

WORKING P A P E R

Comparison of Medicare Spending and Outcomes for Beneficiaries with Lower Extremity Joint Replacements

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I. Executive Summary

Last year, the Centers for Medicare and Medicaid Services (CMS) released a regulation revising the definition of an inpatient rehabilitation facility (IRF) for payment purposes under the Medicare program. Specifically, the revised regulation (known as the “75 percent rule”) replaced *polyarthritis*, one of the 10 conditions that had to constitute 75 percent of a facility’s patients, with four arthritis-related conditions. The change was highly controversial. IRF industry leaders charged that the regulation would lead to reduced access to IRF care for lower extremity joint replacement (LEJR) patients. They claimed that LEJR had been implicitly included under the polyarthritis definition since arthritic joints are replaced. Under the revised definition, however, only LEJR patients with certain risk factors will be counted towards the threshold, which could lead to a reduction in access to IRF care for LEJR patients. CMS has pointed out that all types of LEJR patients can continue to receive rehabilitative care in skilled nursing facilities — a setting some have suggested might be a more appropriate site of care for uncomplicated joint replacements.

The primary objective of this study is to conduct a set of analyses comparing costs and outcomes of lower extremity joint replacement patients discharged to three different post-acute settings: inpatient rehabilitation facilities, skilled nursing facilities, and patient homes. We employ multivariate techniques in order to adjust these analyses for observable differences in severity of illness across sites of care. In doing so, we use multinomial models that predict which type of institutional post-acute care a beneficiary accesses, and we describe these predictors. In addition, we use instrumental variables (IV) techniques that allow us to account for unobserved patient selection into IRFs and SNFs in order to learn how patient costs and outcomes are affected by the availability of IRF and SNF care.

We analyzed data on elderly Medicare joint replacement patients discharged from hospitals between January 2002 and June 2003. Approximately 30 percent of the sample used SNF care, 35 percent used IRF care, and the remainder returned home (either with home health care or without any Medicare-paid post-acute care). We assembled, and included as independent variables in our models, a wide array of indicators of clinical, individual, discharging hospital, and PAC supply factors that might affect PAC choices. We created indicators for the outcomes death and institutionalization within 60 and 120 days of acute discharge. We then combined these two variables (institutionalization and mortality) into a composite measure since just examining the institutionalization variable for the population of survivors would result in a biased subsample. Using the home health, skilled nursing, and inpatient rehabilitation standard analytic files and hospital claims, we built length of stay and payment variables for each site of care for each beneficiary with an acute admission for lower-extremity joint replacement in 2002 or 2003. To account for selection on the basis of unobservable patient characteristics, we develop an IV model that uses the variation in proximity to IRFs and SNFs as a natural experiment. The resulting model examines whether patients who go IRFs and SNFs because of their proximity to these facilities have different outcomes and costs than patients who go home.

Our results indicate that there are differences in costs and possibly in outcomes across PAC sites for LEJR patients. The unadjusted data show that patients whose first site of care is an IRF or SNF have higher rates of mortality or care in an institutional setting 120 days after discharge from acute care compared to patients who receive care at home. However, our analysis suggests that these results are primarily driven by observed and unobserved differences in severity of illness and patient health at admission across sites of care. The apparently deleterious effects of IRFs and SNFs diminish significantly in our IV models that attempt to control for patient selection on both observable and unobservable characteristics. In particular, we find that after controlling for patient selection there are no statistically significant differences in mortality rates across patients in different sites of post-acute care. However, the results from the IV models suggest that patients in IRFs and SNFs are more likely to be institutionalized. In particular the results indicate that compared to patients at home, patients in IRFs and SNFs are more likely to be dead or institutionalized at post-discharge day 120 by 0.18 percentage points and 0.46 percentage points respectively.

The results from the models of Medicare payments show that episodes of post-acute care in an IRF or SNF are much more expensive than episodes of care for patients who receive care at home or in a non-institutional setting. The results from the IV model that accounts for selection both on observable and unobservable patient characteristics show that total Medicare post-acute care payments (for 120 day episodes of care following acute discharge) for IRF and SNF patients were \$8,023 and \$3,578 respectively higher than Medicare payments for patients in the reference group who were discharged home. The results are similar when one compares total Medicare payments for the acute stay plus post-acute care. Finally, these results also highlight the importance of controlling for patient selection, although controlling for selection had a smaller effect in the payment models compared to the outcome models.

It is important in evaluating these findings to understand a key limitation of studies of health outcomes based on observational data: controlling fully for selection is extremely difficult. Our best estimates of the causal effect of PAC on outcomes are the IV models, but we cannot rule out the possibility that some selection remains in these estimates. Outcomes depend on many factors, including patients' physical and cognitive abilities, underlying medical diseases, sensory and emotional factors, willingness to participate in care, and supportive environments. No risk adjustment approach can control for every factor affecting outcomes of care. While our choice of instrumental variables was carefully considered to address this problem, our estimates could be biased if our instruments are invalid.

Another limitation of the study is that the outcomes we analyzed are not the ideal outcomes for LEJR patients. We would have preferred to examine functional status and changes therein, but we did not have the necessary data. Death and institutionalization at 120 days are imperfect proxies for functional decline and are likely to be less closely related than functional status to the surgical procedure and the rehabilitation process. In addition, our outcome measures do not capture other dimensions of quality of life. The evidence from our unadjusted functional measures suggests that patients going to IRFs and SNFs experience a short-term increase in functional status, with IRF patients beginning their stays with a lower level of functioning and achieving with a higher level of functioning than SNF patients over a similar period of time.

Finally, we underscore that our results do not apply to all patients who use IRFs or SNFs. Rather, our IV models show the effects of IRF and SNF use for *marginal* patients. In this context, marginal patients are those whose decision to use IRF or SNF is swayed by the proximity and availability of these PAC sites. Thus our results apply to patients for whom, in a sense, the clinical decision is gray. They do not apply to patients who are ideal candidates for IRF or who clearly require SNF care. Rather than being a limitation of our analysis, our focus on the marginal patient is an asset from a policy decision-making perspective since it is precisely these patients who will likely be affected by the reduced accessibility of IRF care as the 75 percent rule is enforced.

Our analyses of costs have limitations as well. We have not captured the costs of physician, outpatient and hospice care. If patients not using institutional PAC rely more heavily on those types of care, then our findings overstate the degree to which IRF and SNF episodes of care are more expensive. If patients in IRFs and SNFs are using these services after their stay, our findings could understate costs for these patients. However, we do include costs of home health care, which is used at comparable rates by patients regardless of discharge destination. It seems reasonable to believe that use of outpatient and hospice care is likewise comparable across all categories of patients (i.e., those use institutional PAC and those who do not).

Ultimately, in order to fully assess the impact of the 75 percent rule, we would need three additional types of information. First, we would ideally measure real resource use across sites of care rather than measuring only Medicare payments. Second, we would need a method for evaluating the trade-off between better outcomes and higher costs. Finally, we would need better measures of outcomes, including a measure of functional status that was captured consistently across all discharge settings.