly unlikely. This would require beneficiaries with individual-purchase health insurance to be 50% "sicker" than those without it, yet reveal no difference in health status when asked, and have any differences related to the mix of diseases under active treatment (the HCCs) fully accounted for in the regression.

A second and subtler alternative explanation is that individuals who desire more health care, independent of their objective health status, may be more likely to obtain secondary insurance.[13] In other words, those who purchased Medigap knew that they wanted to use more health care, and would have used more health care regardless of their actual insurance status. This alternative might plausibly be put forth as an explanation of higher use for Medigap holders, but not those with employer-based health insurance. That insurance is a byproduct of career choice and it seems implausible that individuals choose their careers based on expected health care use after retirement.

Finally, we note that secondary coverage exhibited a strong "dose-response" relationship with spending. Within each secondary insurance class, significantly higher Part B spending was observed only for those with first-dollar or near-first-dollar coverage. So, for example, the mere presence of employer-sponsored coverage was not sufficient to raise spending. Instead, the coverage had to eliminate all or nearly all out-of-pocket costs before spending was observed to rise.

Ultimately, it is not necessary to speculate about why Medicare-only beneficiaries avoid getting health care. We can simply ask them. Compared to those with private health insurance, those with Medicare only where both more likely to worry about their health and more likely to avoid going to the doctor (CMS 2005). When asked about why they avoided seeing the doctor, 19 percent of Medicare-only beneficiaries reported that they delayed getting care due to the cost, compared to 5 percent or less for those with private secondary insurance (CMS 2005). In short, beneficiaries' self-reported behavior and the reasons for that behavior dovetail with insurance as an explanation for use. Medicare-only beneficiaries are more worried about their health than others, they know that they avoid getting medical care, and they say that the reason they avoid getting that care is the cost. The cost – that is, their lack of secondary insurance -- is a significant driver of their lower use of services.

At this point, the evidence appears fairly clear. After eliminating persons with VA use and adjusting for covariates (health, income, education, demographics), beneficiaries without secondary insurance use much less health care than those who do. This was due

[13] In the context of HMO risk selection, this historically was discussed as the "worried well" hypothesis, that HMOs might attract individuals who were well but who worried about health status and so used more health care.

entirely to those with near-first-dollar coverage, while no significant differences were found for those who paid at least 5 percent of Part B costs. This strongly suggests that the lack of full insurance – the presence of out-of-pocket costs -- causes the lower use of care in the Medicare-only population. When asked, beneficiaries themselves say exactly that – those without secondary insurance are far more likely to report having delayed care due to cost.

3 SERVICE-LEVEL DIFFERENCES

This section looks in more detail at the impact of secondary insurance on the types of services used. Medicare claims data are used to isolate individual services and groups of services. We ask what types of services appear most strongly affected by the presence of secondary insurance.

We use the same regression framework above to calculate adjusted rates of use for various services. We run a regression to predict service use (spending) as a function of insurance status, health, income, education, and demographics. We then report the estimated impact of health insurance on use as a percent of the actual service use of the Medicare-only population. The result is that all tables are shown after adjustment for health status, income, education, and demographics, and all tables use the population without secondary insurance as the reference population.

In most cases, we track physicians' services. We do this because in (almost) all cases, acute care will result in physicians' services bills. Further, if we count services from multiple files we risk double-counting. The physicians' services results should be indicative of the overall variation in use of services by these populations.

The bottom line is that beneficiaries without secondary insurance appear to get services that are clearly needed, in the sense of getting acute care in response to serious illness. Essentially, they get the care that is not discretionary. By contrast, they tend not to get care for which the benefits are less directly obvious, or which is not "life and death" care. They get less well patient care, less preventive care, fewer scheduled inpatient admissions, and fewer procedures that are costly but do not address life-threatening conditions. In essence, on average, they appear to get the care required to address acute-care problems, but get less care that is discretionary or preventive in nature.

3.1 Conceptual framework and methods.

This section briefly describes a conceptual model of health care use for a given level of health status or health care "need". That is, we ask in a very general way what systematic factors will affect the level of care that beneficiaries will obtain for a given health care problem of a given severity. In particular, to be clear, we are not interested in variations in health status as a causative factor (the regression adjustment should deal with them) or with seemingly irrational "small area variations" in health care use. We are discussing what factors, in general, will affect the decision to obtain care.

We believe that four factors provide a reasonably coherent framework for discussing the systematic, observable factors that will affect beneficiaries' use of care.

- The care's near-term impact on health status ("life and death" care versus discretionary or preventive care);
- The pain, risk, and time associated with the care and its consequences;
- The beneficiary's monetary cost for the care;
- The extent to which packages of services are delivered within one episode, so that provision of one service requires the provision of additional services with little or no discretion on the level of subsequent care.

The near term impact should be fairly obvious. Beneficiaries weigh the costs and benefits of care when making the decision to obtain care or not. All other things equal, the more obvious the immediate benefit, the less role there is for other factors to enter the decision. Thus, we would expect emergency care for life-threatening conditions to be relative unaffected by (say) money cost, while care for conditions that are merely inconvenient or uncomfortable might be more strongly affected by other factors such as monetary cost.

The pain, risk, and time would suggest that beneficiaries in general should be more amenable to short, non-invasive, low-risk procedures than to (e.g.) surgical procedures that carry significant mortality and morbidity risk. For example, if promised equal outcomes from drug-based or surgically-based treatment for blocked arteries, we would expect beneficiaries to lean toward drug-based treatment, all other things equal.

Monetary cost should be obvious. Beneficiaries themselves report delaying care due to cost. On net, we would expect beneficiaries with full secondary insurance to be less reluctant to seek and undergo treatment than beneficiaries with Medicare only.

The episodic nature of care tends to trump any of these factors. Once admitted to the hospital for (say) a heart attack, a beneficiary has relatively little choice over such factors as blood tests, imaging, and possible surgical intervention. Similarly, one would not be able to have (e.g.) gall bladder removal without imaging of the gall bladder, or total hip replacement without followup physical therapy. In all of these examples, services that might be discretionary in other contexts (tests, imaging, therapy) are non-discretionary when they are part of an acute episode (hearth attack, cholecystectomy, total hip replacement). This means that analysis of those individual categories (imaging, tests, therapy) may understate the variation in the truly discretionary portion of the services in those categories.

One purely practical consideration should be mentioned. Medicare-only beneficiaries may often not pay their hospital deductible and coinsurance amounts. In 2005, hospitals incurred roughly $1.1B in Medicare bad debt (calculated from Sutton et al. 2005). It is reasonable to assume that much of that was concentrated among beneficiaries with no secondary insurance. If it were entirely concentrated on the 11 percent of fee-for-service beneficiaries with no secondary insurance, a rough calculation suggests it would account for nearly half of all inpatient and outpatient deductible and coinsurance amounts

incurred by the Medicare-only population. Thus, while inpatient procedures may appear to have high deductible burdens, the actual realized burden may be less than the burden calculated from full payment of the Medicare inpatient deductible.

In practice, there are no off-the-shelf measures that would systematically quantify all health care services along these dimensions. Instead, we have to take some seemingly-reasonable "cuts" of the data to see whether or not, in a qualitative way, these factors appear to explain the systematic variation in use of care.

To increase sample size within group and to simplify the analysis, this section combines the three separate private secondary insurance categories. Many significant surgical procedures occur at rates ranging from the several-per-hundred to the several-per-thousand-beneficiaries level. This makes analysis difficult, given the small sample size of the MCBS. Pooling all private secondary insurance helps with this issue, as does looking at broader categories of services when possible.

We applied a second screen to address the issue of small sample size. Results are not presented for a spending category if fewer than 30 persons had such spending in the Medicare-only group. We apply this screen if those results would be "statistically significant" based on the usual tests. Formally, the asymptotic (large-sample) statistics used for the tests may be substantially inaccurate when there are few cases. Less formally, if only a handful of cases are involved, there is simply too much likelihood for differences in spending to arise due to one or two spending outliers. This screen helps weed out the findings that are most likely to be such "flukes" and therefore helps to present a more conservative picture of the actual differences in service mix by secondary insurance status.

To get at some of the issues around episodes of care, we will sometimes separate out and discard inpatient services. Individual services provided in the inpatient setting (for example, tests and imaging) are likely to be part of a larger episode. Once admitted to the hospital, beneficiaries may have relatively little discretion over service use. This is our (admittedly coarse) way of trying to separate out the use of seemingly discretionary services that may in fact take place within the context of large non-discretionary ("life-or-death") episodes.

The upshot of this is that we do not have any precise way to test for the impact of these factors. Instead, we will simply tabulate the data in ways that seem to be informative. For example, we can contrast use of emergency and non-emergency services, or inpatient versus non-inpatient services.

MCBS sample size presents one final and important limitation on methods. There are only about 1600 persons in the final Medicare-only group for the three-year pooled MCBS file. Yet, many procedures of interest may be done at the rate of a few procedures per hundred or per thousand Medicare beneficiaries. There may not be enough sample size to provide a stable average rate of service use at the level of specific procedures.

To address the sample-size issue, we do not show any cell in the following tables unless there is at least $10 per capita in spending for the Medicare-only group, and at least 30 beneficiaries with some spending in the Medicare-only group. These rules of thumb serve to screen out some results that may reflect the experience of just a few beneficiaries or just a few claims, regardless of the apparent statistical significance level of the result.

While this does guard against making inferences based on a handful of persons, it also has the effect of eliminating almost all analysis of specific surgical procedures. Almost no major surgical procedures are common enough to exceed that cutoff for the Medicare-only group. This means that the analysis is effectively restricted to looking at broader classes of procedures and services.

3.2 Detailed Analysis of Spending

We used the following categorizations of spending to explore which services are more or less strongly affected by secondary insurance status:

- Physicians' services by site of service.
- Physicians' services by broad specialty category.
- Part B (physician and hospital outpatient) spending within broad Berenson-Eggers Type of Service (BETOS) categories.
- Hospital admissions by emergency, urgent, and elective status.[14]
- Part B spending for all preventive services combined.
- Total spending for decedents, and spending by individuals with diagnoses for the leading causes of death in the elderly.

Table 7 shows regression-adjusted differences in per-capita spending between those with no secondary insurance and those with private insurance. The columns show the per-capital spending for those with no insurance, and the percent increase in spending associated with ownership of private secondary insurance.

The impact of secondary insurance is highest in the office setting (as opposed to hospital inpatient or outpatient), where those with private secondary insurance cost Medicare about 75 percent more than those with no secondary insurance. By specialty, the effect is most profound among medical specialists. On the inpatient side, there is essentially no difference in spending for emergency and urgent admissions. For elective admissions, by contrast, spending is about 90 percent higher for those with private secondary insurance than for those with no secondary insurance (Table 9).

[14] Hospitals are not required to code this field accurately for payment purposes, but two tests suggested that coding is largely accurate. First, this field was consistent with hospital coding on admission source. About 90 percent of Medicare admissions occur either through the emergency department (ED) or from physician referral. Less than 2 percent of ED admissions were marked as elective while nearly 60 percent of physician referral admissions were marked as elective. Second, for one common procedure (hip replacement), field coding matched the clinical indications for emergency versus elective surgery. When hip replacement admissions were split by presence of a fracture, almost all fracture cases were marked as emergency or urgent, while almost all other cases were marked as elective. Both of these tests suggest that the type of admission field provides a reasonable average measure of admission urgency.

Table 9: Medicare Spending by Category, Sorted By Estimated Impact of Private Secondary Insurance				
Elderly Non-Institutionalized Fee-for-Service Beneficiaries With no VA Use				
		Per-capita spending, no secondary insurance	Percent Increase in Spending, Private Supplemental Insurance	p-value
Carrier claims by place of service				
	Other	$ 127.29	23%	*
	Inpatient	$ 280.56	32%	**
	OPD/ASC	$ 260.67	33%	***
	Office	$ 643.44	75%	***
Carrier claims by physician specialty (non-physician omitted)				
	Radiologists	$ 118.79	30%	
	Generalists	$ 315.50	36%	***
	Surgical specialists	$ 328.97	50%	***
	Medical specialists	$ 341.39	89%	***
Inpatient claims by admission type				
	emergency	$ 1,220.59	-6%	
	urgent	$ 404.89	6%	
	elective	$ 405.17	90%	***
Preventive services (carrier and OPD claims combined)				
	Preventive services payments	$ 21.30	97%	***
	% of persons with some preventive svc.	37%	60%	***
Notes: * = p < .05, ** = p < .01, *** = p < .001, analysis is based on regression that included health status, income, education, and beneficiary demographics. Place of service "other" consisted mainly of ambulance services and clinical laboratory tests, and the cofficient averages the impact of the two.				
Source: Analysis of MCBS 2003-2005 Cost and Use files.				

Table 10 is one attempt at a systematic look across services. Table 10 takes all carrier and hospital outpatient claims and summarized Medicare payments by aggregations of Berenson Eggers type of service codes (BETOS). The resulting pattern of differences has some intuitive appeal. First, presence of secondary insurance has little apparent effect on emergency care services, including ambulance services and emergency room visits. Second, presence of secondary insurance has its largest impact on drug spending. Beneficiaries with secondary insurance spend three times as much as others on other Part B injectable drugs.[15]

[15] There is a significant risk adjustment caveat here. The HCCs capture only some of the diagnoses that may raise costs. In particular, some of the most expensive drugs provided under Part B are for fairly rare diagnoses that did not merit their own separate categories under the HCC system. There is a caveat that the risk adjustment might have missed the rare conditions that are the focus of many of the highest-cost drugs.

Table 10: Medicare Spending Sorted By Estimated Impact of Private Secondary Insurance				
Elderly Non-Institutionalized Fee-for-Service Beneficiaries With no VA Use				
		Per-capita spending, no secondary insurance	Percent Increase in Spending, Private Supplemental Insurance	p-value
Carrier and OPD payments by aggregated BETOS category (<$10/capita omitted, <30 Medicare-only beneficiaries with services omitted)				
	Ambulance (O1A)	$ 76.66	-21%	
	Emergency Visits (M3)	$ 57.84	0%	
	Eye procedures (P4)	$ 115.33	14%	
	Hospital Visits (M2)	$ 124.91	28%	*
	Chiropractic (O1B)	$ 14.83	30%	
	Major Procedures, Cardiovascular (P2)	$ 74.20	30%	
	Tests other than clinical lab tests (T2)	$ 43.99	32%	**
	Consultations (M6)	$ 64.65	34%	***
	Clinical Lab Tests (T1)	$ 112.62	40%	***
	Anesthesia (P0)	$ 30.30	45%	***
	Office Visits (M1)	$ 243.84	45%	***
	Ambulatory Procedures (P5)	$ 61.65	52%	***
	Major Procedures, Various (P1)	$ 32.16	53%	*
	Imaging, Standard (I1)	$ 92.10	55%	***
	Imaging, Echography (I3)	$ 49.85	56%	***
	Imaging, Advanced (I2)	$ 77.59	62%	***
	Imaging, Procedure (I4)	$ 15.26	72%	*
	Specialist Visits (M5)	$ 56.63	78%	***
	Minor procedures (P6)	$ 92.84	89%	***
	Endoscopy (P8)	$ 53.63	100%	***
	Other Drugs (O1E)	$ 31.33	325%	***
Notes: * = p < .05, ** = p < .01, *** = p < .001, analysis is based on regression that included health status, income, education, and beneficiary demographics.				
Source: Analysis of MCBS 2003-2005 Cost and Use files.				

Finally, we tabulated total costs for beneficiaries with serious illnesses. That is, we took decedents and those with diagnoses associated with the five most common underlying causes of death in the elderly, and tabulated total costs, Part A costs, and Part B costs (Table 11). The HCCs were used to flag the beneficiaries with the specific diagnoses in question. For example, the presence of any HCC for cancer flagged a patient with (some mention of) cancer during the year. Each of these classes of beneficiaries showed no significant difference in Part A spending between those with and without secondary insurance, but typically showed large and significant differences in Part B spending. Probably the most interesting finding is that the largest difference in total spending was for beneficiaries who had none of these conditions. For that relatively healthy population, Medicare spent about two-thirds more for beneficiaries with secondary insurance than for those without it.

Table 11: Decedents, Beneficiaries With Diagnoses Among the Leading Causes of Death, and Others									
Elderly Non-Institutionalized Fee-for-Service Beneficiaries With no VA Use									
	Total Spending			Part A Spending			Part B Spending		
Beneficiary Category	Per-capita spending, no secondary insurance	Increase with 2ndry Insur.	p	Per-capita spending, no secondary insurance	Increase with 2ndry Insur.	p	Per-capita spending, no secondary insurance	Increase with 2ndry Insur.	p
Diabetes	$8,481	6%		$5,198	-4%		$3,283	22%	**
Cancer	$12,070	13%		$7,146	-1%		$4,924	32%	**
Cardiovascular Other Than CHF	$11,786	14%		$8,023	4%		$3,763	34%	***
Congestive Heart Failure	$15,260	20%		$10,692	13%		$4,568	36%	***
Chron. Obst. Pulm. Dis.	$10,945	23%		$7,068	13%		$3,877	41%	***
Decedents	$20,367	25%		$15,873	20%		$4,494	44%	**
None of the above	$1,003	67%	***	$357	51%		$646	76%	***
Notes: * = p < .05, ** = p < .01, *** = p < .001, analysis is based on regression that included health status, income, education, and beneficiary demographics.									
Source: Analysis of MCBS 2003-2005 Cost and Use files.									
Note: This is total spending for beneficiaries with these conditions, not spending for those conditions only.									

3.3 Conclusion and Interpretation.

We believe that most of the findings of this section can be interpreted as showing the impact of out-of-pocket payments on beneficiaries' decisions to obtain care. That is, the findings here are consistent with spending differences that are the result of differences in insurance status.

First, emergency care is typically provided in life-threatening situations. We consistently found no impact of secondary insurance status on emergency care, whether it was ambulance services, emergency room visits, or emergency or urgent hospital admissions. It seems reasonable to suggest that beneficiaries in emergency situations either will not or cannot take copayment liabilities into account when obtaining care.

By contrast, with some exceptions, areas with the largest differences in spending between those with and without secondary insurance tended to be suggestive of care with a larger discretionary component. Spending for those with secondary insurance was higher for:

- elective hospital admissions compared to emergency and urgent;
- preventive care services;
- office-based as opposed to hospital-based care;
- medical specialists as opposed to primary care or generalist physicians; and
- persons without any diagnosis among the leading causes of death, as opposed to decedents and persons with such diagnoses.

4 CONCLUSIONS

All of the available evidence suggests that secondary insurance raises Medicare spending substantially. We restricted our sample to non-institutionalized fee-for-service Medicare beneficiaries, and then eliminated those with any use of VA health care (and any Part-A-only or Part-B-only enrollment). The raw (unadjusted) data for Medicare spending and for total (all-sources) spending for acute care both showed that those with private secondary insurance have much higher spending than those with Medicare only. That remained true after regression-based adjustment for several health status factors, as well as income, education, and demographics.

Several further pieces of evidence strengthened our conclusion that these differences in use were the result of the insurance itself, and are not an artifact of some unobserved factor that would drive both health care use and insurance purchase. Most telling, there was a dose-response relationship between depth of coverage and spending. Essentially the entire impact of secondary insurance on spending was due to beneficiaries with nearly-first-dollar coverage. Total Part B spending by those who paid at least 5 percent of costs was not statistically significantly different from spending in the Medicare-only population. Once this was taken into account, the actual type of secondary insurance did not matter as a determinant of Part B spending. In addition, beneficiaries themselves said that cost caused them to curtail use of care. Beneficiaries without secondary coverage said they were far more likely to defer health care use due to concerns about cost. Less obviously, when we looked at the spending data in detail, the impact of secondary insurance fell heavily on what appears to be more discretionary spending. There was no apparent impact on emergency services and on emergency or urgent hospitalizations. By contrast, spending for elective admissions was substantially higher for those with private secondary coverage. There were smaller impacts on (presumably) basic service provided by generalist (primary care) physicians, and much larger impacts on the services of medical specialists, smaller impacts in the inpatient setting and larger impacts in the office setting, and so on.

We were completely unable to replicate the results of Lemieux et al. In our analysis, the inclusion or exclusion of VA-covered beneficiaries made little difference, because their Medicare-paid spending was only modestly lower than that of other beneficiaries (while their total spending including all payers was higher.) On the face of it, we do not see how Lemieux et al. could have gotten such dramatically different results simply by excluding VA beneficiaries.

While the fact of higher spending remains, the potential policy implications are not so clear. As far as we could tell, the presence or absence of secondary insurance made little difference in the use of care in life-threatening situations. To the contrary, it appeared to make the largest difference in areas where there was more discretion in the provision of care. But we cannot conclude from that that the additional care is waste or of marginal value. For example, beneficiaries with private secondary insurance obtained nearly twice as much preventive care as those without such coverage, and preventive care has almost uniformly been judged as “good” health care. Whether or not the additional service use

in other areas represents appropriate care or waste is a question that cannot be properly answered from claims data.

One broader policy conclusion is that coinsurance works to reduce service use, even among the elderly. If the Medicare program were ever reformed in such a way as to include effective copayments (not covered by secondary insurance), those copayments could be used to reduce the volume of services provided to Medicare beneficiaries. For example, the evident sensitivity to coinsurance suggests that a Medicare Preferred Provider Organization (PPO) option could probably encourage beneficiaries to use preferred providers if it could impose effective copayments on out-of-network use.

A second conclusion is that coinsurance on emergency services appears to serve no purpose in reducing demand. For example, the Part A deductible does little to reduce the demand for emergency and urgent hospital admissions among beneficiaries with no secondary insurance. For those cases, it serves merely as a way to share the cost burden and not as a way to encourage prudent use of services. Any proposed Medicare benefit redesign might rethink the role of the Part A deductible in that light, and might even consider setting different deductibles based on admission status or other criteria.

Proposals to cap beneficiary total out-of-pocket liability for Medicare services are also relevant to this work. Some have suggested introducing a stop-loss provision or eliminating coinsurance liabilities for beneficiaries with consistently high expenditures. Here, we found that Part B expenditures remained sensitive to copayments even for high-illness-burden populations (decedents and those with diagnoses among the leading causes of death.) This suggests that costs for any such proposals probably would have to include a factor for the additional Part B spending that would occur among those currently lacking secondary insurance.

By and large, however, the conclusions boil down to two statements. Secondary insurance increases service use and raises Medicare's Part B costs substantially. But there is no way to suggest that the additional services used are either all bad or all good. Policy actions in this area would require judgment as to whether the benefit of the additional health care use induced by insurance coverage does or does not appear to be worth the additional cost.

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