

6

Extending the Scope of the PAC Transfer Payment Policy

6.1 Introduction

6.1.1 Conceptual Issues

In considering extending the PAC transfer policy to other DRGs, a few conceptual issues must be addressed. The first has to do with the way patients are clustered into DRGs and whether the Congressional mandate emphasizing total PAC discharges unduly narrowed the range of “problematic” DRGs. Indeed, serious consideration should be given to expanding the policy to all DRGs on the basis that any PAC transfer is a substitution of post-acute for inpatient care. Analytically, the best way to approach the question of more PAC-transfer DRGs is to ask: Why wouldn’t any DRG be a candidate for a discounted per diem payment for an early discharge? That a DRG simply has a low total PAC volume may be a byproduct of the fact that patients have been fractionated into two or more related DRGs and multiple DRGs should be considered as a group.

Barring misleading splitting of DRGs that dilutes PAC totals, one must consider the reasons for PAC use more closely. At bottom, the concern over site substitution of care is paramount. DRG payments are based on historically determined standardized amounts and DRG weights, which, in turn, are based on

(possibly) outdated PAC rates. That is, the current standardized amounts and weights are based on costs and submitted charges that reflect an historical rate of PAC transfers and, presumably, a truncation of inpatient care. To the extent hospitals are more likely to discharge to PAC care today, and do so earlier in the patient's stay, less inpatient costs are incurred and providers enjoy a PPS profit that is not being shared with Medicare. This behavior can be termed "the dynamic PAC transfer problem." The PAC transfer policy addresses the site substitution concern, but to be optimally efficient and equitable, it must do so in a properly targeted way. This is the motivation behind the brief modeling of PAC use in this chapter (section 6.3).

As will be emphasized below, short-stay PAC transfers are of primary policy concern. This immediately raises the question: Who are the PAC patients in a DRG experiencing short-stay PAC transfers? One might not be too concerned if the lengths of stay in a DRG exhibited a smooth normal (or even log-normal) distribution, with relatively few cases below the geometric mean length of stay.¹ But if the distribution is bimodal with clumps of cases with very short and very long lengths of stay, the underlying assumption of patient homogeneity is likely wrong. Surgical DRGs, for example, often contain several related, but quite different, procedures that may result in quite disparate lengths of stay. Procedure inhomogeneity may falsely identify some short-stay PAC cases as substitutions of

¹ The geometric, not the arithmetic, mean length of stay is relevant because the PAC transfer per diem payment policy triggers off the former and not the latter.

care when, in fact, they were actually kept in the hospital a relatively long time *for the specific procedure they underwent*.

6.1.2 Overview of Chapter

The rest of the chapter is in seven sections. Section 6.2 reviews the manner in which HCFA staff selected the 10 DRGs in implementing the Congressional mandate. Drawbacks to the mandate are discussed and, based on various public perceptions of the “PAC transfer problem,” a few key ratios are proposed for identifying additional DRGs for expansion of the policy. Also in this section is a discussion of the limitations of the usual recalibration methods in dealing with the dynamic PAC transfer problem introduced by ProPAC staff (ProPAC).

Section 6.3 provides a brief model of PAC utilization that guides the patient sample frame for analysis and highlights the challenges of teasing out a PAC effect on length of stay. Section 6.4 presents both a static (1998) and dynamic (1992-98) analysis of 23 DRGs appearing in HCFA’s list of 20 DRGs supplemented by MedPAC’s 3 additional DRGs.² Section 6.5 elaborates on the problem of in homogeneous DRGs using craniotomy as a case study. Section 6.6 provides conceptual and empirical arguments for extending the DRG list to DRG pairs, as HCFA did with DRGs’ 263 and 264. Section 6.7 similarly provides conceptual and empirical arguments for extending the DRG list to “super-bundles” of related DRGs that appear fractionated but exhibit fairly similar PAC use rates.

² Two MedPAC DRGs overlapped with HCFA’s list of second DRG PAC transfer candidates while DRG 109 is a newly created DRG in 1999 that used to be DRG 107 in earlier years and does not appear in the 1992 or 1998 claims files.

The chapter ends with Section 6.8 discussing the pros and cons of extending the PAC transfer policy to all DRGs.

6.2 HCFA DRG Selection Criteria

6.2.1 Implementing the Congressional Mandate

BBA Section 1886(d)(5)(J) required the Secretary of DHHS to select 10 DRGs “based upon a high volume of discharges classified within such group and a disproportionate use of” certain postdischarge services (Federal Register, July 31, 1998, p. 40974). The Act then defined a qualified postacute discharge as one with the patient going to a non-PPS hospital, SNF, or receiving home health services for care related to the acute admission. HCFA staff operationalized the Congressional charge in two steps. First, all Medicare PPS discharges in 1996 were ranked in terms of the absolute number of PAC discharges (as defined under Section 1886) and the top 20 in terms of PAC use were identified. Second, staff “considered the volume and percentage of discharges to postacute care that occurred before the mean length of stay and whether the discharges occurring early in the stay were more likely to receive postacute care.” (Fed. Reg., 7/31/98, p. 40975). This description implies 4 interrelated criteria used to select the final list of 10 DRGs.

Mathematically, they can be written as

$$(6-1) \quad TPAC = DIS \bullet (TPAC/DIS) = DIS \bullet (SPAC/DIS + LPAC/DIS)$$

$$(6-2) \quad SPAC = DIS \bullet (SPAC/DIS)$$

$$(6-3) \quad SPAC/DIS = (SLOS/DIS)(SPAC/SLOS)$$

(6-4) $SPAC/SLOS$,

where $TPAC$ = total PAC discharges in a given DRG; DIS = total discharges in a DRG; $SPAC$ = PAC discharges among short-stay (below geometric mean) discharges, $LPAC$ = PAC discharges among long-stay (above geometric mean) discharges; and $SLOS$ = total number of discharges below the geometric mean length of stay in a DRG.

Eq. (6.1) decomposes total PAC discharges into total DRG discharges times the overall proportion of PAC in total discharges ($TPAC/DIS$), i.e., the PAC discharge rate.

The PAC rate can be further decomposed into the proportion of PAC discharges made up of short-stay ($SPAC/DIS$) and long-stay ($LPAC/DIS$) discharges. Total PAC volume was the initial condition HCFA used in considering DRGs for the PAC transfer policy. Eq. (6.2) measures the total volume of PAC discharges occurring before the mean length of stay while eq. (6.3) breaks down the proportion of all PAC discharges occurring before the mean LOS. This proportion is decomposed into two components: the share of short-stay in all discharges ($SLOS/DIS$) and the PAC rate among short-stay discharges ($SPAC/SLOS$). Eq. (4) considers the latter proportion by itself as a criterion; namely, the proportion of short-stay patients discharged to PAC.

6.2.2 Drawbacks to Congressional Mandate

Likely, Congress focused on 10 high volume DRGs, initially, as a compromise. Ten DRGs would allow HCFA to test for other candidates while evaluating the criteria for selection more carefully. Emphasizing high volume PAC DRGs would also target the policy change to DRGs with the highest cost savings and narrow the set to potentially problematic DRGs with significant site substitution effects. The total PAC criterion (eq. 6.1), and its subcomponent, TPAC/DIS, reflect the Congressional mandate. TPAC captures both the PAC rate and the overall size of the DRG in terms of Medicare discharges.

HCFA's two-step procedure recognized the "blunt" nature of the mandate. Total discharges appear in the first two criteria. HCFA staff wanted to target problem DRGs while adhering to the letter of the mandate. Staff recognized that total PAC counts included both short-stay and long-stay PAC cases and that the latter were not of key policy significance because site substitution was likely minimal. Moreover, long-stay PAC discharges (relative to the geometric mean) would be paid the full DRG rate anyway.

6.2.3 The Perceived Transfer Problem

In expanding the DRGs eligible for the new transfer policy, it is worthwhile to review the different perceptions of the PAC problem. Three groups have considered and investigated the problem. First, the Congressional Conferees expressed concern

“that Medicare may in some cases be overpaying hospitals for patients who are transferred to a post acute care setting after a *very short acute care hospital stay*.” (Italics added) (H.R. Rep. No. 105-217, 740).

In its March, 1997 report, ProPAC voices the same concern while emphasizing the dynamic nature of the problem:

“length of stay declines have been greater in DRGs associated with substantial postacute care use, *suggesting a shift in care from hospital inpatient to postacute settings*.” (Italics added) (Pp. 21-22)

The dynamic nature of the problem, as opposed to a static, point-in-time characterization, provides another criterion in expanding the list of DRGs, as explained below.

Finally, HCFA’s response to a comment on the proposed transfer rule makes another important point justifying a broader scope of the transfer policy:

“...the transfer provision [of PPS] appropriately adjusts hospitals’ payments to *avoid duplicate payments* for the care provided during a patient’s episode of care.” (Fed. Reg., 7/31/98, p. 40977)

In sum, three key points have been put forward for expanding the PPS transfer policy to include PAC-defined discharges as well:

1. Hospital overpayments due to very short inpatient stays; (Congressional conferees);
2. Shifts in the site of care over time; (ProPAC) and

3. Duplicate payments for care through greater PAC outlays post-discharge; (HCFA).

6.2.4 Key Policy Variables

Given Congress', ProPAC's, and HCFA's perceptions of the PAC problem, using total PAC cases (TPAC) in a DRG appears to unduly constrain the list of DRGs.. The DRG could have many discharges but a low overall PAC rate. Second, TPAC is based, in part, on the share of long-stay PAC cases which are not of policy concern because they do not imply undesirable skimping or dumping of patients.

The short-stay PAC rate of all discharges (SPAC/DIS) and of just short-stay discharges (SPAC/SLOS) would appear the best at identifying DRGs with a high likelihood that skimping and dumping to PAC providers is occurring in order to make profits on inpatients. The two provide differing perspectives on the problem. SPAC/SLOS indicates the proportion of all short-stay cases that are discharged to PAC. A high rate is troublesome as it suggests that many of the short stays may be due to early transfers. SPAC/DIS, on the other hand, also captures differences across DRGs in the share of short-stay cases in all discharges.³ A high PAC rate may result in a disproportionate share of short-stay cases below the mean which is also of policy concern. Yet a third valuable

³ If the frequency distribution of DRG length of stay was symmetrical, half of cases would always be below the mean LOS. Practically all distributions, however, are positively skewed with many more than half of cases exhibiting short stays.

indicator of potential problems would be the relative odds of observing short-versus long-stay PAC cases among short- and long-stay patients, respectively, i.e., $RELODD = SPAC/SLOS//LPAC/LLOS$. The relative odds of observing a short-stay case going to PAC versus a long-stay case to PAC is generally less than 1.0. As we discuss below in modeling PAC use, patient severity drives both inpatient length of stay and the need for PAC use and usually dominates any perverse effects from early PAC discharge. What the relative odds does is control for the overall rate of PAC use across DRGs by considering the long-stay patients as a form of control group. DRGs with higher odds suggest that PAC transfers for short-stay patients may be particularly unusual.

HCFA staff implemented the Congressional mandate based on static considerations. Levels of PAC discharges were ranked by DRG at a point in time (1996). Staff then responded to the Congressional concern about short stays by identifying DRGs with disproportionate PAC use among short-stay patients. MedPAC (1998, ch. 6) analyzed the growth in PAC use from 1994-96 and displayed DRGs with particularly high TPAC/DIS rates of change, e.g., total mastectomies, coronary bypasses (Table 6-8). "This could indicate that post-acute provider use is spreading to a larger population [as] post-acute care use is climbing most rapidly in DRGs [with] comparably low post-acute care use in 1994."⁴ (MedPAC, 1998, p. 95) Given the concern over the rapid increase in

⁴ Interestingly, MedPAC found the PAC rates had fallen between 1994-96 for 5 of the 10 DRGs HCFA selected for the transfer policy, suggesting a possible regression to the mean and overstatement of the PAC problem (MedPAC, 1998, Table 6-8, p. 95).

PAC use leading to overpayments, analyzing *changes* in the key policy variables also seems in order. Policy makers may consider a secular decline in PAC rates to be a mitigating factor in a DRG's high PAC rate and evidence against treating it as a "PAC problem DRG."

6.2.5 The Dynamic PAC Problem and Recalibration

MedPAC's emphasis on the decline in DRG length of stay as a result of increased PAC referrals adds another dimension to the selection process. It also suggests revisiting the way DRG inpatient payments were initially set in 1983/84 and have been updated since. One might hypothesize that in updating rates the PAC effect has been adequately dealt with. This would be wrong.

Initial standardized amounts and relative DRG weights in 1983/84 had embedded in them a baseline amount of PAC usage. That is to say, patients transferred in the baseline period to SNFs, PPS-exempt hospitals, or to home health had somewhat truncated acute stays. Fifteen years ago, PAC use was much less than now. Over time, two routine HCFA updating protocols have affected DRG payments; neither of which has automatically addressed the growing PAC problem.

First, standardized amounts have been updated annually for market basket inflation. Rising PPS margins, generated in part by greater use of PAC providers, prompted Congress to enact update rollbacks. These were justified by ProPAC site of care analyses.

Second, all DRG relative weights have been recalibrated each year based on charges. DRGs experiencing faster than average declines in lengths of stay--possibly due to greater PAC referrals--have seen their relative weights fall, although by not as much as the fall in their relative LOS because average daily charges are higher among shorter-stay patients.

Because DRG weights are recalibrated each year, a built-in mechanism exists to adjust for changes in patient care management within DRGs. If relatively more drugs are used, then the DRG weight rises, for example. If overall lengths of stay fall, relative to other DRGs, then the DRG relative weight falls. To the extent that recalibration captures shifts in site of care through lower inpatient charges from the (avoided) later days of inpatient care, an additional transfer payment policy focused on PAC may seem redundant. This would apply, in particular, to those DRGs undergoing the greatest shifts to PAC care. Recalibration accounts for DRG-specific changes and provides a powerful automatic adjustor to account for changes in patient care management.

Recalibration does not automatically reduce payments for either acute-to-acute or PAC-related transfers, however. This is for two reasons.

1. Recalibration of DRG weights is outlay neutral via “denominator effects.”
2. Adjustments for transfers eliminates most (all?) of any decline in “the numerator” of the DRG weight.

Denominator Effects. What recalibration does not do is account for secular trends in PAC referral rates. A trend towards greater reliance on PAC

after discharge pervades the acute hospital industry but is factored out of payment updates through normalization of the annual DRG relative charges per case. Thus, recalibration only accounts for DRG-specific PAC transfer increases beyond the norm. It fails to capture industry-wide financial gains from early discharges across all DRGs. The extent of the bias depends on the average percent reduction in inpatient charges across all DRGs due to early PAC discharges. Indeed, DRGs without any reductions in charges from early PAC discharges will see their weights increased because the denominator used to normalize their own average charges is falling (or rising less rapidly) from pervasive PAC use.

Numerator Effects. More significantly, the routine adjustment to charges for transfer patients prevents recalibration from even reducing DRG-specific average charges for excessive PAC use. Under current policy, identified transfers are weighted by the ratio of their acute lengths of stay to the DRG geometric mean. (Transfers with lengths of stay greater than the mean are given a full weight of 1.0.) Thus, early transfers in a DRG are counted less than 1.0. This is done to put the charges for transfers on the same LOS basis as non-transfer cases. The effect is to raise overall charges per discharge in a DRG to assure that non-transfer discharges receive an actuarially fair DRG full payment and not one reduced by short-stay, lower-charge transfers.⁵

⁵ It is even possible that the transfer-adjusted charge per discharge might be higher than if transfers were simply dropped from the DRG weight calculation. Whether the DRG weight would rise after adjusting for truncated stays of transfers depends on whether the average charges per day of transfer versus non-transfer patients exceed the average LOS of non-transfers relative to the geometric mean LOS. Very high per diem charges of transfer patients could result in higher overall adjusted DRG charges per stay.

Summarizing, the manner in which DRG-specific charges are adjusted for transfers eliminates any automatic recalibration adjustment to DRG weights for shorter-stay, lower charge transfers in HCFA's 10 PAC-intensive DRGs. Of course, Medicare now pays less for very short-stay PAC cases in 10 DRGs, thereby saving Medicare money and unlike recalibration, the new PAC transfer policy is targeted to individual hospitals that disproportionately discharge patients early to PAC.⁶ The policy still does not address the problem of early PAC transfers in hundreds of other DRGs, nor is the problem indirectly addressed in any way through annual recalibration because of normalization.

⁶ Targeting individual hospitals is HCFA's stated goal: "We believe that any change in Medicare payment because of the early transfer of acute care patients to postacute care should be targeted at those hospitals that have actually incorporated this practice into their patient care." (Fed. Reg., 7/31/98, p. 40983)

6.3 Model of PAC Utilization

6.3.1 Motivation behind Model

The new PAC transfer policy presumes that early discharges to rehab and psychiatric hospitals, SNFs, and to Home Health represent a clear substitution of care similar to transfers to other acute hospitals. While a reasonable assumption, it is important to understand the reasons behind such discharges before expanding the number of PAC transfer DRGs. Clinical issues may be important. For this reason, a general model of PAC utilization could provide a structure for evaluating new DRG candidates. Particular attention should be given to the possible links between PAC rates and lengths of inpatient stays because reduced, per diem payments for PAC cases are triggered by shorter stays prior to PAC discharge. The PAC-LOS link must be carefully considered because PAC patients generally have longer, not shorter, stays. Any offsetting feedback effects of PAC leading to early discharge are usually not observed in the raw, unadjusted data.

6.3.2 Model

Why are patients discharged to post-acute care? Three types of clinical follow-up are possible. First, patients undergoing an acute inpatient episode, e.g., stroke, may need post-acute continued treatment, e.g., rehabilitation. Second, patients may suffer from chronic illnesses, e.g., arthritis, congestive heart

failure, that require acute care followed by continuing SNF care. A third type of post-acute care may simply be a return to the post-acute provider for an unrelated condition, e.g., a psychiatric patient who breaks her hip. In addition to clinical factors, some patients may be sent to post-acute providers simply due to the lack of home support or to long travel distances. In these cases, the patient may need short-run care that could have been provided by a spouse or relative if they had been nearby.

Why aren't patients discharged to post-acute providers? Most do not need intensive follow-up care and can take care of themselves or have adequate help in the home. Others are either transferred to another acute care facility or die in the hospital.

The likelihood of a patient being referred for PAC after an acute discharge depends on several variables (see below). The path diagram indicates the positive, negative, and null effects of prior variables on the likelihood of post-acute use (PAC). Certainly the key variable is the severity of the condition either upon admission to the hospital (SEV on ADM) or by developing complications during the admission.

More severely ill patients will likely require PAC after discharge, which is indicated by a positive arrow in the figure from SEV to PAC. It is this powerful influence that

produces the

generally

positive

correlation

between PAC

rates and

inpatient LOS.

Other

variables

either reinforce or attenuate the positive SEV-PAC link. In the diagram, the effect of severity on PAC use is divided into three components: two that carry the positive link and a third that offsets the link to some extent. Considering the

negative effect first, patients who die or are transferred to another acute hospital (DIED/ATRANS) will not exhibit PAC use on the first inpatient admission. As more severely ill patients are more likely to die, the positive correlation between severity and PAC use is reduced and understates the strength of the direct effect.

Severity also has an indirect, positive effect on PAC through longer inpatient stays (LOS). With greater severity typically comes more complications that result in longer stays and greater need for PAC after discharge. It is primarily this path that produces the observed positive correlation between LOS and PAC; LOS, being a proxy for greater (unmeasured) severity and post-acute care needs (MedPAC, 1998, p. 99).

A negative feedback arrow is drawn from PAC back to LOS to indicate the possibility of early PAC discharges shortening stays. It is this feedback behavior that is of most concern to Congress and HCFA policy makers. Early PAC discharges diminishes the LOS-PAC correlation driven by underlying severity, although it is not generally so strong as to reverse the sign.

A patient's severity upon admission to an acute facility, although largely random, is also related to a patient's sociodemographic characteristics, including age (AGE) and whether the patient lives alone (ALONE) among other factors. Both likely relate positively to severity upon admission. Older persons are afflicted with more serious illnesses on average, e.g., cancer, strokes. They also recover from surgery more slowly in the hospital. This produces a positive direct effect of age on PAC use even after controlling for severity upon acute admission. Persons living alone are also more apt to require post-acute care.

A final important variable affecting the likelihood of a PAC referral after discharge is the patient's PAC status just prior to the acute admission (pre-PAC). Patients admitted from PAC providers prior to an acute admission are more likely to continue their PAC use post-discharge for services related and unrelated to the admission itself. Pre-PAC usage will also be positively related to sociodemographic characteristics. Because we will not have information on a patient's prior PAC use in subsequent analyses, it is important to keep this link in mind. Any biases are discussed briefly in section 6.3.3.

6.3.3 Implications of Model for Identifying Problematic PAC DRGs

The path model has implications for identifying possible DRG candidates for extending the PAC transfer policy. First, consider the static implications. It is clear that the overall PAC/DIS rate is a weak criterion for identifying DRGs

experiencing feedback effects of early PAC transfers on LOS. This is for three reasons. Most importantly, the link between inpatient SEV, LOS, and PAC use rates will generally dominate the feedback effect of PAC on LOS. Also, any Pre-PAC use will confound the feedback effect by artificially strengthening the direct LOS-to-PAC link. By artificially, we mean that unrelated Pre-PAC use will raise both inpatient LOS and post-discharge PAC, masking a negative feedback link between PAC and LOS. And third, the severity link via death (or acute transfer) lowers LOS (for a given severity) but does not result in PAC use. Hence, some non-PAC cases have short stays, not because they were transferred to PAC, but because transfer was impossible. Two of the three confounding paths can (theoretically) be factored out through careful sample selection. By deleting all cases where the patient died, was transferred to another acute facility, or was admitted from a Pre-PAC provider (e.g., SNF), one can avoid a downward bias in the DRG PAC rate. The bias arises because the PAC decision to discharge early to PAC is censored. That is, hospitals (and physicians) might have discharged the patient early to PAC had the patient lived. In this chapter, patients who expired or who were transferred to another acute facility were excluded. It was not feasible to drop patients already receiving PAC services just prior to an acute admission. This likely produces an upward bias in the DRG total PAC rate. The bias should not be very severe, however, because of the generally low Pre-PAC frequency. It can also be accounted for using more targeted measures of PAC effects.

Remember that PAC/DIS can be decomposed into SPAC/DIS + LPAC/DIS, or the short- and long-stay PAC rates. The long-stay PAC rate can be a good proxy for the severity level in a DRG as long-stay patients discharged to PAC are likely quite ill. The short-stay PAC rate is a more targeted measure of the negative feedback effect. Even better is the share of short-stay PAC patients of all short-stay patients, SPAC/SLOS. The denominator of this ratio controls for severity as short-stay patients are presumably less ill with fewer serious complications. A high percent of patients in this group discharged to PAC is strongly indicative of a feedback effect. However, because some DRGs exhibit high severity levels for most patients, the overall PAC rate will be high based on patient care needs alone. Therefore, calculating the relative odds of short- versus long-stay PAC patients is a quick way of controlling for high severity levels. In effect, LPAC/LLOS becomes a control group reflecting the direct arrow between SEV and PAC as well as the indirect arrow via LOS.

Next, consider the dynamic implications of the model. Within DRGs over time, patients on average have (a) become sicker, (b) stayed shorter times in the acute facility, and (c) used PAC more often. This is strong circumstantial evidence of a strong feedback effect as shorter LOS cannot be interpreted as a decline in average patient severity. Sharp declines in inpatient LOS in a DRG suggest either that hospitals are (a) becoming more efficient in the management of patients without dumping patients into PAC, and or (b) using PAC to shorten stays and save on costly inpatient resources. DRGs exhibiting significant

increases in the PAC/DIS rate coupled with declining average LOS are likely undergoing extraordinary rates of site substitution of care. Thus, (PAC/DIS, LOS) trends are indicative of dynamic PAC problems. Rapid increases in (SPAC/DIS, SPAC/SLOS) may be even more indicative of particularly high amounts of site substitution as PAC rates could be rising but primarily among long-stay cases.

Any unusual increases in the relative odds of short-stay versus long-stay PAC rates may be the best single indicator of all. PAC/DIS rates may be rising simply among long-stay patients. This may mean a higher quality of care being provided through continuity of care post-discharge. If the PAC/DIS rate is rising faster among short-stay than long-stay patients, on the other hand, this is strong evidence of a secular decline in inpatient LOS and services due simply to early PAC transfer.

6.4 Extensions Based on HCFA & MedPAC DRGs

6.4.1 Justification for Additional DRGs

In addition to the 10 DRGs that HCFA staff selected to implement the PAC-transfer policy, 10 additional DRGs were considered by HCFA and a few others by MedPAC staff. The 10 HCFA DRGs are the residual after the first 10 were selected. They were considered by HCFA based on total PAC volume alone then rejected for final selection because they generally had lower rates of short-stay PAC discharges. MedPAC staff in comments on the new transfer rule suggested 6 DRGs, 3 of which overlapped with HCFA's second ten, e.g., the 3

bypass DRGs.⁷ The 3 additional MedPAC DRGs involve simple pneumonia.

Hence, 13 additional DRGs are investigated in this section.

⁷ In the 1999 DRG Grouper, heart bypasses were split into 3 DRGs, 106, 107, and 109 from the original two (106, 107). Care must be taken in analyzing trends in them because 106, bypass with cardiac cath, was split into with and without PTCA with the non-PTCA cases put into 107, which was always bypass without cardiac cath on the same admission. DRG 107 cases are now in 109.

All of the HCFA second-tier DRGs have fairly high PAC counts. The MedPAC recommendations are high-PAC DRGs as well with a strong emphasis on the PAC discharge rate.

6.4.2 Data Sources

We used HCFA's Medicare Provider Analysis and Review (MedPAR) data files exclusively for our analyses. MedPAR provides records for 100 percent of Medicare beneficiaries using inpatient services, as well as DRG - specific information. There were roughly 12 million inpatient records to work from in each of two years, 1992 and 1998. Using variable #113 on the discharge record, discharge destination code, we identified the cases discharged to a postacute care provider, with codes 3, 5, and 6. We did not verify PAC using any PAC claims. All inpatient deaths and acute hospital transfers were excluded (code = 20 or 2). Only PPS discharges were included; distinct past psychiatric and rehab patients were dropped. After calculating the geometric mean length of stay for each DRG, we were able to categorize postacute care transfers as either short stay and long stay cases. Short-stay patients were those with $LOS \leq \text{geometric-mean} - 1$ day. Similarly, we identified the rate of short stay postacute care transfers among all short stay cases.

6.4.3 Static Analyses

Table 6-1 gives the key PAC characteristics of the 10 DRGs currently involved in the PAC-transfer system plus the additional 13 recommended by HCFA and MedPAC for

investigation. The data come solely from the 1998 MedPAR acute hospital discharge files.

Original 10 DRGs. The top 10 DRGs chosen initially by HCFA exhibit very large PAC levels and PAC discharge rates (except for DRG 264, skin graft without CC, which was paired with 263). All 10 appear to be excellent choices based on the other criteria as well. Most have fairly high short-stay PAC rates (except possibly for strokes, 14, and mental retardation, 429). They also all have quite high relative odds ratios. Ratios near 1.0 suggest that the frequency of PAC cases is just as likely to be found in short- as in long-stay cases. A short-stay case is defined as one at least 1 day shorter than the geometric mean LOS for the DRG. Strokes had the lowest odds ratio, .67, which is still quite high compared with other DRGs.

Next 13 DRGs. The second group of 13 DRGs also exhibit large numbers of PAC discharges (with the exception of DRG 109 which is an artifact of the partial shift of some bypass patients from 107 to 109). Their PAC rates are generally lower, however, although still quite substantial in most instances compared with all DRGs. Roughly 100 DRGs exhibit PAC rates of 10 percent or higher. While none of the original 10 DRGs had relative odds ratios below two-thirds, 4 of the next 13 had odds ratios below .50, with DRG 243, medical back problems, the lowest at .356. Back problems exhibit a fairly high overall PAC rate but quite low occurrence among short-stay patients. One reason for the low short-stay PAC rate (=4.1 percent) is the short LOS of this DRG of 4.7 days (excluding deaths and transfers to other acute hospitals).

6.4.4 Dynamic Analyses

Table 6-2 shows rates of change of the key PAC characteristics over the 1992-98 period. Relative odds are given as absolute proportions in each year.

Original 10 DRGs. Almost all of the original 10 DRGs show large increases in the PAC rate over the 6-year period. DRG 209, major joint surgery, and 264, skin graft without complications, saw their PAC rates rise by over one-third. The growth in short-stay PAC cases was mixed, however, with 4 of the 10 DRGs experiencing negative rates. Note DRG 14, strokes, in particular. This result warns against using the overall PAC rate as a barometer for a growing problem among short-stay patients. Despite negative or low growth rates for several DRGs, all of the short-stay PAC rates among short-stay patients grew anywhere from 14.3 percent (DRG 14) to 56.6 percent (DRG 264). Negative growth in the share of short-stay PAC cases, coupled with overall positive growth in SPAC/SLOS highlights the “moving target” phenomenon of the geometric mean.

Consider DRG 209. Its short-stay PAC rate declined 6.3 percent over 6 years while its PAC rate among only short-stay patients increased over 44 percent. This can happen when the share of short-stay patients in the DRG, defined as cases discharged at least one day below the geometric mean length of stay, falls very rapidly. In the case of DRG 209, the share of short-stay patients fell over 50 percent (not shown). The short-stay share, in turn, will fall, in part, as more long- and short-stay patients have their acute admission truncated by a PAC transfer.

Eight of ten of the original DRGs also show an increase in their relative odds ratios, led by DRGs 264, 209, and 483, Tracheostomy. Hence, while the length of stay in these DRGs was often falling 35-45 percent, the likelihood of short-rate patients being transferred to PAC was rising relative to long-stay patients.

Next 13 DRGs. PAC rates in several of these DRGs increased even faster on average than in the original 10 DRGs, led by DRGs 106,7,9, heart bypass at 90 percent and DRG 243, medical back problems, at over 62 percent. This is explained, in part, by starting from lower base rates (see MedPAC, p. 95). Short-stay PAC rates, both as a share of all discharges and just for short-stay discharges, generally rose as fast or faster than in the 10 original DRGs. DRG 90, simple pneumonia without complications, is a notable exception. It was one of only 3 of these DRGs that saw its relative odds ratio decline. Conversely, DRG 89, simple pneumonia with complications, showed strong growth in both of short-stay PAC indicators and in its relative odds ratio.

The heart bypass DRGs experienced the strongest PAC growth across all of the statistics. PAC's share of short-stay patients rose 116.5 percent and its relative odds also jumped 11 points.

DRG 415, OR procedures for infectious diseases, exhibited particularly strong PAC growth as well. Despite the fact that its average length of stay plummeted 81 percent, it still showed a 58 percent increase in short-stay PAC

patients and a 51 percent increase in the short-stay PAC rate for just short-stay patients. Its relative odds increase was the highest of any of the DRGs.

6.5 Inhomogeneous DRGs: Implications for PAC Transfer

6.5.1 Problem of Inhomogeneous, Bimodal Distributions

When considering extending the postacute care transfer policy to include additional DRGs, attention must be given to the procedures included within each DRG, and lengths of stay patterns, as well as volume and overall rates of postacute care use. Within a given DRG the various covered procedures may have disparate lengths of stay causing a bimodal distribution with clumps of very short and very long stay cases. DRG inhomogeneity causes some cases discharged to postacute care to be classified erroneously as a short-stay PAC case despite having been hospitalized for a longer time for a specific procedure. The acute care facility may be penalized by receiving only partial DRG reimbursement despite discharging the patient when appropriate and not as a premature shift in the site of care.

Conversely, a case may be discharged to postacute care before the average length of stay for a particularly difficult procedure in the DRG; yet because the length of stay is above the overall average for the DRG, the hospital will receive full DRG payment under the PAC transfer policy. While the majority of DRGs consist of procedures with similar length of stay distributions, this cannot be assumed for all DRGs. Inhomogeneous procedure DRGs may not be suitable for the postacute care transfer policy.

One can think of the PAC destination code as a potential indicator, or “test,” of a truncated stay. As implemented in the payment policy, it only materially applies for stays at least one day below the geometric mean LOS. How accurate an indicator it is of site substitution depends upon the homogeneity of cases and procedures within the DRG. The implicit assumption is that all short-stay cases are less severely ill and, therefore, in less need of PAC. Any short-stay patient discharged to PAC, consequently, is assumed to be sicker, upon discharge due to a “premature” discharge.

The PAC indicator can be thought to have both a sensitivity and specificity dimension. How sensitive is the indicator in picking up truly truncated cases? How specific is it in ignoring cases that have not been discharged early? If patients are undergoing very different kinds of procedures requiring very different lengths of stay, the sensitivity and specificity of the PAC indicator can be low. It can be insensitive in not picking up early discharges of cases undergoing the more complicated procedure. It can also be unspecific by including longer stay cases undergoing a simpler procedure. The former have been discharged earlier resulting in a site of care substitution while the latter have gone to PAC after staying longer than expected.

6.5.2 DRG 1: Craniotomy, A Case Study

To illustrate the bimodal/inhomogeneous DRG problem, DRG 1, *Craniotomy, Age Greater Than 17 Except For Trauma*, was identified as an

example because it appears to have a collection of procedures with varying degrees of severity and length of stay patterns. It includes skull biopsies, diagnostic procedures, brain excisions, craniotomies, ventriculostomies as well as shunt insertion, repair and removal. The DRG geometric mean length of stay is 7.2 days, but it may not accurately reflect the systematic variation in lengths of stay for different procedures. To better understand multiple length of stay patterns within a DRG, procedures must be organized into groups reflecting similar inpatient length of stay distributions. Based on the range of procedures, we hypothesized that DRG 1 contained two or more subgroups with significantly different mean lengths of stay, creating the potential for cases to be falsely identified as short-stay PAC despite a greater than average length of stay for the particular subgroup undergoing the procedure.

6.5.3 Identifying Surgical Subgroups

The purpose of reclassifying the surgical procedures is to analyze the groups separately and identify any patterns in length of stay and utilization of postacute care services within each subgroup that might be masked when they are all lumped together. We began by highlighting the procedures, identified by ICD9 procedure codes, included within DRG 1. The 1998 MedPAR file was used to extract length of stay frequency distributions and volume of cases for all DRG 1 procedures. Procedures were then grouped into one of three surgical subgroups

based on the frequency and distribution of cases in each of the following length of stay categories; 1 to 3 days, 4 to 8 days, 9 to 15 days, 16 or more days.

A basic clinical understanding of each procedure also helped in understanding its severity, and therefore the length of stay patterns. The primary ICD9 procedure codes covered in DRG 1 are; biopsies, diagnostic procedures, ventricle shunt procedures, ventriculostomies, and craniotomies. Biopsies require the removal and examination of tissue of the brain, skull or cerebral meninges for diagnostic purposes. Ventricle shunts are tube-like devices inserted to drain intracranial fluid from the brain to another body cavity, such as the abdominal cavity, for absorption into the blood stream. Shunt infection occurs in roughly 5% of cases and requires removal and replacement. A ventriculostomy serves the same general purpose as a shunt but without any tube insertion. Instead, an opening is created, with a laser, in the third ventricle of the brain to release excess fluid thereby reducing pressure on the brain. A craniotomy is any operation on the cranium, such as a craniectomy, which is the excision of part of the skull. Based on our clinical understanding of DRG 1, we predicted that further analysis would confirm that biopsies were among the less severe procedures, ventricle shunts were more challenging, and craniotomies, craniectomies and ventriculostomies required the most inpatient medical attention.

The final classification was based on two factors -- individual procedure length of stay patterns and perceived degree of clinical complexity. Surgery Class 1 was considered the least severe and consisted of procedures such as,

biopsies, simple operations, diagnostic procedures and some shunt replacement and insertion. Surgery Class 2, slightly more severe cases, included brain excisions and cerebral meninges repair. Surgery Class 3 included the most intense procedures with cases such as craniotomy, ventriculostomy, incisions, and some shunt removal, irrigation and insertion. The distribution of cases in the three subgroups was roughly equal, and their individual geometric mean lengths of stay clearly indicated distinct inpatient utilization patterns, at least between Class 1 and Class 3.

6.5.4 Discharge Destination by Subgroup

Using variable #113, discharge destination code, from the 1998 MedPAR file, we examined the postacute care utilization rates for each of the specific surgical subgroups (see Table 6-3). Classes 1 and 2 have similar discharge patterns. The majority of cases are discharged to home/self care, and postacute care utilization rates are roughly equal (40.7 percent and 42.2 percent, respectively). Mortality rates are low for both surgery classes. On the other hand, Class 3 has a unique discharge destination pattern. Only a quarter are sent home with self care. A significant portion of cases are sent to a postacute care provider (45.5 percent), and the rate of inpatient deaths is very high for this group (23.1 percent). Due to the high percentage of expired cases in Surgery Class 3, subsequent analyses excluded inpatient deaths, identified by a discharge destination code '20'. The following table shows the number of cases and geometric mean length of stay for all Surgery Classes when the expired are excluded.

Surgery Class	No. of Cases	Geometric Mean LOS
Class 1	7,643	6.44
Class 2	9,242	8.50
Class 3	7,471	13.05

Total	24,356	9.25
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6.5.5 Frequency Distribution of LOS by Subgroup

The 1998 MedPAR file was used to develop the frequency distributions for the three Surgery Classes. We first identified the number of cases discharged from an acute care facility to a postacute care provider for a 1 to a 50-day length of stay. If the length of stay

equaled 51 days or more, it was categorized as a 51-day inpatient stay. We plotted the distribution of cases by length of stay for each Surgery Class, as well as the total for DRG 1. See Figure 6-1.

Surgery Class 1, 2 and 3 have distinct distribution curves. The modal length of stay for Class 1 is 2 days (1,323 cases). Class 2 peaks at day 4 (1,005 cases) and Class 3 at day 7 (500 cases). The geometric mean lengths of stay also follow the same pattern, as reported in Section 6.5.4. Class 1 and Class 2 have a more similar distribution compared to Class 3. Notice how the overall frequency distribution of LOS in DRG 1 masks procedure-specific differences.

Class 1 and 3 highlight the inherent problem of including inhomogeneous DRGs in the postacute care transfer policy (see Figure 6-2). The Class 1 mean is 6.4 days compared to 13.1 for Class 3. The geometric mean length of stay for DRG 1 overall, 9.4 days, falls between these two “procedure based” means. All cases with $LOS \leq 9$ days would be paid per diems under the PAC policy, i.e., all cases under either density function to the left of the overall DRG 1 mean. Note that 23 percent of the cases in Class 3 (area B) that would be considered short-stay PAC cases for their procedure, fall above the overall geo-mean for DRG 1. Similarly, 8 percent of Class 1 cases are long-stay postacute care cases for Class 1 (area A); yet because they have a length of stay of less than 9 days they would be reimbursed as a short-stay case. The implications of ignoring procedure-based LOS differences are discussed in Section 6.8.

6.6 Extensions Based on DRG Pairs

6.6.1 Description & Justification for Pairs

In selecting the top 10 DRGs for initial implementation of the PAC transfer policy, HCFA staff decided to include DRG 264 as a pair with DRG 263. Together, the two DRGs capture patients undergoing skin graft or debridement procedures for skin ulcer or cellulitis, without and with complications, respectively. HCFA argued that if the much lower PAC volume DRG 264 was excluded, an incentive would be created for hospitals not to code complications so as to receive full DRG payment. The extent of such an incentive depends directly and multiplicatively upon the ratio of the full DRG payment for the paired DRGs and the geometric mean of the DRG without complications minus one day for double payment on the first day.⁸ Based on data published in St. Anthony's 1999 DRG Guidebook, DRG 263's full DRG payment was \$8,226 versus \$4,547 for DRG 264. Therefore, a hospital would have to keep a patient in the hospital for skin grafts at least 9 days to recover the full payment it would have received had it coded complications. Nine days is approximately 2 days beyond DRG 264's arithmetic length of stay. Hence, the greater the disparity in full payment between the DRG

⁸ For the uncomplicated paired DRG to generate the same or greater revenue as the complicated DRG, the per diem revenue of the former must be greater than the full DRG payment of the latter. That is, 1) $PD2(LOS_{i,2} + 1) > DRG1$, where $PD2$ = the per diem payment for the second, uncomplicated DRG pair, $LOS_{i,2}$ = Length of the i-th in the second DRG, and $DRG1$ = the full DRG payment in the complicated first DRG. Because $PD2 = DRG2/GMLOS2$, where $DRG2$ = full payment for DRG 2 and $GMLOS2$ = the uncomplicated DRG's geometric mean LOS, equation (1) can be rewritten as 2) $LOS_{i,2} > [DRG1/DRG2]*GMLOS2 - 1$.

pair and the higher the geometric mean LOS of the uncomplicated DRG, the less the incentive to not code complications.

Several other “pairing factors” are used in the DRG classification system. The best known is age $><17$, but others include (a) with or without cardiac catheterization, (b) with or without trauma, (c) with or without heart attack (AMI), etc. It is arbitrary whether one defines these criteria splitting DRGs as pairing criteria or different, but related illness, criteria. In this report, we have separated the analysis as follows. In this section, we consider DRG pairs based on complications, age, and cardiac catheter splits. In section 6.7 we extend the concept to include the other pairing factors--as well as relatedness more generally--in defining “super-DRG bundles.”

While age and cardiac cath can be considered along with complications in pairing DRGs, it should be noted at the outset that they are not gamable as are complications. Both patient age and whether he/she underwent cardiac catheterization on the same admission are perfectly auditable without question. Complications can always be a grey area. Nevertheless, it is worth considering such pairs for their similarity in PAC use. On this basis, there may be little reason for excluding them.

6.6.2 Analysis of Pairs in the HCFA-MedPAC Expanded List

Besides DRGs 263-4 in HCFA's original 10, another 6 DRG pairs occur in the list of 23 expanded DRGs split on age, cardiac cath, or complications:⁹

DRGs **1**, **2**, and **3**: Craniotomy, age>17 w/o or with complications, age<17

DRGs **79**, **80**: Respiratory Infections, age>17 w/ or w/o complications

⁹ DRGs 209-211 are split on several criteria including age, complications, and with or without major joint surgery. HCFA included all three in its original 10 DRGs because of their very high PAC use rates.

DRGs **89, 90, 91**: Simple pneumonia, age>17 w/ or w/o complications, or age<17

DRGs **106,7,9**: Coronary bypass with PTCA, w/o PTCA w/ or w/o complications

DRGs **148,9**: Major bowel procedures, w/ or w/o complications

DRGs **296, 297, 298**: Nutritional/metabolic disorders, age>17 w/ or w/o complications, or age<17.

Bolded DRGs were included in the expanded list of 23 DRGs. Thus, MedPAC has recommended all three paired pneumonia DRGs and concurs with HCFA in considering all three paired bypass DRGs.

Table 6-4 includes the original pairs, 263-4, along with the six new pairs under consideration. The table is analogous to Table 4-1 in reporting the key PAC use rates and relative odds ratios. As before, data are for calendar year 1998, excluding in-hospital deaths and transfers to other acute hospitals. Column (1) gives the total number of PAC cases for the paired set of DRGs.

All pairs are already high PAC use DRGs by virtue of HCFA's selection criteria. "Ignored" pairs do exhibit substantial numbers of new PAC cases, with the obvious exception of the age<17 split. The bypass DRGs are notable in being fairly evenly split between those with or without cardiac cath on the same admission. This is reflected in the PAC numbers for DRGs 106,7. For three-quarters of calendar 1998, these two DRGs contained all the bypasses with or without cardiac cath. DRG 109 PAC counts will eventually include all bypass with out cath.

PAC referral rates are high in several of the DRG companions not in HCFA's top 20 list. Craniotomy with trauma, for example, DRG 2, had 3,384 PAC transfers in 1998 and a 61 percent PAC rate, which actually exceeds the rate for included DRG 1. But except for DRG 2, short-stay PAC rates of the companion DRGs are lower. Even, still, their relative odds ratios remain fairly high and quite comparable to the included DRGs. This implies that their lower short-stay PAC rates are due to lower PAC rates in general and not to a bias away from short-stay PAC discharges. Except for the generally lower PAC rates of the companions, which is not compelling, there is little reason to treat DRG 264 differently from the other DRG pairs.

Dynamic analysis, shown in Table 6-5, confirms this conclusion. In several instances, the PAC growth rate over the 1992-98 period has been greater in the less complicated DRG pair. Growth in the short-stay PAC rate is mixed with DRG 149 showing exceptional growth and DRGs 90, and 297 minimal or even negative growth. Nevertheless, the relative odds ratios on all the DRG pairs (except DRG 297) rose over the period and ended at relatively high levels of 40-50 percent or more.

6.6.3 Analysis of All DRG Pairs

Over 125 DRG pairs exist in the classification system based on age, cardiac cath, and complications. In identifying those that might be candidates for extending the PAC transfer policy, we first ranked individual DRGs in pairs from

high to low on their short-stay PAC per discharge rate, SPAC/DIS. This measure is preferable to total PAC rates because it

ignores the high PAC rates of long-stay patients, who are not targeted by the PAC transfer policy. SPAC/DIS captures both the likelihood of a short-stay patient being discharged to PAC and the likelihood of a patient experiencing a short stay in the first instance. DRGs with low rates on either measure may not be good candidates for the policy.

Once all DRGs were ranked, the top 25 index DRGs were chosen for consideration along with their companion DRGs. The top 25 DRGs had SPAC/DIS ratios ranging from a high of 0.304 (Knee procedures with infections and complications) to a low of 0.105 (Cardiac valve procedures w/o cardiac cath). The low value (about 10 percent of discharges) is still roughly three times the rate for all paired DRGs. The results are presented in Table 6-6.

Out of 25 pairs, 15 had total PAC counts in 1998 of 10,000 or more. The lowest total PAC count was for DRG pair 501,2 (Knee procedures with infection w/ or w/o complications), that, together, had 1,587 discharges--mostly in 501. Low overall PAC volume for this pair is due to its overall low frequency of cases. DRG 501 had the highest short-stay PAC transfer rate of any DRG in a pair as well as high PAC rates per discharge. Its smaller companion DRG 502 showed very similar characteristics.

Besides ranking high on the SPAC/DIS measure, all 25 index DRGs also exhibited high relative odds as well. Only DRG 1, craniotomy except trauma w/ age>17, had an odds ratio as low as the median ($\approx .40$) of all DRGs in pairs. The vast majority of pairs had odds ratios above .50.

Companion DRGs in pairs were usually uncomplicated or of young age and did not exhibit the high short-stay PAC rates of their index DRGs. (This is to be expected given the way the pairs were selected based on individual DRGs with especially high SPAC/DIS ratios.) Notable exceptions are 6 DRG pairs with at least two DRGs in the top 25 index DRGs:

DRGs 501, 502: Knee procedures w/ infection w/ or w/o complications

DRGs 263, 264: Skin graft for ulcer w/ w/o complications

DRGs 210, 211, 212: Hip/femur procedures, exc. Major joint, age ><17 w/ or w/o complications

DRGs 79, 80, 81: Respiratory infections, age ><17, w/ or w/o complications

DRGs 1, 2, 3: Craniotomy age ><17, w/ or w/o trauma

DRGs 106, 107, 109: Coronary bypass w/ or w/o PTCA, w/ or w/o cardiac cath.

Although the SPAC/DIS rates of companion DRGs were generally lower, their relative odds ratios still were quite comparable to that of the index DRG. Companion DRGs in four pairs, however, showed much lower odds ratios than their index DRG:

DRGs 83 (o.r. = .708), 84 (.236): Major chest trauma w/ or w/o CC

DRGs 16 (.542), 17 (.215): Nonspecific cerebrovascular disorders w/ or w/o CC

DRGs 154 (.441), 155 (.117): Stomach procedures age >17, w/ or w/o CC

DRGs 218 (.641), 219 (.298): Lower extremity procedures except hip, foot, femur, age >17 w/ or w/o CC.

All four companion DRGs have odds ratios well below the median. They also have very short geometric mean lengths of stay of 2.6 to 3.6 days. Although

not problematic DRGs in terms of high short-stay PAC rates, no compelling reason exists for not including them in the pair.

6.7 Extensions based on “Super-DRG” Bundles

6.7.1 Justification for Bundles

Often, the way in which DRGs are clustered is inconsistent with the proposed Congressional method for identifying problematic DRGs experiencing truncated PAC stays. Emphasizing only overall PAC volume and PAC rates, as mandated by Congress (Federal Register, July 31, 1998, p. 40974), does not take into consideration the fact that many DRGs are fractionated, hence giving a biased view of the total PAC problem for a similar class of cases. We have already justified and analyzed three standard ways DRGs are fractionated, i.e., by complications, age, and cardiac cath. In fact, DRGs are fractionated in many other ways, including trauma, length of coma, infections, PTCA, AMI, complex diagnosis or procedure, use of laparoscope, malignancy, major OR procedure, skin graft, or related condition. And these stratifiers do not even include still others such as location of fracture, e.g., thumb versus other hand or wrist procedures, or major versus minor bladder procedures, to name a few.

In extending the PAC transfer policy, it is necessary to go beyond the flawed concept of a single DRG to discover multiple DRGs with a common link that exhibit similar PAC statistics. Aggregation of this sort provides a logical bridge in expanding the PAC transfer policy that is easily justified to Congress and that avoids unintended inequities in the way DRGs--and potentially hospitals--are

treated under the policy. Hospitals can be inadvertently penalized or not under the current implementation criteria due to systematic differences in their DRG mix.

6.7.2 Criteria for Bundling

Given the myriad ways DRGs are decomposed, what is the best way to put them back together for the purposes of extending the PAC transfer policy? No *a priori* solution presents itself. In lieu of conceptual guidance, we first ranked all DRGs using 1998 data based on their short-stay PAC rates, i.e., SPAC/DIS. Next, we noted the key characteristics of roughly the top 100 DRGs in search of recurring patterns; that is, elements in the descriptions that occurred multiple times across DRGs.

The following DRG descriptors reoccurred several times in the top 100 DRGs:

- Trauma
- Skin grafts
- Burns
- Infections
- Behavioral Health
 - o Psychiatric
 - o Alcoholism
- Major Organ Procedures
 - o Heart
 - o Bowel
 - o Stomach
 - o Hepatobiliary System
 - o Brain

- Musculoskeletal Procedures
 - o Major joint/back
 - o Fractures
 - o Amputations

MDCs, in general, do not appear to be the best way to isolate DRGs for consideration in extending the PAC transfer policy. The majority of DRGs exhibit low PAC rates as do MDCs (with a few very notable exceptions such as musculoskeletal and burns). Nevertheless, within many low-PAC MDCs one does find a DRG or two with high rates--usually related to infections, trauma, or a major organ procedure. One example is DRG 320: Kidney & Urinary Tract Infections, age >17 w/ CC. While in an MDC with unremarkable PAC rates for the most part, this particular DRG exhibits an SPAC/DIS rate of 0.12, which is roughly 3 times the median DRG rate, and a relative odds rate of 0.66, which is 50 percent above the DRG norm. Given the number of DRGs across MDCs with infections in their titles that appear in the top 100 list, it is clear that infections, for example, not organ or body system, is a better predictor of PAC use.

This also makes sense from a clinical perspective. It is not surprising that patients treated for trauma, burns, amputations, or psychiatric illnesses are far more likely to be discharged to PAC. But more than just being discharged to PAC, a relatively large number of *short-stay* PAC patients with these conditions and procedures are being discharged “early” to PAC.

In the analysis to follow, super-DRGs are created that group together DRGs under the descriptors listed above. Once associated with larger groups, the PAC

volumes of isolated, small-volume DRGs give a fairer picture of the true volumes associated with characteristic transcending fractionated DRGs. Key to successful aggregation is similar performance according to the set of PAC use indicators used throughout the chapter. Similar PAC behavior across DRGs pinpoint meaningful casual factors obscured by looking at individual DRGs.

6.7.3 Analyses of Super-DRG Bundles

A set of tables have been constructed indicating potential super-DRG bundles. Some DRGs fall into more than one bundle as would be expected.

Trauma. Table 6-7 displays all 18 DRGs with a trauma descriptor. Total PAC cases in 1998 were 31,660 (based solely on discharge destination code), ranging from a low of 1 (DRG 282: Trauma to skin, age<17) to a high of 7,320 (DRG 280: Trauma to skin, age>17 w/ CC). Separately, none of the DRGs reached HCFA's initial 14,000 PAC volume threshold. PAC use rates (= 51 percent, on average) are nearly double the rate for all DRGs (= 26.4 percent). Short-stay PAC rates are more than double the average, i.e., 13.5 percent versus 5.8 percent. A few DRGs have below average SPAC/DIS rates, but the relative odds ratios are all high with the exception of low volume DRG 84: Major chest trauma w/o CC.

Skin Graft & Wound Debridement. Table 6-8 displays 14 DRGs involving either skin grafts or wound debridement (i.e., cutting away diseased skin). Total PAC cases in 1998 were 47,571, with only DRG 263, Skin graft for

skin ulcer, meeting HCFA's volume threshold by itself. PAC use rate per discharge (=49.3) averages 78 percent above normal for all DRGs, and the short-stay PAC rate per discharge averages even higher than for trauma (2.9-fold above normal). This group's equally high odds ratios indicates that a particularly high percent of short-stay patients are discharged to PAC.

Burns. Table 6-9 contains data on the 8 burn DRGs, most of which involve either skin grafts or trauma as well. Total PAC volume is only 480 which is quite low, but PAC use rates are extraordinary--as expected. What is particularly noteworthy is the very high average odds ratio of the group ($= 0.841$): double the DRG average. Short-stay and long-stay burn patients are almost equally likely to go to PAC even though short-stay patients are presumably less severely ill. (Note: inpatient deaths and transfers to other acute facilities have been eliminated.)

Infections. Table 6-10 displays 24 DRGs with involving various types of infections spread across many body systems. PAC volume totals 601,089 led by DRG 89, simple pneumonia w/ CC, with nearly 170,000 PAC referrals. PAC use rates per discharge average about a third above normal while short-stay PAC rates are nearly double the average, and the relative odds about 50 percent above average. Although a couple of DRGs with reasonable volumes exhibited below average SPAC rates per discharge (i.e., DRG 202: Cirrhosis & Alcoholic hepatitis; DRG 321: Kidney/Urinary infections w/o CC), all DRGs had above average odds ratios.

Behavioral Health. Table 6-11 displays 14 DRGs representing psychiatric and alcoholism DRGs. Total PAC volume is over 43,000 in 1998. It may be surprising that the PAC rate per discharge is not higher given that freestanding psychiatric facilities are one of the PAC providers. These

discharges are being treated in what are sometimes called “scatter-beds” to distinguish them from patients treated in distinct-part units of general acute

hospitals. Often, scatter-bed patients are eventually transferred to such a distinct unit in another acute hospital, in which case they would not appear in our database.

DRGs 429, Organic disturbances & mental retardation, and 430, psychoses, stand out among the psychiatric conditions as having very high relative odds. DRG 429 also exhibits extremely high short-stay PAC rates. It is not clear what treatment is taking place in these scatter-beds. Almost certainly, patients are not being cured as in most other DRGs. On the one hand, it might be better care for the patient to be transferred from a scatter-bed to a PAC facility and HCFA may not wish to discourage early transfers if the facility lacks the skills to treat the case. On the other hand, Medicare is paying a full DRG rate for short-stay patients transferred to PAC. It may be that length of stay is not related to disease severity but more to hospital type and location (e.g., mid-west versus west coast). More study of these patients is needed.

Also striking are the very high odds ratios for many of the alcoholism DRGs 433-437. DRG 434 involves detoxification alone and is the most common DRG of the group. DRGs 436/7 both involve rehabilitation and have fairly long lengths of stay. If rehabilitation is thought to be complete upon discharge, it is not clear what PAC referrals are required. Again, more study of these DRGs is needed.

Major Cardiovascular Procedures. Table 6-12 displays data on a few of the most complex operations performed in hospitals, e.g., valve repairs and replacements, coronary bypasses, aortic endarterectomies, and open heart

massages. Heart transplants (DRG 103) have been excluded, as have all other organ transplants, because they likely form a special

class of their own. Eight DRGs are shown with a total PAC volume of 97,789. Bypass DRGs are already on HCFA's second ten list and have been recommended for study by MedPAC as well. Together, the group shows higher-than-average (and rising) PAC rates and odds ratios. Given the similarity across the group, no strong reason exists to concentrate solely on bypass patients. No strong clinical reasons suggest that the other related DRGs, such as value surgery, are less susceptible to early discharge with PAC follow-up.

Major Musculoskeletal/Bone Procedures. Table 6-13 presents statistics on 17 DRGs involving major musculoskeletal procedures, e.g., hip and knee replacement, limb reattachments, spinal fusion. Together, the DRGs accounted for 445,969 PAC cases in 1998. HCFA has already included DRGs 209-211 in its top 10. All three show remarkably high PAC rates and odds ratios. PAC rates for the other DRGs, while lower, are often still 3-4 times the overall DRG average. Note the high PAC rates for DRG 218, Lower extremity procedures except hip and foot, DRG 485, Limb reattachment for hip and femur with trauma, and DRG 496/7, Combined A/P spinal fusion and fusion with CC.

By contrast, several similar DRGs exhibit low short-stay PAC rates that can be explained in part by short stays. DRG 223, for example, involving major shoulder procedures, had a geometric length of stay of less than 2 days and, hence, no short-stay patients by our definition; that is, no patients that would have received less than the full DRG payment even for a 1-day stay. DRGs 219, 491,

and 498-500 also had very low geometric mean stays, resulting in practically no short-stay PAC patients per discharge. The

overall PAC rates for these DRGs are not low, however. As a group, they illustrate the “extreme compression of LOS” and how the PAC payment policy can be rendered null and void. DRG 223, for example, had a geo-mean of 2.7 days in 1992 along with a 13 percent PAC rate. By 1998, the PAC rate had risen to 22.4 percent, but the effect was to shorten the LOS to the point where no more per diem penalty is exacted for PAC transfers if included in the policy.

Fractures. Table 6-14 puts together the 7 different fracture DRGs into a related super-group. Total PAC volume is almost 79,000, including DRG 236 and 239, Fractures of hip and pathological fractures, that appear in HCFA’s top 20 list. The group as a whole exhibits PAC rates (= 61.1 percent per discharge; 13.1 percent per short-stay patient) over double the norm. Except for DRG 251, fractures of forearm, hand, or foot w/o CC, the other DRGs show above average PAC use rates and generally high odds ratios.

Amputations. Table 6-15 adds 3 more related DRGs to HCFA’s 113: Amputation for circulatory disorders except upper limb or toe. Total PAC volume is 43, 275. Although none of the other 3 DRGs approach the overall PAC volume of 113, their PAC use rates are comparable. DRG 113 leads the group, but, overall, the PAC rate per discharge is over double the norm while the short-stay PAC rate of the group is nearly 4 times the norm on average. Odds ratios for all 4 DRGs are very high.

Tracheostomy. Table 6-16 adds a second related DRG to 483 that is included in HCFA’s top 10 list. The only clinical difference is that the procedure in

DRG 482 is specifically for face, mouth, and neck diagnoses. DRG 483 is far more prevalent and

includes tracheostomies required for a range of emergency conditions. Seeming quite similar and involving an identical procedure, the kinds of patients involved are quite different. The larger DRG 483 had a geo-mean of 31 days versus 9.7 in DRG 482. Inpatient death rates are higher in 483 as well, further indicating much greater severity. These clinical differences, notwithstanding, the two DRGs do appear to form a group. DRG 482 has a PAC rate per discharge double the national DRG average and a short-stay PAC rate triple the average. Its odds ratio is quite high indicating a high share short-stay patients being referred to PAC.

6.8 Extending PAC Transfer Policy to All DRGs

6.8.1 Policy & Research Questions

A fundamental question facing HCFA and the Congress is:

Should all short-stay PAC cases be paid on a per diem basis?

The Congress has taken an initial first step in mandating that 10 high-PAC DRGs be paid on per diems if their stays are at least one day below the geometric mean length of stay. Focus in this chapter has not been on overall PAC volumes or even PAC use rates per discharge, but on the frequency of PAC transfers among short-stay patients. This is because the rationale for the policy was primarily to address the growing trend to truncate care in the acute setting and discharge early to a post-acute provider. Early discharges to PAC are seen as a

substitution of the site of care, resulting in two outcomes, both undesirable.¹⁰ First, the acute facility is overpaid for care it did not provide. Second, the post-acute provider is paid for care already paid for in the acute facility. Regarded this way, one could argue (as we do below) that all SPAC discharges involve site substitution regardless of how infrequent they appear in a given DRG.

Considered another way, the DRG's geo-mean may not be the best indicator of abbreviated inpatient care. The individual patient's continued need for acute services logically be the best indicator if he/she is transferred early. However true this may be, the fact remains that Medicare pays average per case amounts based on DRGs. It has always "overpaid" for short-stay, lower cost, patients. It is willing to do so as long as the distribution of patient severity within a DRG is random by hospital. Medicare usually pays "above cost" for low severity patients within a DRG and generally "below cost" for high severity patients. No payment bias occurs if patient severity is not manipulable by the provider. The method breaks down if early patient discharge is manipulated by providers in ways that alter the actuarial rules under which the payment amounts were constructed. Rapid PAC growth, contemporaneous with a rapid decline in inpatient lengths of stay, strongly indicate that systematic overpayments accompany all early PAC discharges.

But do all PAC cases involve site substitution?

¹⁰ The impact of early discharges on patient health outcomes is a third important "outcome" of site substitution. The present project does not address the impacts substitution have on the continuity and quality of care.

We have argued that long-stay cases transferred to PAC may not. It is quite possible that the tremendous growth in PAC providers in the last 15 years has allowed physicians to enhance care quality for their sickest, longest stay patients by referring them to, say, rehab or home health care for a brief period. Of course, it is true that lengths of stay have fallen drastically for long-stay patients since DRGs were implemented. And many of these patients are now sent to post-acute providers who would have remained hospitalized. But whether they constitute true site-of-care substitutions or not seems irrelevant given the way the policy was implemented. Patients still defined as “long stay” today will receive the full DRG payment and remain outside HCFA’s reach--probably for good reasons.

Are there any short-stay PAC patients not having their care truncated in the acute facility?

This question raises the possibility of inhomogeneous DRGs illustrated earlier by craniotomy. It is discussed again below as a reason against broad expansion of the PAC policy to all DRGs.

6.8.2 Arguments for Broad Expansion to all DRGs

Simple, uniform formula-driven policy. One argument for expanding the policy to all DRGs is that it would be simple and uniform. The per diem payment scheme is driven by formula and keys off the discharge destination code on the claim. It would not be necessary to justify why certain DRGs were chosen or ignored for the policy or why DRGs with few short-stay PAC patients were not

also reaping profits for hospitals--albeit on fewer cases. It would be extremely simple for FI's to implement and would not be subject to confusion as to which DRGs the policy applied to.

Skimping/dumping can occur in any DRG. No inherent reason exists why early discharge PAC patients in one DRG are being "dumped" to PAC providers while in another DRG they are not. And isn't skimping and dumping bad for any patient regardless of the DRG he/she falls in?

No logical SPAC cutoff thresholds. Whenever HCFA draws a line in the sand, such as wage market areas, or sole community market areas, controversy and political repercussions surely follow. HCFA focused on high PAC and SPAC rates in choosing its first 10, then 20, DRGs. We have concentrated on both SPAC/DIS and relative odds ratios to extend the list of DRGs. MedPAC also noted DRGs with rapid increases in overall PAC rates. Because all these criteria involved continuous variables, drawing any line is somewhat arbitrary. One could make a good case for including DRGs that fell just below the criterion level. And it is hard to justify, for example, including a DRG in the policy such as 14: strokes and not including DRG 239: Pathological fractures, a DRG in HCFA's second 10.

"No harm, no foul." But what about all those DRGs exhibiting very few or no PAC transfers ("no harm")? These include obvious DRGs like 433: Alcohol Dependency, Left Against Medical Advice, and 124/5: Cardiac catheterization w/ or w/o CC. Many maternity, female, and male reproductive DRGs also exhibit extremely low PAC rates. Yet, if hospitals do not discharge patients in these

DRGs to PAC, then they still receive the full DRG payment (“no foul”). A uniform formula keying off destination code would be irrelevant to certain DRGs and would not create any payment problems. On the other hand, a comprehensive formulistic policy already in place would immediately begin picking up short-stay PAC transfers in heretofore “irrelevant” DRGs and discouraging premature transfers and overpayments.

No confusion in coding discharge destination. Under current procedures, social workers, case managers, and clinicians write discharge recommendations and make the necessary arrangements for patients to be transferred to other acute facilities, nursing homes, psychiatric/rehab hospitals, home health, or other PAC providers. Any hiatus between discharge and subsequent care provision is determined by a combination of clinical necessity and patient convenience. If a patient can wait a couple of days before entering a SNF or rehab facility in her home city, the discharge planner still would code SNF or Rehab Hospital as the destination. This makes the most clinical sense.

Under the new PAC transfer payment policy, discharge coordinators must now keep track of how long a gap exists between care providers for 10 (out of 500) DRGs--and only for Medicare. In just these 10 DRGs, a gap of more than one day to another institutional PAC provider is not coded as a PAC discharge, nor is one with more than a 3-day lag in home health care. HCFA can argue *caveat emptor*; that it is the hospital's responsibility to code Medicare cases properly to receive full

payment. Yet, the confusion is compounded by the fact that the new rules apply to only a tiny number of DRGs.

Ten DRGs inequitable to some hospitals. Hospitals treating a disproportionate number of cases in the 10 (or even expanded list of) DRGs may be unfairly treated by the narrow scope of the policy. Not that HCFA is treating them unfairly in paying per diems for any of their short-stay PAC patients in the 10 DRGs. The inequity arises from exempting other, possibly competitor, hospitals who are treating related, but unaffected, DRGs. One hospital might specialize in mental retardation (DRG 429) which is under HCFA's current PAC transfer policy while a competitor concentrates more on psychoses (DRG 430) which is not. Or a hospital concentrates on major joint surgery which is on the list and not other, simpler orthopedic surgery which is not, even though short-stay PAC rates are fairly high across-the-board for such procedures.

Likely the most serious inequity would arise by including only DRGs with complications, leaving hospitals receiving the uncomplicated cases to discharge early to PAC at will. That physicians triage patients to hospitals based in part on severity and type of procedure is well known. A strength of the DRG system is that it automatically pays hospitals more if they are seeing patients in more costly DRGs. A limited DRG PAC policy would undermine that strength to some extent.

6.8.3 Arguments against Broad Expansion to all DRGs

Will require multiple per diem payment policies. HCFA has already decided that the standard transfer payment policy fails to cover high front-end costs for DRGs 209-211. Were the policy extended to all DRGs, HCFA would have to consider the cost-LOS gradient for 500 DRGs. Even if the Agency settled on just the two payment schemes it uses now, it still would have to process and analyze nearly 11 million discharge records, converting them to cost and comparing costs to payments by DRG.

Another complication concerns the asymmetric treatment of acute hospital versus PAC transfers. Only PAC transfers in DRGs 209-211 enjoy a blended per diem; acute hospital transfers for the same set of DRGs receive less generous “double per diems” for day 1. If HCFA expands the list of DRG PAC transfers, it may wish to consider the equity and efficiency of using different per diem payment algorithms for acute hospital versus PAC transfers.

An Irrelevant Policy for Many DRGs. There are over 50 DRGs with less than 10 PAC transfer cases. A few DRGs involve diagnoses only that lead to transfer to another acute facility or return to home. DRG 123 includes only AMI cases that expired. Maybe another 100 DRGs exhibit very short inpatient stays resulting in relatively few short-stay patients triaged to PAC providers. It would seem unnecessary, and in some DRGs nonsensical, to apply the PAC transfer policy across low, or zero, PAC DRGs.

More auditing required. FI's are required to audit the discharge destination codes for accuracy now that they are used for payment purposes.

Extending the policy to all DRGs would require more auditing of more cases. Moreover, complete auditing requires linking PAC claims with inpatient claims because of the 24- and 72-hour window established by the policy. The only way to assure the discharge code was consistent with the PAC rules is to follow the claims trail and compare dates of discharge with dates of initiation of PAC care by type.

Diluted Cost-Benefit to implementation. FI's and carriers are asked by HCFA to quantify the savings from any screens they use in detecting fraud and abuse in provider billing practices. The same logic should be applied to implementing the PAC policy. By focusing on DRGs with very high PAC volume, HCFA is assured substantial overall savings from per diem payments with a very targeted payment change. As the PAC volume and rates decline by including more DRGs, the overall cost-benefit ratio declines as well. The strength of this argument appears to rest on the cost of the auditing function and not initial implementation. It should be just as easy for FI's to code in the payment formula for all DRGs as it is for just ten.

Difficulties in identifying unrelated PAC prior to admission. If a patient was under PAC care prior to admission and then returns to that care after an unrelated admission, the PAC policy does not apply. With many more DRGs, HCFA (and hospitals) would have more work sorting out unrelated from related PAC.

Inhomogeneous DRGs. A number of DRGs contain a varied mix of patients undergoing very different procedures, sometimes for fairly different conditions. Craniotomy, DRG 1, is one example already investigated. There are likely several others, e.g., DRG 315: Other Kidney/Urinary OR Procedures; DRG 231: Local Excision & Removal of Internal Fixation Device. Providers will point out that they are not gaming the system by discharging early to PAC when performing operation X, which is much simpler with a shorter average stay than other procedures in the DRG. They can argue they are only referring to PAC cases with above-average LOS *for the particular procedure*.

Inhomogeneous DRGs undermine HCFA's site-of-care justification for its per diem payment policy. It can still argue that it is overpaying for short-stay PAC cases on actuarial grounds, however, *if PAC rates have been rising for short-stay patients*. If they haven't, then the actuarial basis underlying the original calculation of the standardized amount for the DRG remains unchanged, i.e., HCFA was overpaying for certain procedures in 1984 and it is still doing so today in a "fair" way.