

Evaluating Hospital Inpatient Discharges at the Regional Level

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Abstract

Historically, the evaluation of hospital utilization in the United States has been addressed by providers and health planning agencies. This study evaluated resident inpatient hospital discharges for adult medicine and adult surgery in the Central New York Health Service Area, an eleven county region of upstate New York. It focused on small local hospitals and larger referral center hospitals in the region. The study demonstrated that numbers of adult medicine resident discharges from small local hospitals declined by 17.3 percent in most counties of the region between 2012 and 2017. This reduction resulted, in part, from the implementation of medical observation programs that shifted many patients with low severity of illness to outpatient status. The study also demonstrated that numbers of adult surgery resident inpatient discharges from small local hospitals declined by 15.8 percent. This resulted from the immigration of many surgical patients from these providers to larger hospitals in the region. The study suggested that there may not be sufficient inpatient adult surgery and medicine volumes to support the current number of hospitals in the region.

Keywords

Hospitals, Hospital Utilization, Health Planning

1. Introduction

In recent years, interest in improving efficiency and outcomes in the health care system of the United States has increased. This interest has been supported by an expanding amount of resources consumed by this sector of the economy [1] [2] [3].

The relationships between health care utilization and demographics emphasize the connections between this sector and regional and community popula-

tions. Health care is a community based service related to the needs of populations [4] [5] [6].

A major driver of health care at the community level is the utilization of inpatient hospitals. These providers focus on the delivery of inpatient acute care, although they also deliver emergency, outpatient, and other services. This care can include inpatient adult medicine, adult surgery, pediatrics, obstetrics, and mental health.

One of the most important indicators of the use of health care utilization is inpatient hospital discharges. Discharges are important because they identify use of acute care. They are also important because they are the basis of hospital reimbursement for health care payers [7].

Historically, health planning initiatives have focused on hospital discharges at regional and community levels. These include the Health Systems Agencies developed through federal legislation during the twentieth century as well as State government efforts to evaluate and regulate health care providers [8].

In the United States, most inpatient hospital payments are determined by utilization, especially inpatient discharges. Because of the relationship between hospital discharges and reimbursement, efforts to maintain financial viability are frequently linked to inpatient discharge volumes [9].

2. Population

This study focused on hospital utilization in the Central New York Health Service Area of New York State. It included hospital inpatient utilization for residents of this area for hospitals in New York State.

The Central New York Health Service Area includes local hospitals in each of the eleven counties. The total number of hospitals in the region is 22. Most of these hospitals are small facilities that provide primary and secondary acute care to patients in the immediate areas. The Health Service Area has a population of approximately 1,400,000.

Most of the referral center hospitals for the Health Service Area are located in Syracuse, New York. They include Crouse Hospital (19,612 inpatient discharges excluding well newborns, 2018), St. Joseph's Hospital Health Center, 25,390 discharges, 2018), and Upstate University Hospital (32,881 discharges, 2018).

Historically, the Syracuse hospitals have worked cooperatively to improve the efficiency and outcomes of care in their service area and the Central New York Region. These efforts have included programs to reduce hospital lengths of stay, readmissions, and inpatient complications, as well as support for the efficiency of admissions and emergency departments. Many of these efforts have been implemented through their cooperative planning organization, the Hospital Executive Council [10] [11].

3. Method

This study evaluated resident hospital inpatient utilization by county in the

Central New York Health Service Area for 2012 and 2017. It focused on discharge volumes for hospitals where residents of each county were admitted for adult medicine and adult surgery.

The evaluation focused on three types of hospitals. They included relatively small local hospitals in communities in seven of the eleven counties in the Region. They also included relatively large referral center hospitals in Syracuse and Onondaga County. They also included additional hospitals with some referral center services in three of the counties in the Region.

The study population included residents of the eleven county Central New York Health Service Area discharged from hospitals in New York State during 2012 and 2017. The resident counties included Onondaga, Cayuga, Cortland, Madison, Oswego, and Tompkins in the central area of the region; Jefferson, Lewis, and St. Lawrence in the northern area; and Oneida and Herkimer in the eastern area. Residents of these counties discharged from hospitals outside New York State were not included in the study.

Within these definitions, the study focused on hospital discharges for adult medicine and adult surgery. These services included all hospital inpatients except those aged 17 years and younger and those identified as obstetrics, psychiatry, and substance abuse treatment according to the All Patients Refined Diagnosis related Groups Defined by 3M™ Health Information Systems. These services accounted for approximately 80 percent of all hospital inpatient discharges in the region.

By identifying resident hospital discharges for adult medicine and adult surgery between 2012 and 2017, the study was able to evaluate the extent of this utilization during this period. It was also able to evaluate the impact of developments including the implementation of medical observation regulations for Medicare and other payors in 2013 and the movement of some surgical patients between hospitals.

The study data for 2012 and 2017 were obtained from the New York State Planning and Research Cooperative System (SPARCS) maintained by the New York State Department of Health. They included hospital inpatient discharges for the most recent year period available.

The study data for adult medicine and adult surgery were analyzed in tables for each of the two inpatient services. Each table included total numbers of resident hospital discharges for adult medicine and adult surgery for each of the eleven counties in the region for 2012 and 2017. This utilization was identified by the hospitals where the discharges occurred. They included local hospitals located within each county, in the combined Syracuse hospitals, and in other hospitals located outside the resident counties and the Syracuse hospitals.

Analysis of the data for adult medicine and adult surgery focused on comparison of resident discharges among the resident counties in the region for 2017. These data included local hospitals, the Syracuse hospitals, and other hospitals. The analysis also focused on identification of changes in resident discharges for each of these categories and the individual counties between 2012 and 2017.

4. Results

The initial component of the study focused on resident hospital discharges by county in the Central New York Health Service Area for adult medicine. Relevant data are summarized in **Table 1**.

This information demonstrated that the largest numbers of resident hospital discharges from local hospitals for adult medicine patients occurred in Onondaga County (including Syracuse) (22,634 - 24,485 annual resident discharges); Oneida County (including Utica) (11,851 - 14,590 annual resident discharges), and Jefferson County (including Watertown) (4084 - 4291 annual resident discharges). In addition, St. Lawrence County in the northern part of the region, and Tompkins County, in the southern part, generated 5083 - 6132 and 2076 - 2341 annual resident discharges respectively.

Smaller numbers of resident hospital discharges occurred in the four counties contiguous to Onondaga, Cayuga, Cortland, Madison, and Oswego (1060 - 3217 annual resident discharges per county) Herkimer County, adjacent to Oneida (627 - 723 annual resident discharges); and Lewis County, adjacent to Jefferson (581 - 608 annual resident discharges).

The study data suggested that the most important developments in adult medicine resident discharges between 2012 and 2017 were reductions for nine of the eleven counties. This change resulted in 5689 fewer resident adult medicine discharges, or 14.85 percent, for counties outside Onondaga. For patients in the combined counties discharged from hospitals in Syracuse, the reduction was much smaller, 1074 discharges or 3.2 percent. For other hospitals, the reduction

Table 1. Resident inpatient adult medicine discharges, central New York counties, 2012, 2017.

	Local Hospitals			Syracuse Hospitals			Other Hospitals			Total		
	2012	2017	Difference	2012	2017	Difference	2012	2017	Difference	2012	2017	Difference
Onondaga County	24,485	22,634	-1851	24,485	22,634	-1851	599	656	57	25,084	23,290	-1794
Cayuga County	3217	3037	-180	1127	1010	-117	594	587	-7	4938	4634	-304
Cortland County	2466	1803	-663	635	660	25	214	228	14	3315	2691	-624
Madison County	1317	1060	-257	1438	1377	-61	552	469	-83	3307	2906	-401
Oswego County	2927	2182	-745	3864	3671	-193	242	255	13	7033	6108	-925
Tompkins County	2076	2341	265	160	185	25	464	351	-113	2700	2877	177
Oneida County	14,590	11,851	-2739	803	1389	586	1169	1208	39	16,562	14,448	-2114
Herkimer County	723	627	-96	62	111	49	3269	3063	-206	4054	3801	-253
Jefferson County	4291	4084	-207	816	892	76	291	256	-35	5398	5232	-166
Lewis County	581	608	27	127	265	138	340	440	100	1048	1313	265
St. Lawrence County	6132	5038	-1094	340	589	249	295	395	100	6767	6022	-745
Total	62,805	55,265	-7540	33,857	32,783	-1074	8029	7908	-121	80,206	73,322	-6884

Includes patients aged 18 years and over assigned to medical APR Diagnosis Related Groups excluding obstetrics (APR DRGs 540 - 566), mental health/substance abuse treatment (APR DRGs 740 - 776), and rehabilitation (APR DRG 860). Source: New York Statewide Health Planning and Research Cooperative System (SPARCS).

was only 121 discharges or 1.5 percent.

As a result of these developments, the percentages of total resident adult medicine discharges reached 65.54 - 67.00 percent in Cayuga and Cortland Counties, 35.72 - 36.48 in Oswego and Madison Counties, 46.31 percent in Lewis County and 16.50 percent in Herkimer County. For Jefferson, Oneida, and Tompkins Counties, the percentages remained above 78 percent.

Available information suggests that these reductions in adult medicine discharges were produced by the implementation of medical observation programs by Medicare and other payers in 2013. They involved reductions in reimbursement to hospitals for patients with short stays and relatively low severity of illness. The study data indicated that most of this impact involved the smaller hospitals outside Syracuse, probably because a considerable part of their adult medicine involved patients with low severity of illness. Many of these patients were candidates for movement to observation status.

The second component of the study focused on resident hospital discharges by county in the Central New York Health Service Area for adult surgery. Relevant data are summarized in **Table 2**.

As in the data for adult medicine, this information demonstrated that the largest numbers of resident hospital discharges from local hospitals for adult surgery patients occurred in Onondaga County (10,771 - 10,925 annual resident discharges), Oneida County (4118 - 4809 annual resident discharges), and Jefferson County (800 - 921 annual resident discharges). In addition, St. Lawrence County and Tompkins County generated 866 - 945 and 728 - 745 annual resident

Table 2. Resident inpatient adult surgery discharges, central New York counties, 2012, 2017.

	Local Hospitals			Syracuse Hospitals			Other Hospitals			Total		
	2012	2017	Difference	2012	2017	Difference	2012	2017	Difference	2012	2017	Difference
Onondaga County	10,771	10,925	154	10,771	10,925	154	380	420	40	11,151	11,345	194
Cayuga County	518	427	-91	1083	853	-230	290	274	-16	1891	1554	-337
Cortland County	311	252	-59	633	630	-3	213	216	3	1157	1098	-59
Madison County	492	363	-129	912	1054	142	339	281	-58	1743	1698	-45
Oswego County	362	313	-49	2711	2749	38	148	177	29	3221	3239	18
Tompkins County	745	728	-17	297	306	9	370	308	-62	1412	1342	-70
Oneida County	4809	4118	-691	1119	1868	749	1010	1021	11	6938	7007	69
Herkimer County	7	11	4	137	168	31	1480	1451	-29	1624	1630	6
Jefferson County	800	921	121	1310	1358	48	255	196	-59	2365	2475	110
Lewis County	90	62	-28	247	276	29	317	271	-46	654	609	-45
St. Lawrence County	945	866	-79	649	744	95	474	475	1	2068	2085	17
Total	19,850	18,986	-864	19,869	20,931	1062	5276	5090	-186	34,224	34,082	-142

Includes patients aged 18 years and over assigned to surgical APR Diagnosis Related Groups excluding obstetrics (APR DRGs 540 - 566), mental health/substance abuse treatment (APR DRGs 740 - 776), and rehabilitation (APR DRG 860). Source: New York Statewide Health Planning and Research Cooperative System (SPARCS).

discharges respectively.

Smaller numbers of annual resident discharges occurred in the counties contiguous to Onondaga-Cayuga, Cortland, Madison, and Oswego (252 - 518 annual resident discharges) and Herkimer and Lewis Counties (fewer than 100 annual resident discharges).

The study data indicated that inpatient adult surgery discharges in the hospitals outside Onondaga County declined from 9079 to 8061, a reduction of 11.2 percent between 2012 and 2017. During the same period, adult surgery discharges in the Syracuse hospitals increased from 19,869 to 20,931, or 5.3 percent.

Most of these developments probably resulted from the immigration of adult surgery discharges from the outlying counties to the Syracuse hospitals. These efforts were developed to support inpatient utilization in the Syracuse hospitals as some procedures were moved to outpatient status. They were generated, in part, by initiatives of the Syracuse hospitals including the development of affiliations with the outlying hospitals and physician affiliations with these providers. They also included considerable marketing by the Syracuse hospitals through electronic media, television, print media, and billboards.

As a result of these developments, the percentage of total resident inpatient adult surgery performed at local hospitals declined to 21.38 - 27.48 percent in Cayuga, Cortland, and Madison Counties, 0.67 - 10.18 percent in Oswego, Herkimer, and Lewis Counties, and 54.25 - 58.77 percent in Tompkins and Oneida Counties.

5. Discussion

In the United States, the utilization of inpatient hospitals is related to populations at the regional and community levels. Historically, the evaluation of regional hospital utilization has been developed by health planning agencies and groups of providers. This process has supported the monitoring and planning of the use of hospital services at the regional and community levels.

Evaluation of inpatient hospital utilization at the regional level is useful because it is based on wide utilization patterns, rather than fragmented approaches involving small numbers of providers. Regional utilization usually includes sufficient numbers of discharges to identify consistent developments in the provision of care over time.

This case study evaluated inpatient hospital discharges in the Central New York Health Service Area of upstate New York, an eleven county region. It concerned adult medicine and adult surgery, the largest hospital inpatient services, during a five year period.

Within this region, the study identified three types of inpatient hospital providers for the two services by discharge volumes. They included small community hospitals with limited numbers of discharges in Cayuga, Cortland, Madison, Oswego, Herkimer and Lewis Counties; community hospitals with larger volumes serving their own communities and adjacent areas in Oneida, Tompkins,

and Jefferson Counties; and hospitals in Syracuse serving all counties in the region.

The study demonstrated that numbers of adult medicine and adult surgery resident inpatient discharges from small local hospitals in most counties in the region declined between 2012 and 2017. This decline was large, about 17.3 percent of the 2012 adult medicine discharges and 15.8 percent of the 2012 adult surgery discharges for these hospitals.

As a result of these reductions, by 2017, the percentage of total resident adult surgery discharges performed at hospitals in the smaller counties was 27 percent or less. This reduction resulted, in part, from the increased migration of adult surgery patients to hospitals in Syracuse. The percentage of adult medicine resident discharges from local hospitals also declined. This resulted, in part, from the implementation of medical observation programs that shifted many of these individuals to outpatient status.

Another issue concerned counties with larger inpatient adult medicine and surgery volumes that were not part of the regional center such as Oneida, Tompkins, and Jefferson Counties. The study data suggested that discharge volumes in these areas declined, but not enough to challenge their viability.

The study data suggested that, in the Central New York Health Service Area, there may not be sufficient inpatient discharge volumes to support the continued viability of hospitals in most of the smaller counties. This could reduce the number of hospitals in the region to those in Syracuse and those in counties such as Oneida, Tompkins, and Jefferson. Additional research concerning inpatient utilization should be carried out to determine whether similar developments have occurred in other regions.

Conflicts of Interest

The authors declare there are no conflicts of interest regarding the publication of this paper.

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