Assessing HMO Performance: Average Length-Of-Stay

Many studies of comparative inpatient hospital utilization, particularly the comprehensive set of analyses reviewed by Luft, have concluded that prepaid health maintenance organizations (HMOs) have lower rates of inpatient days per thousand than conventional insurance plans.1 HMOs’ lower inpatient day rates are generally attributed to their comparatively lower rates of admissions. Most studies have found that HMOs’ average length-of-stay (ALOS) rates appear to be similar to those of conventional insurers.2

The extent to which HMOs’ lower admissions and inpatient day rates reflect genuine “efficiency” in the utilization of hospital services or the health status of their enrollees is uncertain. In theory, HMOs’ prepaid structure and competition for consumers in the insurance sector of the medical market establish financial incentives for HMOs to reduce inpatient use in order to control hospital expenditures and thereby maintain attractive premium prices.3 Alternatively, individuals who enroll in HMOs may tend to be younger and more healthy than consumers who decide to retain conventional health insurance coverage. Thus, HMOs may attract consumers who are low utilizers of medical care services, particularly inpatient services. This is the subject of an ongoing debate in the literature and is an important issue of clear relevance for health policy.

HMO Performance In Minneapolis/St. Paul

Several analysts have examined HMO performance in Minneapolis/St. Paul, a metropolitan area in which HMO enrollment in 1982 reached 535,000 (over one-quarter of the region’s residents).4 Christianson and McClure found that in 1977, Twin Cities HMOs averaged 493 inpatient days per thousand enrollees, a rate 43 percent below the 860 days per thousand reported for Blue Cross-Blue Shield employed groups in Minnesota, which they assert should have an age-sex distribution comparable to the HMOs.5 According to Morrissey and his colleagues, in 1979, admissions per thousand for HMO members (89 admissions/1,000) were 48 percent below the community average, and contrary to the findings in the literature, the HMOs’ average length-of-stay (4.8 days) was 42 percent lower than the community average.6 However, they attribute the HMOs’ lower utilization to population differences since “the HMO population is decidedly younger than the community at large.”7

May Samoszuk, Council of Community Hospitals and Hospital Educational & Research Foundation, Inc., Harold S. Luft, University of California, San Francisco, and Dale V. Shaller, Center for Policy Studies, reviewed the draft of this paper. Their insightful comments and suggestions are gratefully acknowledged. The author also wishes to express sincere appreciation to The Robert Wood Johnson Foundation for their generous support.
Kleinman examined 1978 inpatient-days-per-thousand rates for the individual HMOs in the Twin Cities. He concluded that HMOs’ rates are strongly and positively correlated with the percentage of their enrollees over forty-five years of age. This finding would suggest that the age of HMO members does influence HMO utilization performance.

Jackson-Beeck and Kleinman studied the inpatient utilization of consumers in eleven employee groups in Minneapolis/St. Paul. They compared utilization rates (for the year before the firms first offered HMOs as an option) for individuals who selected HMOs during the first open enrollment versus those who retained conventional insurance. “Before enrolling in HMOs, those joining averaged 53 percent fewer inpatient days (470 days/1,000 versus 994 days/1,000) than those retaining fee-for-service coverage.” Their findings parallel those of previous preenrollment utilization studies conducted in other communities.

The data they present show that 83 percent of those aged fifty and above in their study retained conventional coverage during the initial open enrollment, compared to 68 percent of those under age thirty. Thus, the HMOs attracted more of the younger employees. Moreover, the utilization differences they found persisted, even after controlling for age. Within age cohorts, consumers retaining fee-for-service coverage had higher pre-HMO offering use rates than those who chose HMOs.

In sum, recent studies of HMO utilization in Minneapolis/St. Paul conclude that the HMOs have comparatively low inpatient use rates. However, it appears that HMO utilization patterns are perhaps more attributable to the age and prior utilization experience of their members than to “efficient” performance.

Focus And Methodology

This analysis takes a different approach to the assessment of HMO performance. It focuses on one central question: Can overall, average length-of-stay (ALOS) for major payers in the Twin Cities, including the HMOs, be explained by the age and specialty service distributions of their hospitalized patients? In other words, the issue is whether HMOs achieve efficiencies once they hospitalize their members.

The data for this analysis is taken from the Council of Community Hospitals (COCH) Database, which computerizes utilization information from medical record abstracts for all patients discharged annually from all nonfederal hospitals in the Twin Cities metropolitan region. The COCH Database captures over 95 percent of all patient discharges in Minneapolis/St. Paul. The data elements incorporate those on the Uniform Hospital Discharge Data Set (UHDDS), and for the purposes of this analysis the relevant data elements include: patient age; days of admission and discharge; specialty service (defined by ICD-9-CM group
codes); and payer source (such as Medicare, self-pay, Blue Cross-Blue Shield, and the HMOs).

Using 1982 data, each payer’s actual ALOS for all cases was calculated by dividing total patient days by the total number of admissions. Then for each age group, specialty service, and service/age cell, three 1982 systemwide length-of-stay (LOS) rates were calculated: for all cases (surgical and nonsurgical); for surgical cases; and for nonsurgical cases. The system LOS rates were applied to the 1982 distributions of payers’ admissions in order to calculate estimated overall ALOS rates for each payer which were then compared to the actual 1982 rates. Thus, the data compare payers’ actual ALOS to estimates derived “as if,” each payer hospitalized patients at the community LOS rates by age group, medical service, and service/age categories.

Findings And Interpretation

Exhibit 1 presents each payer’s actual 1982 ALOS. In addition, a set of estimated rates are also presented: (1) an estimate derived by multiplying the 1982 system LOS by age group by each payer’s number of cases in the age groups; (1a) controlling the age category for surgery/nonsurgery; (2) an estimate derived by multiplying the 1982 system LOS by specialty service by each payer’s number of cases in the service groups; (2a) controlling the service category for surgery/nonsurgery; (3) an estimate derived by multiplying the 1982 system LOS by service (broken out by age) by each payer’s number of cases in the service/age cells; and (3a) controlling the service/age category for surgery/nonsurgery. Exhibit 2 presents the ratios of actual to estimated rates. The estimates are averages using the system LOS rates weighted by each payer’s distribution of cases by age group, medical service, and service/age category. It is interesting to note that the HMOs have the shortest actual ALOS. The HMOs’ ALOS is about half

Exhibit 1
Actual And Estimated Average Length-Of-Stay, 1982

<table>
<thead>
<tr>
<th>Payer</th>
<th>Actual</th>
<th>Age</th>
<th>Age a</th>
<th>Service</th>
<th>Service a</th>
<th>Service/ Age</th>
<th>Service/ Ages a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicare</td>
<td>9.92</td>
<td>9.51</td>
<td>9.65</td>
<td>8.06</td>
<td>7.81</td>
<td>9.61</td>
<td>9.69</td>
</tr>
<tr>
<td>Other government</td>
<td>7.88</td>
<td>6.22</td>
<td>6.32</td>
<td>7.86</td>
<td>7.77</td>
<td>7.32</td>
<td>7.24</td>
</tr>
<tr>
<td>Workers compensation</td>
<td>6.73</td>
<td>6.88</td>
<td>6.41</td>
<td>7.92</td>
<td>8.11</td>
<td>6.43</td>
<td>6.54</td>
</tr>
<tr>
<td>Self-pay</td>
<td>6.16</td>
<td>6.37</td>
<td>6.33</td>
<td>7.61</td>
<td>7.44</td>
<td>6.69</td>
<td>6.63</td>
</tr>
<tr>
<td>Commercial insurance</td>
<td>6.02</td>
<td>6.46</td>
<td>6.26</td>
<td>6.87</td>
<td>6.84</td>
<td>6.15</td>
<td>6.13</td>
</tr>
<tr>
<td>Blue Cross/Blue Shield</td>
<td>6.75</td>
<td>6.64</td>
<td>6.49</td>
<td>7.34</td>
<td>7.31</td>
<td>6.65</td>
<td>6.70</td>
</tr>
<tr>
<td>Group HMOs*</td>
<td>4.53</td>
<td>6.06</td>
<td>5.74</td>
<td>5.56</td>
<td>5.60</td>
<td>5.18</td>
<td>5.10</td>
</tr>
<tr>
<td>IPA HMOs**</td>
<td>4.56</td>
<td>6.21</td>
<td>5.96</td>
<td>6.03</td>
<td>5.95</td>
<td>5.47</td>
<td>5.25</td>
</tr>
</tbody>
</table>

*Controlled for surgery/nonsurgery.
*Group HMOs include Group Health, Med Center Health Plan, Nicollet-Eitel, SHARE, and Coordinated Health Care.
**IPA include Physicians Health Plan and HMO Minnesota.

Source: Council of Community Hospitals Database
the Medicare rate and one-quarter below the commercial insurance rate. For Medicare, which accounts for about one-quarter of all Twin Cities admissions, the four estimates which control for age come within about 2 to 4 percent of the actual ALOS rate. Almost 90 percent of all Medicare patients in the Twin Cities are elderly (age sixty-five and above), and Medicare accounts for 95 percent of all elderly patients. Thus, actual Medicare utilization determines the system LOS rates for the elderly age groups. The two service estimates that do not control for age are below the actual Medicare ALOS because within service groups, LOS generally increases with age.

For “other government” (Medicaid), the two age estimates are about 20 percent below actual ALOS. This payer has the highest concentration of patients in chemical dependency and psychiatry (17 percent versus the system average of about 7 percent). These are the two services with the longest LOS rates in Minneapolis/St. Paul. Thus, the service estimates more closely approximate the actual “other government” ALOS rate. In contrast, the age estimates are good indicators of actual ALOS for both workers compensation and self-pay.

For commercial insurance, the four estimates that control for age (particularly the two service/age estimates) seem to explain actual ALOS. Commercial insurance patients represent approximately one-third of all Twin Cities admissions. Commercial insurance accounts for around 40 percent of all patients aged 0-44 and about 45 percent of those between the ages of 45-64. Therefore, for the nonelderly age groups, the system LOS rates strongly reflect commercial insurance utilization patterns. In contrast, the two estimates which control only for service are high by roughly 14 percent, perhaps because commercial insurance has substantial numbers of cases in specialty services (such as orthopedics, cardiology, oncology) which are dominated by Medicare. In such service groups, elderly Medicare patients pull the system LOS upward.

### Exhibit 2

**Ratios Of Actual To Estimated Average Length-Of-Stay, 1982**

<table>
<thead>
<tr>
<th>Payer</th>
<th>Age</th>
<th>Age&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Service</th>
<th>Service&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Service/Age</th>
<th>Service/Age&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicare</td>
<td>1.04</td>
<td>1.03</td>
<td>1.23</td>
<td>1.27</td>
<td>1.03</td>
<td>1.02</td>
</tr>
<tr>
<td>Other government</td>
<td>1.27</td>
<td>1.25</td>
<td>1.00</td>
<td>1.01</td>
<td>1.08</td>
<td>1.09</td>
</tr>
<tr>
<td>Workers compensation</td>
<td>0.98</td>
<td>1.05</td>
<td>0.85</td>
<td>0.83</td>
<td>1.05</td>
<td>1.03</td>
</tr>
<tr>
<td>Self-pay</td>
<td>0.97</td>
<td>0.97</td>
<td>0.81</td>
<td>0.83</td>
<td>0.92</td>
<td>0.93</td>
</tr>
<tr>
<td>Commercial insurance</td>
<td>0.93</td>
<td>0.96</td>
<td>0.88</td>
<td>0.88</td>
<td>0.98</td>
<td>0.98</td>
</tr>
<tr>
<td>Blue Cross/Blue Shield</td>
<td>1.02</td>
<td>1.04</td>
<td>0.92</td>
<td>0.92</td>
<td>1.02</td>
<td>1.01</td>
</tr>
<tr>
<td>Group HMOs*</td>
<td>0.75</td>
<td>0.79</td>
<td>0.81</td>
<td>0.81</td>
<td>0.88</td>
<td>0.89</td>
</tr>
<tr>
<td>IPA HMO**</td>
<td>0.73</td>
<td>0.77</td>
<td>0.76</td>
<td>0.77</td>
<td>0.83</td>
<td>0.87</td>
</tr>
</tbody>
</table>

<sup>a</sup>Controlled for surgery/nonsurgery.
<sup>*</sup>Group HMOs include Group Health, Med Center Health Plan, Nicollet-Eitel, SHARE, and Coordinated Health Care.
<sup>**</sup>IPAs include Physicians Health Plan and HMO Minnesota.

Source: Council of Community Hospitals Database.
All of the estimates, particularly those that control for age, reasonably approximate actual ALOS for Blue Cross-Blue Shield. Since this payer accounts for a smaller percentage of Twin Cities patients (10 percent in 1982) relative to commercial insurance, Blue Cross-Blue Shield utilization patterns probably do not determine or decisively influence the system LOS rates.

Group HMOs account for about 7 percent of all admissions in Minneapolis/St. Paul; IPAs, around 3 percent. Relative to the other private payers, HMO admissions are more highly concentrated in the younger age groups and in the obstetrics and newborn service categories. For example, in 1982, almost 27 percent of group HMO admissions were in obstetrics, compared to 22 percent for the IPAs, 15 percent for commercial insurance, and 13 percent for Blue Cross.\textsuperscript{15} The HMOs’ patients represent about one-fifth of all obstetrics and newborn cases in the Twin Cities, but except for these two service categories, HMOs do not account for substantial percentages of total admissions, especially relative to commercial insurance and Medicare (for orthopedics, cardiology, and oncology).

The two age estimates are about 27 to 36 percent higher than the actual HMO ALOS rates, and the two service estimates are high by 23 to 32 percent. The service/age estimates, even when controlling for surgical cases, are high by over one-half day (13 to 15 percent).

\textbf{Discussion And Conclusion}

In Minneapolis/St. Paul, with the noteworthy exception of the HMOs, payers’ actual 1982 average length-of-stay (ALOS) rates can be explained by the age group and/or specialty service distributions of their hospitalized patients. For all payers, except the HMOs, two to four of the six estimates come within 5 percent of their actual ALOS.

For Medicare and commercial insurance, the results must be discounted. As previously noted, Medicare admissions account for almost all elderly patients in the Twin Cities, and commercial insurance patients represent substantial percentages of all cases in the under sixty-five age groups. Consequently, the estimates, particularly as more factors are controlled, are based on system LOS rates which most likely reflect these payers’ actual utilization patterns. This is clearly the case for Medicare and commercial insurance, but not for the other payers whose patients represent much smaller percentages of total admissions.

The results suggest that HMOs in Minneapolis/St. Paul have comparatively shorter ALOS even after controlling simultaneously for patient age, specialty service, and surgery/nonsurgery. Perhaps one-quarter to one-half day of their overall ALOS cannot be explained by the composition of their admissions. Thus, contrary to previous findings in the literature,
this analysis would indicate that Twin Cities HMOs actually do have shorter ALOS.

It should be noted that these findings do not necessarily contradict the study by Jackson-Beeck and Kleinman. They chose inpatient days per thousand as the unit of analysis and did not compare previous ALOS rates for HMO enrollees and consumers deciding to retain fee-for-service coverage. Thus, it is not clear whether prior utilization experience influences HMO members’ subsequent lengths-of-stay. This would certainly be an interesting topic for future research efforts.

Finally, it would be interesting to replicate this analysis in order to assess whether the findings are unique to the Twin Cities. Do HMOs in other metropolitan areas have genuinely shorter ALOS relative to other payers, or is the utilization performance of Minneapolis/St. Paul HMOs related to the particular competitive dynamics of their market? As it stands, this analysis shows that HMOs may have shorter ALOS compared to other payers, and it contributes to the research evidence which suggests that HMOs do achieve actual efficiencies in inpatient utilization.

David Aquilina
Vice-President
Council of Community Hospitals
Hospital Educational & Research Foundation, Inc.
NOTES


2. Luft, Health Maintenance Organizations, 91-98.


7. Ibid., 67.


10. Ibid., 2828.


12. Ibid., 14-15.

13. Ibid., 13.


15. Ibid., 17-18.