

# Length-Of-Stay After Delivery: Managed Care Versus Fee-For-Service

*Is managed care responsible for the trend toward shorter maternal lengths-of-stay? The answer may surprise you.*

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THE LENGTH-OF-STAY associated with hospital deliveries has been steadily decreasing since 1970.<sup>1</sup> Cost containment strategies and the increased prevalence of managed care have been targeted as major reasons for this trend.<sup>2</sup> With indemnity coverage there are few incentives for physicians to limit lengths-of-stay, whereas managed care plans have a clear incentive to reduce their enrollees' health care expenditures while maintaining quality. Although one would expect that managed care enrollees would have shorter lengths-of-stay after delivery than indemnity enrollees have, the few studies that have examined this issue yield inconsistent results.<sup>3</sup>

For example, when cesarean section rates were controlled for, lengths-of-stay for Harvard Community Health Plan enrollees were similar to lengths-of-stay for fee-for-service patients.<sup>4</sup> However, another study found that lengths-of-stay after normal vaginal deliveries for patients in prepaid group practices and individual practice associations (IPAs) were much shorter than lengths-of-stay for similar patients in Blue Cross and commercial health insurance plans.<sup>5</sup> Recent national data indicate that 35.9 percent of enrollees in commer-

cial plans were discharged within one day after delivery, compared with 57.7 percent from commercial health maintenance organizations (HMOS).<sup>6</sup> These inconsistent results may reflect an earlier time period with different distinctions between types of plans, restricted geographic areas, or vague definitions of health plan types. Moreover, none of the studies examined whether health plan type was related to quality issues such as readmission rates.

There clearly is a need to examine the potential impact of the type of health plan on length-of-stay. The purpose of this study is to compare newborn and maternal lengths-of-stay after delivery and rates of readmission among HMO, point-of-service, and traditional indemnity health plans.

## DATA AND METHODS

All normal vaginal deliveries (based on diagnosis-related group [DRG] codes 373 for mothers and either 390 or 391 for newborns) occurring between 1 January 1994 and 31 December 1994 in either HMO, point-of-service, or indemnity plans were abstracted from the Prudential HealthCare claims system.<sup>7</sup> Records in which the mother's or the newborn's

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length-of-stay was longer than five days ( $n = 141$ ) were excluded from the analysis. The final data set included information on 13,945 enrollees who had normal vaginal deliveries in 1994 (4,547 HMO, 5,342 point-of-service, and 4,056 indemnity enrollees).

The provider network is probably the most important feature distinguishing managed care plans from traditional indemnity coverage.<sup>8</sup> Within the HMO category, there are either group or IPA models, or a combination of both. HMO enrollees, regardless of the specific arrangement, have coverage for services provided within the network but usually have no coverage for out-of-network services except in cases of life-threatening emergencies or acute care out of the network area. In contrast, point-of-service enrollees can choose to receive services out of network and still obtain some coverage for those services. In the traditional indemnity model, enrollees can see any provider of their choice and are reimbursed within their plan's coverage limits.

Information obtained from the claims system included type of plan, geographic region (based on U.S. census regions: Northeast, North Central, South, and West), mother's age (categorized into five age groups), and newborn and maternal readmissions within twenty-eight days after discharge (date of admission). The primary cause for readmission was determined by the *International Classification of Diseases*, Ninth Revision, Clinical Modification (ICD-g-CM) codes.<sup>9</sup> Length-of-stay was defined as the difference between the newborn's date of birth and the discharge date, and it was calculated separately for mothers and newborns. We categorized length-of-stay as either one day, two days, or three to five days.

The distributions of geographic region, mother's age, and newborn and maternal lengths-of-stay were examined by type of plan. Maternal and newborn lengths-of-stay

were examined by region and mother's age for each plan type. We evaluated the association between any of these variables and plan type using a Chi-square test.<sup>10</sup> Spearman correlation coefficients were calculated to assess which factors were most strongly related to length-of-stay.<sup>11</sup> Newborn and maternal readmissions were examined by length-of-stay, type of plan, region, and maternal age. Primary diagnoses upon readmission were examined by type of plan, length-of-stay, postdischarge period (fewer than three days, three to fourteen days, or fifteen to twenty-eight days), and region for both newborns and mothers. We evaluated the association between any of these variables and readmissions using a Chi-square test.<sup>12</sup>

*"In the Northeast, there was no significant difference in length-of-stay by plan type."*

## RESULTS

### ■ ENROLLEE DEMOGRAPHICS

Overall, a large proportion (42 percent) of the study population lived in the South, compared with 26.5 percent in the Northeast, 19.7 percent in the North Central, and 11.8 percent in the West. The distribution of enrollees among plan types varied by region. In the Northeast there were 58.4 percent point-of-service, 23.2 percent indemnity, and 18.4 percent HMO enrollees, while in the West there were 46.1 percent HMO, 28.2 percent point-of-service, and 25.7 percent indemnity enrollees. The distribution of enrollees among plan types also varied by the age of the mother. Women ages twenty to twenty-four were more likely to be enrolled in HMOs (40.8 percent) than in point-of-service (31.9 percent) or indemnity (27.3 percent) plans. Women ages thirty-five to forty-three were more likely to be enrolled in point-of-service plans (42.8 percent) than in indemnity plans (30.9 percent) or HMOs (26.3 percent). Almost all (98.4 percent) mothers and newborns were discharged together.

■ **LENGTH-OF-STAY.** Although the majority of newborns (62.4 percent) and mothers (64.1 percent) were discharged within one day after delivery, there was considerable

variation by plan type (Exhibit 1). For example, 81.7 percent of HMO enrollees were discharged within one day, compared with 61.4 percent of point-of-service and 48.1 percent of indemnity enrollees. Both geographic region and mother's age modified the relationship between length-of-stay and health plan type. Overall, there was a higher frequency of one-day lengths-of-stay in the West (87.6 percent) compared with the South (76.8 percent), North Central (63.9 percent), and Northeast (33.8 percent) regions. For the North Central, South, and West regions, length-of-stay varied by type of plan: HMOs consistently had

the highest frequency of one-day lengths-of-stay, followed by point-of-service and indemnity plans. However, in the Northeast, there was no significant difference in length-of-stay by type of plan. For all plan types, women ages twenty to twenty-four were more likely than women ages thirty-five to forty-three to be discharged within one day after delivery.<sup>13</sup>

■ **READMISSIONS.** Overall, 307 of 13,945 newborns (2.2 percent) were readmitted to the hospital within twenty-eight days after discharge (Exhibit 2). The newborn readmission rate did not vary significantly by length-of-stay, plan type, region, or mother's age.

**EXHIBIT 1**

**Number Of Hospital Discharges Within One Day After Delivery, By Type Of Plan And Selected Characteristics, 1994**

	HMO		Point-of-service		Indemnity		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total sample size	4,547		5,342		4,056		13,945	
Postdelivery newborn								
length-of-stay*	3,581	78.7%	3,214	60.2%	1,904	47.0%	8,699	62.4%
Postdelivery maternal								
length-of-stay*	3,714	81.7	3,280	61.4	1,949	48.1	8,943	64.1
Region <sup>a</sup>								
North Central*	347	82.6	874	79.3	541	43.8	1,762	63.9
Northeast	263	38.7	700	32.5	286	33.4	1,249	33.8
South*	2,404	89.4	1,294	79.9	794	51.5	4,492	76.8
West*	700	92.5	412	88.8	328	77.7	1,440	87.6
Maternal age (years) <sup>b</sup>								
10-19*	49	79.0	28	87.5	20	45.4	97	70.3
20-24*	667	85.7	419	68.8	269	51.6	1,355	71.0
25-29*	1,323	80.5	1,153	64.6	678	49.3	3,154	65.5
30-34*	1,226	80.5	1,197	58.8	687	46.5	3,110	61.8
35-43*	448	83.0	481	54.8	293	46.2	1,222	59.5

**SOURCE:** Prudential HealthCare claims system.

**NOTE:** HMO is health maintenance organization.

<sup>a</sup>Rates reflect maternal length-of-stay.

<sup>b</sup>Rates reflect maternal length-of-stay. Numbers may not add up to sample size because persons with missing values were excluded.

\*  $p < 0.05$  for overall chi-square test between characteristic and type of plan.

## EXHIBIT 2

## Newborn And Maternal Readmissions, By Type Of Plan And Postdelivery Length-of-stay, 1994

	HMO		Point-of-service		Indemnity		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Postdelivery newborn length-of-stay								
1 day	78	2.18%	65	2.02%	41	2.21%	185	2.13%
2 days	22	2.58	36	1.84	55	2.73	113	2.34
3-5 days	2	1.79	5	2.89	2	1.45	9	2.13
Total	102	2.24	106	1.98	99	2.44	307	2.20
Postdelivery maternal length-of-stay								
1 day*	21	0.56	9	0.27	4	0.20	34	0.38
2 days	6	0.75	8	0.41	14	0.69	28	0.59
3-5 days	0	0.00	0	0.00	1	1.11	1	0.45
Total	27	0.59	17	0.32	19	0.47*	63	0.45

**SOURCE:** Prudential HealthCare claims system.

**NOTE:** HMO is health maintenance organization.

\*  $p < 0.05$  for overall chi-square test between maternal readmissions and length-of-stay for indemnity plan; and between maternal readmissions and type of plan among women discharged within one day after delivery.

Sixty-three of 13,945 women (0.45 percent) were readmitted within twenty-eight days after discharge. As with the newborn readmission rate, this rate did not vary significantly by plan type, region, or maternal age. However, among women discharged within one day, women enrolled in HMOs had a higher readmission rate (0.56 percent) than women enrolled in either point-of-service (0.27 percent) or indemnity (0.20 percent) plans ( $p < 0.05$ ).

The primary cause for newborn readmission was jaundice, followed by other conditions originating in the perinatal period; miscellaneous causes; symptoms, signs, and ill-defined conditions; infectious and parasitic diseases; respiratory diseases; and congenital anomalies (Exhibit 3). Jaundice was the only cause of readmission that was significantly associated with plan type: 42.2 percent of jaundice readmissions were among newborns enrolled in indemnity plans, compared with 28.9

percent among either HMO or point-of-service enrollees ( $p < 0.05$ ). The majority of newborn readmissions (68.7 percent) occurred between three and twenty-eight days after discharge. Several of the causes of newborn readmission—infectious and parasitic diseases, respiratory diseases, congenital anomalies, and other conditions in the perinatal period—occurred more frequently fifteen to twenty-eight days after discharge than within three days after discharge ( $p < 0.05$ ). However, readmissions for jaundice were more frequent within three days after discharge than they were later ( $p < 0.05$ ).

The primary cause for maternal readmission was complications of the puerperium (36.5 percent), followed by complications related to pregnancy and to labor and delivery, and genitourinary system diseases (9.5 percent each). The majority of maternal readmissions (81.0 percent) occurred three days after delivery discharge. Maternal cause of read-

**EXHIBIT 3****Cause Of Newborn Readmissions, By Type Of Plan, 1994**

	HMO		Point-of-service		Indemnity		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Jaundice*	26	28.9%	26	28.9%	38	42.2%	90	29.3%
Infectious and parasitic diseases	13	40.6	12	37.5	7	21.9	32	10.4
Respiratory diseases	9	34.6	12	46.2	5	19.2	26	8.5
Congenital anomalies	4	21.0	9	47.4	6	31.6	19	6.2
Other conditions in perinatal period	26	41.3	24	38.1	13	20.6	63	20.5
Ill-defined conditions	10	30.3	10	30.3	13	39.4	33	10.8
Miscellaneous	14	31.8	13	29.6	17	38.6	44	14.3
Total	102	33.2	106	34.5	99	32.3	307	100.0

**SOURCE:** Prudential HealthCare claims system.

**NOTE:** HMO is health maintenance organization. Coding for cause of readmissions: jaundice (ICD-9-CM codes 773, 774), Infectious and parasitic diseases (008-079), respiratory diseases (465-486), congenital anomalies (742-758), other conditions in perinatal period (746-771, 775-779), and ill-defined conditions (780-793).

\*  $p < 0.05$  for overall chi-square test between cause of death and type of plan.

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mission was not related to model of care, postdischarge period, or region. Only complications related to labor and delivery were significantly related to length-of-stay: They were less frequent among women discharged within one day (16.7 percent) than among women who stayed two days (83.3 percent) ( $p = 0.01$ ).

**CONCLUSION**

Hospital discharge practices after normal vaginal delivery are influenced by both type of plan and geographic region. Newborn and maternal readmissions do not appear to be associated with type of plan or length-of-stay. The majority of newborn and maternal readmissions occurred three days after discharge.

Our findings on regional variations in lengths-of-stay were similar to other national data examining length-of-stay after delivery.<sup>14</sup>

Our regional variations are also consistent with other studies that have shown large regional differences in lengths-of-stay for other medical conditions.<sup>15</sup> Typically, these differences show that patients in the Northeast tend to have longer lengths-of-stay and more total hospital days than do those living on the West Coast.<sup>16</sup> Our newborn and maternal readmission rates also were similar to those reported in other studies, as were our results regarding time between delivery discharge and readmission and cause of maternal and newborn readmissions.<sup>17</sup>

The primary limitation of our study is that the administrative data lacked additional information—such as reasons for outpatient visits, emergency room visits, screening tests performed in the hospital, maternal risk factors that could influence discharge, and medical records information for readmissions—

that would have been useful for assessing whether readmission could have been avoided with a longer length-of-stay. Additional information about the delivery hospital and physician also would have been useful to examine because there is some indication that hospitals' patient volume and physicians' managed care loads influence practice efficiency.<sup>18</sup> Moreover, quality of care is made up of many components, including patient satisfaction, counseling, and outpatient services, and the data set used for this study did not provide information on any of these features.

Reasons for regional differences in length-of-stay need to be further understood. One factor influencing the regional differences could be the level of managed care penetration in each region. Interestingly, some of the states that recently have enacted legislation mandating hospital stays of forty-eight hours after normal delivery are in the Northeast (New Jersey, Massachusetts, and New York), where lengths-of-stay are the longest and do not vary by plan type and where managed care penetration is lower than it is in other parts of the country.<sup>19</sup>

Because the majority of newborn and maternal readmissions occurred more than three days after delivery, an additional day in the hospital after delivery probably would not avert most newborn and maternal readmissions. Many of the causes of readmission are likely to be unrelated to length-of-stay, except perhaps jaundice. Additional research is needed to evaluate early diagnosis and treatment for jaundice; in many situations, jaundice can be treated effectively at home.<sup>20</sup>

Our data represent enrollees within Prudential HealthCare managed care plans and most likely other commercial, employed populations enrolled in managed care. Additional data on vulnerable populations, such as Medicaid recipients and the unemployed, must be examined to determine if similar relationships exist. In our study population, the generally lower newborn and maternal readmission rates for patients discharged within one day of delivery compared with those discharged after two or more days may

suggest that in most situations, medical staff are appropriately treating their patients prior to discharge and identifying those in need of longer hospitalization. Even where lengths-of-stay are shorter for managed care enrollees, there is no evidence of an adverse effect on mothers or their infants.

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