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Mortality Rates in Traditional Medicare and Medicare Advantage

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Abstract

Overall age-sex-Medicaid adjusted mortality rates in Medicare Advantage have been below those of Traditional Medicare for many years. They do, however, move toward mortality rates in Traditional Medicare as time after enrollment in Medicare Advantage lengthens. As a result, a common type of study design that compares new Medicare Advantage beneficiaries immediately before and after enrollment in Medicare Advantage with beneficiaries who remain in Traditional Medicare to estimate causal effects of Medicare Advantage on utilization and outcomes is flawed.

Policy makers have long struggled with assessing favorable selection in Medicare Advantage (MA) compared with traditional, fee-for-service Medicare (TM). Before 2004 the marked difference in age-sex-Medicaid adjusted mortality rates between MA and TM was strong evidence of favorable selection that cost Medicare money because at that time age, sex, and Medicaid were the principal risk adjusters.[1–3] The magnitude of favorable selection was such that in 1997 the Congressional Budget Office estimated that if all MA enrollees had instead been enrolled in TM, Medicare spending on these enrollees would have fallen 8%.[4]

Starting in 2004, however, Medicare began to introduce outpatient diagnoses as an additional risk adjuster, a transition that was complete by 2007. (It had begun to use inpatient diagnoses to risk adjust in 2000, but gave those diagnoses only 10% weight; 90% of the weight remained on the prior demographic risk adjusters.) With diagnoses from all settings incorporated into the risk adjustment formula, a simple comparison of age-sex-Medicaid adjusted mortality rates in MA and TM no longer sufficed to demonstrate that selection could cost the government money. Such an effort required adjusting mortality rates for diagnoses as well, but diagnoses were not publically available for MA enrollees. Lacking information on diagnoses, favorable selection from lower mortality within diagnosis could in

principle be either masked or accentuated by differing distributions of beneficiaries between MA and TM across diagnoses that themselves have varying mortality rates.

Instead of comparing adjusted mortality rates, analysts investigating selection employed a different method that used TM data to compare the utilization of new MA enrollees just before they enrolled in MA with comparable enrollees who remained in TM - and similarly for MA disenrollees just after they disenrolled from MA.[5–8] This method, however, necessarily assumed that any initial differences in health status and utilization remain constant over time. In this paper we show that this assumption does not hold. Although the initial age-sex-Medicaid adjusted mortality hazard rates of those first enrolling in MA are well below the corresponding rates of those first enrolling in TM, this difference steadily decreases as time passes, consistent with regression to the mean. Thus, studies that measure selection by assuming that initial differences remain constant over time are flawed.

Prior Studies of Mortality Among MA and TM Enrollees

Following demonstration projects that began in the 1970's, Medicare Part C, or what is now called MA, was established in 1985. Although an early analysis compared mortality at three HMO's that participated in the early demonstration projects with mortality in TM,[1] the first large scale study to investigate differential mortality in what is now MA was done by analysts at the Health Care Financing Administration (now CMS) using 1980–1987 data.[2] At that time, of course, MA was a much smaller program than today, enrolling only 3% of Medicare beneficiaries.[9] The analysts showed that the overall age-sex-Medicaid adjusted mortality rate among non-institutionalized elderly beneficiaries in MA was 20% less than in TM and for those newly enrolling in MA in 1987 it was 31% less.[2] The sample included beneficiaries in the 108 HMO's that at that time had more than 1,000 Part C enrollees, and their mortality experience was compared with matched TM beneficiaries enrolled in Parts A and B who lived in the service areas of the those 108 HMO's. The 20% difference in adjusted mortality rates was evidence of favorable selection into MA since 20% was too large to be a plausible causal effect of MA on mortality. That the overall mortality rate difference was less than the difference among new enrollees also implied some regression to the mean as enrollment in MA lengthened. (The earlier study of results at the demonstration project involving three HMO's had also found a larger difference for new enrollees.[1])

The next effort to compare mortality rates in the two programs was carried out by analysts at the Medicare Payment Advisory Commission (MedPAC) using 1993–1998 data, a period when the MA enrollment share grew from 5% to 15%.[3] Although not clear from their published monograph, the MedPAC analysts' sample included beneficiaries enrolled in both Parts A and B, as well as those who were only enrolled in Part A, but it excluded those only enrolled in Part B (Daniel Zabinski, personal communication). The MedPAC analysts found the overall age-sex-Medicaid adjusted mortality rate among MA enrollees was 15% less than among TM enrollees, and, like the earlier CMS study, found that this difference diminished over time for those who remained in MA.

Subsequently our group used data from a decade later to update the MedPAC results.[10] Over the ten intervening years MA's share of beneficiaries had grown from 15% to 22% and, as

mentioned above, diagnoses in the form of Hierarchical Condition Categories (HCC's) had been introduced as risk adjusters. By 2008 the 15% overall mortality difference the MedPAC analysts found for 1998 appeared to have shrunk to 7% and, as with the earlier results, the difference diminished for those remaining in MA longer. In fact, by 2008 adjusted mortality rates for those enrolled in MA for five years or more appeared to be 99% of TM rates and statistically indistinguishable from TM rates. We took this as evidence that the enrollment expansion and the addition of HCC's to the risk adjustment formula had resulted in less selection of relatively healthier enrollees into MA.

Subsequently Richard Kronick carried out a study of coding behavior in MA.[11] In an appendix to his study he estimated annual age-sex-Medicaid adjusted overall death rates in MA relative to TM for each year between 2006 and 2013. For those eight years he found overall adjusted MA mortality rates between 12% and 18% less than TM, with no obvious pattern within the period. He did not look at how mortality rates changed with longer enrollment in MA.

By 2017 the MA enrollment share had grown to from 22% to 33%,[12] raising the question whether mortality differences might have further diminished and in particular whether the apparent near equality in the 2008 mortality ratio for those enrolled in MA for five years or more that Newhouse, et al. had found had persisted.

Study Data and Methods

The overall mortality ratio that Kronick estimated for 2008 was 0.891, whereas the earlier Newhouse, et al. study had estimated a ratio of 0.93 for the same year. (Both values included beneficiaries enrolled in hospice.) Investigation of the reasons for this difference revealed that it was mostly attributable to a difference in the population included in the sample; Newhouse, et al., in an effort to replicate their understanding at that time of the earlier MedPAC analysis, had included all Medicare beneficiaries whereas Kronick had only included beneficiaries enrolled in both Parts A and B. Because MA enrollees must be enrolled in both Parts A and B, Kronick's restriction is appropriate. Of the additional beneficiaries that Newhouse, et al. had included and Kronick had excluded, 95% were enrolled in Part A only; the others were in Part B only, so the Newhouse, et al. sampling frame was close but not identical to the earlier MedPAC sample.

Any individual who has claimed Social Security benefits but continues to work after turning 65 years of age and has employer-based insurance triggers Part A enrollment, but such a person would normally decline Part B enrollment to avoid paying the Part B premium and possibly incurring less cost sharing in the employer-based plan than in Medicare. Since such persons are working, however, they would on average be better mortality risks than those of the same age, sex, and Medicaid status who are not working and who are enrolled in both Parts A and B. Because those enrolled in Part A only are all in TM, including them in the sample lowers the TM mortality rate and was a principal reason why the Newhouse, et al. MA/TM mortality ratio was above Kronick's. It was also why the ratio appeared to improve from 1998 to 2008, when in fact it was reasonably constant if the sample was restricted to those enrolled in both Parts A and B.

The ratios that we compute here and that Kronick computed both use indirect standardization with the TM population as the reference group. In addition to using indirect standardization, we have also computed ratios for several years using a proportional hazards model rather than indirect standardization. Those results are similar to results using indirect standardization.

In addition to the change in the sampling frame from our earlier paper to exclude Part A only and Part B only beneficiaries, in this paper we make another methodological improvement over the MedPAC and the Newhouse, et al. papers that estimated the mortality ratio as a function of time enrolled in MA. Both those earlier studies compared beneficiaries continuously enrolled in MA with those continuously enrolled in TM over a five year period. In this paper we instead follow a cohort approach. We examine everyone newly enrolling in Medicare ("New Beneficiaries") and from that group define two cohorts, those who initially choose TM and those who initially choose MA. Similarly, we examine those enrolled in TM in December of a given year ("Established Beneficiaries") who enroll in MA in January of the following year and compare them with those who remain enrolled in TM in January of the following year, thereby defining two additional cohorts. We establish inception cohorts in each of the five years from 2008–2012 and compare age-sex-Medicaid adjusted mortality over the subsequent five-year period between the MA and TM cohorts. Specifically, we compute annual hazard ratios at the end of each cohort-year, thereby excluding from the denominator those in the cohort who died in earlier years. Because the results by inception year were similar (online Appendix Exhibit A1), we present in the text the average across the five sets of cohorts conceived in each year from 2008–2012 and followed through 2012–2016.

By eliminating the requirement for continuous enrollment in MA or TM, this method differs from that of both the earlier MedPAC and Newhouse, et al. studies by including enrollees who switch between the two programs over time. For evaluating selection we believe this approach is superior. To see why, consider new Medicare eligibles who enrolled in MA in 2012. A year later 12% had switched to TM and after five years 21% had made at least one switch (online Appendix Exhibit A2). A study comparing new MA enrollees in 2012 with new TM enrollees in 2012 and requiring continuous enrollment would exclude these switchers, yet their mortality risk likely differs from those continuously enrolled in TM or MA because beneficiaries who switch from MA to TM have higher than average risk scores and often report recent health declines.[10,13] As a result, excluding them could alter observed initial selection effects.

We are primarily interested in how length of enrollment modifies initial selection patterns (regression to the mean) as opposed to estimating the causal effect of MA on mortality. Holding cohort membership constant over time based on the initial choice of MA or TM regardless of subsequent switching ensures that the two groups remain the same over time when examining the relationship between time and relative mortality between MA and TM (except for deaths, which are accounted for by our use of a hazard model). Had we excluded switchers, the cohorts would have differentially changed as time passed, potentially exaggerating or obscuring an effect of time.

A drawback of the cohort approach is that it does not quantify the extent to which length of enrollment attenuates the difference in risk between the subset of enrollees who continuously remain in MA or TM, which is arguably the more relevant comparison to estimate any causal effect of MA on mortality. But we know from patterns of selection among switchers that conditioning on continuous enrollment would produce a biased estimate of the independent effect of time. Examining the continuously enrolled would be less problematic if we were able to assess health or utilization among MA enrollees, so our cohort approach is partly motivated by mortality being the only outcome consistently assessed in the two populations at this time.

In summary, the results from our cohort approach can be interpreted as a measure of the relative mortality risk of MA and TM enrollees over successive years of enrollment that would be expected if there were no subsequent switching and no causal effect of MA on mortality. To the extent that subsequent switching follows a pattern that is favorable to MA, our results overstate the extent of regression to the mean among the continuously enrolled. To the extent longer enrollment in MA causally improves mortality, our results understate the extent of regression to the mean.

We used the Master Beneficiary Summary File from 2007–2017 to determine MA or TM enrollment, duration of enrollment, age, sex, and Medicaid status, and date of death information for those newly enrolled in MA or those who changed from TM to MA or from MA to TM at the beginning of a calendar year.

Results

Since 1998 overall adjusted mortality rates in MA have been 9–15% percent below TM rates except in 2001 when they were only 7% below (Exhibit 1). The values in Exhibit 1 are somewhat sensitive to the inclusion or exclusion of hospice beneficiaries; the values shown, which include such beneficiaries, would be 2 to 6 percentage points lower if they were excluded (not shown). The value we computed for 2008 differs from Kronick’s by 0.4 percentage points; we have no explanation for this difference, but it is sufficiently small that no conclusions are affected.

For new Medicare beneficiaries who initially enrolled in MA adjusted hazard rates in their first year of enrollment averaged a full 30% below those of new TM beneficiaries, and for subsequent switchers from TM into MA adjusted hazard rates averaged more than 20% below those remaining in TM (Exhibit 2).

These differences between overall and first year mortality imply that mortality in both MA cohorts regressed back towards TM rates. Whereas the first year average adjusted hazard rate among those who had initially enrolled in MA when first eligible was 30% below TM, after five years it was only 13% below; the initial rate among established beneficiaries who switched to MA averaged 20% below TM, but after five years it was only 7% below (Exhibit 2). In both cases the differences diminished monotonically as time passed.

Exhibit 3 shows the percentage of beneficiaries that remain with their initial choice of TM or MA in each of our four cohorts. Subtracting these values from 100% gives the percentage of

each cohort that would have been excluded after five years if we had required continuous enrollment to remain in the sample; that percentage varies from 10% to 21% across our four cohorts.

Discussion

We compared overall age-sex-Medicaid adjusted mortality rates in MA and TM as well as adjusted hazard rates for mortality in MA relative to TM among cohorts that either newly age in to Medicare and chose either TM or MA at the time of initial eligibility or cohorts of established beneficiaries that did or did not switch from TM to MA at the beginning of a calendar year. Rates were notably lower in both MA cohorts over the five year period following the initial choice of MA, but they converged toward TM rates as the length of time from the initial choice of MA or TM increased. We did not try to determine if further convergence occurred after five years.

Before diagnosis-based risk adjustment was introduced between 2004–2007, the substantial difference in adjusted mortality rates could be taken as indicating selection against TM that cost Medicare money even after risk adjustment.[4] The difference can no longer be used in that fashion, however, since estimating selection effects after risk adjustment now requires accounting for diagnoses or HCC's. Not only are HCC's are not publicly available for MA beneficiaries, but coding of diagnoses is more intense in MA, and any differential in coding intensity across HCC's may be correlated with the mortality rate in the HCC, further confounding any effort to interpret mortality differences that do not account for HCC as indicating selection.[11] Nonetheless, our results show the mix of risks in the two programs differs, even after adjustment for age, sex, and Medicaid status. It is possible that some portion of the difference might be attributed to care provided in MA, but decomposing differences attributable to care versus selection would require a true experiment.

Our finding that adjusted MA hazard rates move toward TM rates as time passes has an important implication for a standard method of quantifying selection, namely comparing the use of those switching to MA with those remaining in TM in the period just prior to the switch and the use of those disenrolling from MA with those who have remained in TM in the period just after the switch.[5–8] Because of marked increase in MA/TM hazard ratios over a five year period, this method, which assumes any differences in use or health status remain constant, overstates the degree of selection, potentially by a great deal.

The marked decline in both the MA and TM adjusted mortality rates between 1999 and 2017 shown in Exhibit 1 is also striking; the MA rate declined 19 percent and the TM rate 17 percent. We wish to emphasize the substantial decline in both rates, not the small difference in the two rates, which may stem from differences in the two populations that are not adjusted for as the MA share expanded from 18 to 33 percent of beneficiaries.

In sum, the age-sex-Medicaid adjusted mortality rate of both New and Established Medicare beneficiaries who initially choose MA is well below that of those initially choosing TM but the rates converge over time, indicating that those initially choosing MA become sicker relative to TM beneficiaries as time passes. Full convergence, however, did not happen over

the five year period we observed. Whether it would happen if a longer period were observed is speculative.

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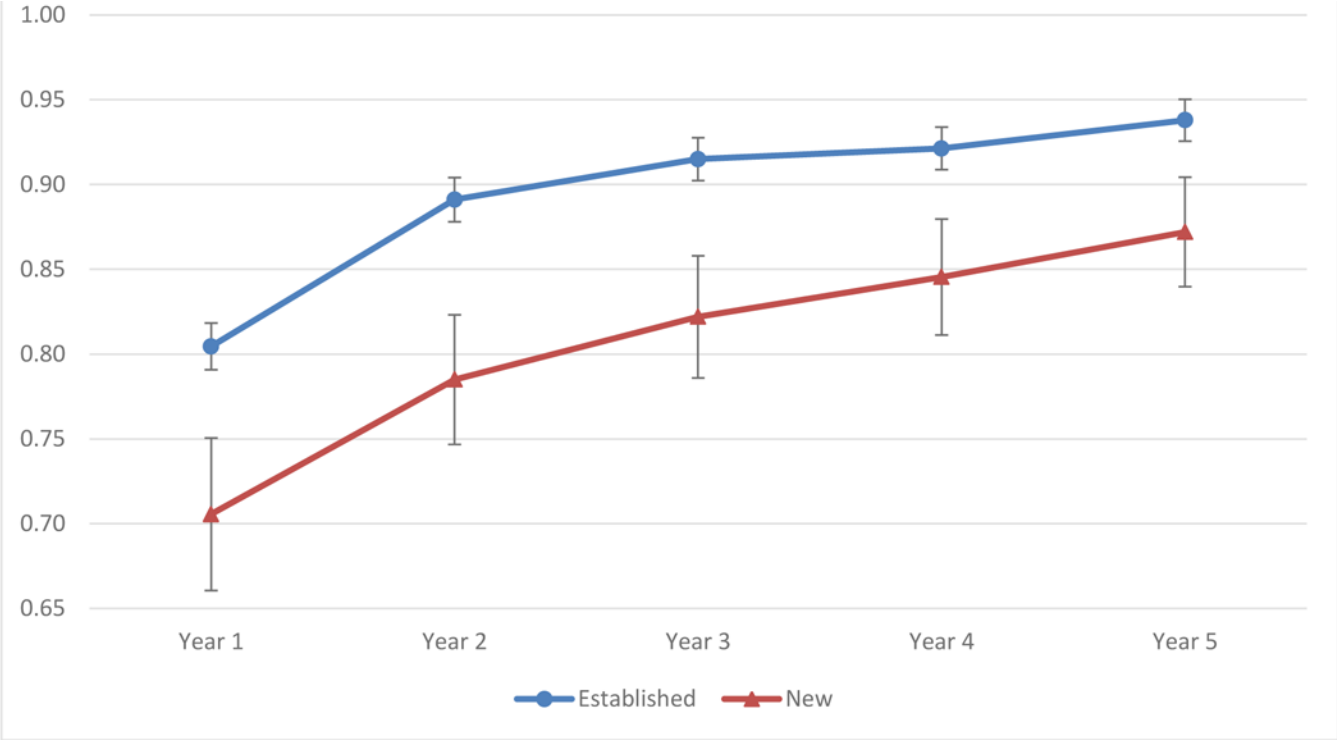

Exhibit 2. Mean Mortality Rate in Medicare Advantage Relative to Mortality in Traditional Medicare, New and Established Beneficiaries, 2008–2012.

Note: Source: Authors' calculations from Medicare Summary Beneficiary File. Values on the vertical axis represent the weighted average of annual proportional unweighted hazard models from 2008–2012 adjusted for age, sex, and Medicaid status. Bars show 95% confidence intervals. New beneficiaries are beneficiaries with no prior Medicare eligibility. Established beneficiaries are beneficiaries enrolled in Medicare as of December of a given year and January of the following year.

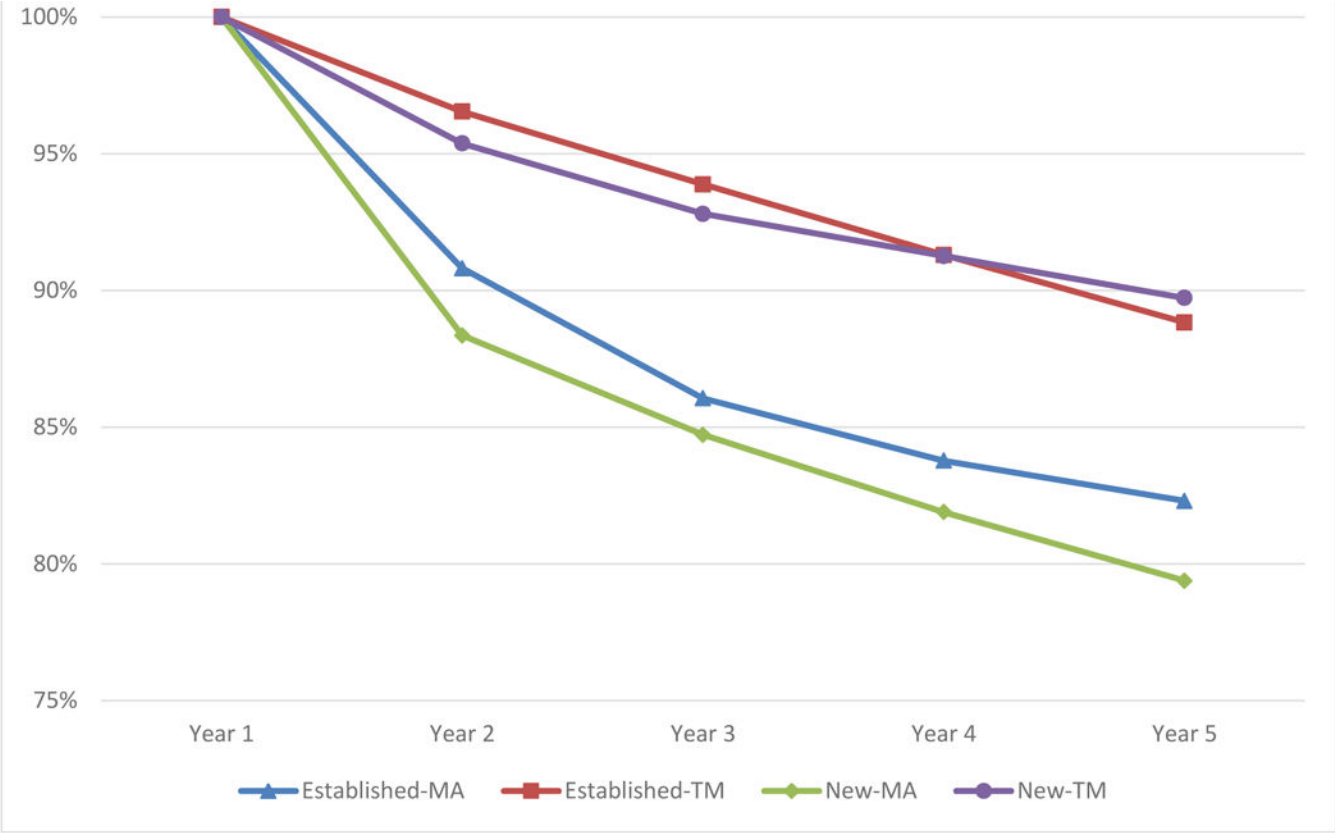

Exhibit 3. Mean Retention in MA and TM for Established and New Beneficiaries, 2008-2012.
Note: Source: Authors' calculations from the Master Summary Beneficiary File. Values are averages over five inception cohorts from 2008–2012. Values for each cohort are shown in an online appendix. Established beneficiaries are beneficiaries enrolled in Medicare as of December of a given year and January of the following year. New beneficiaries are beneficiaries with no prior Medicare eligibility.

Exhibit 1:

Ratio of MA/TM Age-Sex-Medicaid Adjusted Mortality Rates

Year	Adjusted Mortality Rates			
	MA	TM	Ratio	95% CI
1987 *			80%	
1998 **			85%	
Jan 1999 ***	4.68	5.35	87.5%	86.8 – 88.3
Jan 2000 ***	4.72	5.29	89.4%	88.6 – 90.1
Jan 2001 ***	4.84	5.19	93.1%	92.3 – 93.9
Jan 2004 ***	4.38	4.86	90.2%	89.3 – 91.0
Jan 2006 ****			91.3%	
Jan 2007 ****			91.1%	
Jan 2008 ****			89.1%	
Jan 2008 ***	4.11	4.63	88.7%	88.5 – 89.0
Jan 2009 ****			90.9%	
Jan 2010 ****			90.9%	
Jan 2011 ****			88.6%	
Jan 2012 ****			88.6%	
Jan 2013 ****			88.6%	
Jan 2014 ***	3.95	4.49	87.9%	87.7 – 88.1
Jan 2015 ***	3.96	4.51	87.8%	87.5 – 88.0
Jan 2016 ***	3.87	4.39	88.1%	87.9 – 88.4
Jan 2017 ***	3.89	4.37	88.9%	88.7 – 89.1

* Sources and Notes: From reference 4. Excludes institutionalized and non-elderly beneficiaries.

** From reference 1. Includes Part A only enrollees, which later values exclude.

*** Authors' calculations from Medicare Beneficiary Summary File. Indirectly standardized to the TM population. Includes hospice enrollees; excludes ESRD enrollees. TM enrollees who had been enrolled in MA in the past five years are excluded; this exclusion has a negligible effect of 0.1 percentage point.

**** Indirectly standardized to the TM population. Includes hospice enrollees; excludes ESRD beneficiaries.