

# Monitoring Changes in Hospital Utilization

Ronald Lagoe\*, Shelly Littau

Hospital Executive Council, Syracuse, NY, USA

Email: \*Hospexcl@cnymail.com

**How to cite this paper:** Lagoe, R. and Littau, S. (2024) Monitoring Changes in Hospital Utilization. *Case Reports in Clinical Medicine*, 13, 115-121.

<https://doi.org/10.4236/crcm.2024.134014>

**Received:** March 20, 2024

**Accepted:** April 23, 2024

**Published:** April 26, 2024

Copyright © 2024 by author(s) and Scientific Research Publishing Inc. This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

## Abstract

This study focused on recent issues concerning health care utilization at the community level. The study focused on developments in hospital inpatient lengths of stay and discharges. The analysis in the study demonstrated that hospital lengths of stay in the metropolitan area of Syracuse, New York increased by 25.0 percent between 2019 and 2023. This has been a notable increase in the movement of patients with this indicator. The analysis also demonstrated that numbers of inpatient discharges for these hospital services declined substantially during the same periods. Review of the data suggested that this information has been related. The increase in hospital lengths of stay has been related to a rise in numbers of patients at high severity of illness. They have also been associated with a decline in numbers of patients at low severity.

## Keywords

Hospitals, Hospital Utilization, Long Term Care, Ambulatory Care

## 1. Introduction

During the twentieth and twenty first centuries, hospitals in the United States have been viewed as the most important components of the health care systems at the community level. This assumption has been based on the notion that these providers offer care to patients with the highest severity of illness [1] [2].

In recent years, these viewpoints have been challenged by hospital utilization in many communities. Other providers, especially those involved in long term care, have also addressed large numbers of patients with clinical issues [3].

These developments have occurred within the background of health care at the community level. Inpatient hospital utilization continues to be an important component of acute care, however, long term care and ambulatory care also have developed important roles.

One example of these relationships has concerned the line between hospital

and long term care for patients who receive extended care. Historically, these patients have received this level of care in acute hospitals. In some communities, part of this care has been shifted to nursing homes [4].

Another example of these relationships concerns the movement of some patients at low severity of illness from hospitals to ambulatory surgery. This development has resulted in the movement of many patients to one day surgery.

This study reviewed some of these issues in a metropolitan area in the context of different approaches to health care efficiency. It provided examples of how providers of care have addressed this subject [5] [6].

The study focused on developments in the delivery of care in hospitals at the community level. It suggested that hospital utilization at the community level may be changing [7].

## 2. Population

This study was based on hospital lengths of stay and related subjects in the metropolitan area of Syracuse, New York. These acute care facilities include Crouse Hospital (17,309 inpatient discharges excluding well newborns, 2023), St. Joseph's Hospital Health Center (17,715 inpatient discharges, 2023), and Upstate University Hospital (29,967 inpatient discharges, 2023) [8].

Historically, these hospitals have provided primary and secondary acute care to a population of approximately 600,000. They have also provided tertiary acute care services to the Central New York Health Service Area with a population of approximately 400,000.

## 3. Method

The method for the study was based on comparison of inpatient utilization related to hospital lengths of stay and hospital discharges. All of the study is based on analyses of the impact of changes in hospital inpatient lengths of stay and inpatient hospital discharges.

Historically, the Syracuse hospitals have worked to improve the efficiency of care in their service area by maintaining conservative inpatient utilization. These efforts have included the development of a number of specific initiatives.

Monitoring inpatient lengths of stay has been one of the most important of these efforts. Historically, hospital utilization has been identified quantitatively. The use of inpatient services has been based on inpatient admissions and discharges. These initiatives have focused on inpatient adult medicine and adult surgery utilization. These have been the inpatient services with the highest numbers of discharges [7].

In the service area of the Syracuse hospitals, inpatient stays have been monitored by the individual hospitals. They have also been monitored collectively by the Hospital Executive Council.

Programs for addressing inpatient lengths of stay have enabled the Syracuse hospitals to evaluate the efficiency of care and other utilization indicators. This

process has permitted comparisons of inpatient lengths of stay between hospitals and between inpatient services.

In the Syracuse hospitals, comparisons of inpatient lengths of stay have also been developed at the community level using inpatient severity of illness. This indicator has provided an assessment of the degree of inpatient diagnoses based on the principal diagnosis, secondary diagnoses, and other factors.

Hospital utilization data at the community level have enabled the Syracuse hospitals to develop innovative conservative programs that contribute to the efficiency and outcomes of care through health planning.

These programs have been operated by the hospitals for more than twenty years. They have been based on the movement of hospital inpatient lengths of stay to other providers in the community, rather than remaining in inpatient hospital beds for extended time periods.

This study focused on the use of monitoring inpatient lengths of stay and inpatient discharges. It involved both of these indicators. Lengths of stay were monitored as this indicator increased between 2019 and 2023. Inpatient discharges were monitored as this indicator declined in numbers.

The analysis focused on increases in inpatient stays and the relationship of this indicator to declines in discharges. The analysis included lengths of stay, severity of illness and numbers of discharges by Major Diagnostic Categories between 2019 and 2023.

## 4. Results

The first component of the study focused on basic data monitoring for hospital inpatient lengths of stays and inpatient discharges in the Syracuse hospitals. Examples of this information follow. These data have included inpatient lengths of stay and numbers of inpatient discharges for the combined hospitals between 2019 and 2023. The data also included inpatient discharges by severity of illness and Major Diagnostic Categories in the Syracuse hospitals.

The study data focused on lengths of stay in the Syracuse hospitals between 2019 and 2023. This was the most recent five year period for which complete data were available.

The study also included numbers of inpatient discharges for the same time periods in the combined hospitals. This information made it possible to compare changes in numbers of hospital stays with numbers of discharges. These data included basic lengths of stay and discharges by severity of illness and Major Diagnostic Category.

For the combined Syracuse hospitals, lengths of stay increased during the period of the study. Adult medicine stays increased by 24.9 percent, from 4.81 to 6.01 days. During the same period, adult surgery lengths of stay increased by 26.5 percent, from 5.32 to 6.73 patient days. The sizes of the increases for the two services were also equal.

The study data also indicated that numbers of inpatient discharges were reduced by between 2019 and 2023. Adult medicine discharges declined by 15.9

percent, from 37,616 to 31,645. Adult surgery discharges declined by 24.3 percent, from 21,388 to 16,189.

These utilization comparisons were developed based on length of stay and inpatient discharge data combined. They included analyses of the relationships between the increases in stays and the reductions in discharges. Evaluation of the data by severity of illness in the hospitals made it possible to adjust for these specific indicators.

Additional information concerning inpatient lengths of stay in the Syracuse hospitals included lengths of stay for adult medicine and adult surgery, the two largest services. Relevant data were summarized in **Table 1**.

The severity of illness data concerning adult medicine demonstrated that between 2019 and 2023, the number of patients at Minor severity of illness declined by 1,917, from 4,916 to 2,999. The number of patients at Moderate severity of illness declined by 3,590, from 13,052 to 9,462 and the number of patients at Major severity of illness declined by 1,501 from 13,989 to 12,488. At the same time, the numbers of patients at Extreme severity of illness increased by 1,037, from 5,659 to 6,696.

Referring to the inpatient length of stay data, it appears that declines in the numbers of patients at lower severity of illness contributed to longer stays for the remaining inpatients. These longer stays were produced by lower numbers of inpatients in 2023 than in 2019 in the study population.

The impact of lower numbers of inpatients was similar in adult surgery. The reduction in patients at Minor severity of illness declined by 3,070, from 7,180 to 4,110. The number of Moderate severity patients declined by 2,289, from 8,260 to 5,971, and the number of Major severity patients declined by 131, from 3,873 to 3,742. At the same time, the number of Extreme severity patients increased by

**Table 1.** Inpatient discharges and mean lengths of stay by severity of illness, adult medicine and adult surgery, Syracuse hospitals, 2019, 2023.

	Number of Discharges					Mean Lengths of Stay (Days)				
	Minor	Moderate	Major	Extreme	Total	Minor	Moderate	Major	Extreme	Total
<b>Adult Medicine</b>										
2019	4916	13,052	13,989	5659	37,616	2.55	3.40	5.15	9.19	4.81
2023	2999	9462	12,488	6696	31,645	2.91	4.02	5.95	10.30	6.01
Difference 2019 - 2023	-1917	-3590	-1501	1037	-5971	0.36	0.62	0.80	1.11	1.20
<b>Adult Surgery</b>										
2019	7180	8260	3873	2075	21388	2.24	3.65	8.13	17.43	5.32
2023	4110	5971	3742	2366	16189	2.44	3.82	8.10	19.02	6.73
Difference 2019 - 2023	-3070	-2289	-131	291	-5199	0.20	0.17	-0.03	1.59	1.41

Adult medicine data exclude Diagnosis Related Groups concerning surgery, obstetrics, pediatrics, psychiatry, alcohol/substance abuse treatment, rehabilitation, and all patients aged 0 - 17 years.

Adult surgery data exclude Diagnosis Related Groups concerning medicine, obstetrics, pediatrics, psychiatry, alcohol/substance abuse treatment, and all patients aged 0 - 17 years.

291, from 2,075 to 2,366.

Additional information concerning inpatient utilization in the Syracuse hospitals included combined medical and surgical discharges and lengths of stay for adult medicine and adult surgery combined. These data are summarized in **Table 2**.

This information summarized the combined utilization of the hospitals for adult medicine and adult surgery. These data suggested that there were considerable differences among the hospitals by Major Diagnostic Category.

This information demonstrated that total medical-surgical discharges declined

**Table 2.** Inpatient medical-surgical discharges and mean lengths of stay by major diagnostic category (MDC), Syracuse hospitals, 2019-2023.

Major Diagnostic Category	Number of Discharges					Difference 19 - 23	Mean Lengths of Stay (Days)					Difference 19 - 23
	2019	2020	2021	2022	2023		2019	2020	2021	2022	2023	
1 - Nervous System	5472	4940	4876	4514	4397	-1075	5.47	5.60	5.86	6.55	7.00	1.53
2 - Eye	150	117	109	115	130	-20	3.59	3.94	3.39	4.58	3.92	0.33
3 - ENT, Mouth & Craniofacial	724	584	511	521	562	-162	4.20	4.72	4.70	4.90	5.51	1.31
4 - Respiratory System	6163	5889	7014	5723	5073	-1090	5.25	6.11	6.71	6.27	6.07	0.82
5 - Circulatory System	10,808	9234	10,018	8976	8857	-1951	4.83	4.91	5.12	5.50	5.58	0.75
6 - Digestive System	6201	5209	5301	4500	4964	-1237	5.25	5.35	5.56	5.62	6.05	0.80
7 - Hepatobiliary System & Pancreas	2180	2204	2083	1504	1628	-552	5.05	5.31	5.86	6.31	6.39	1.34
8 - Musculoskeletal Sys & Conn Tissue	9382	7314	5981	5704	5778	-3604	3.77	3.96	4.81	5.37	5.48	1.71
9 - Skin, Subcutaneous Tissue & Breast	1657	1355	1417	1099	1230	-427	4.34	4.32	4.73	5.82	5.23	0.89
10 - Endocrine, Nutritional & Metabolic	2989	2528	2421	2627	2613	-376	3.40	3.58	3.88	4.26	4.31	0.91
11 - Kidney & Urinary Tract	3621	3268	3346	3088	3186	-435	4.62	4.87	5.14	5.70	6.06	1.44
12 - Male Reproductive System	421	278	257	132	164	-257	2.33	2.77	2.57	4.06	3.84	1.51
13 - Female Reproductive System	425	444	471	373	388	-37	3.48	3.32	3.52	3.78	3.47	-0.01
16 - Blood & Immunolog Disorders	869	774	723	654	609	-260	5.09	4.94	5.24	5.39	5.97	0.88
17 - Lymphatic & Other Malignancies	686	668	647	623	637	-49	7.81	7.87	8.48	9.69	8.60	0.79
18 - Infectious & Parasitic Diseases	5086	5036	5543	5110	5830	744	7.66	7.79	8.53	9.29	8.68	1.02
21 - Poison, Toxic Effect & Other Injury	1108	902	895	780	781	-327	4.91	4.74	5.14	5.68	7.76	2.85
22 - Burns	145	138	139	109	138	-7	11.06	11.67	11.29	11.40	11.62	0.56
23 - Rehab, Aftercare, Other Health Status	509	461	497	538	467	-42	3.70	3.52	3.60	4.15	4.62	0.92
24 - HIV Infections	66	59	73	59	64	-2	9.32	7.64	8.56	9.41	8.66	-0.66
25 - Multiple Significant Trauma	342	366	408	339	338	-4	8.97	7.33	8.79	9.17	9.55	0.58
Total	59,004	51,768	52,730	47,088	47,834	-11,170	5.00	5.27	5.77	6.14	6.25	1.25

Data exclude Diagnosis Related Groups concerning obstetrics, psychiatry, alcohol/substance abuse treatment, rehabilitation, and all patient aged 0 - 17 years.

Source: Hospital Executive Council.

by 11,170, or 18.9 percent between 2019 and 2023. These reductions were associated with a 25 percent increase in lengths of stay. The reduction in adult medicine and adult surgery inpatients generated a substantial decline in discharges, especially for patients with lower severity of illness.

The study data also indicated that the largest declines in discharges were associated with orthopedic surgery and orthopedic medicine. This Major Diagnostic Category contributed to a 38.4 percent reduction in the numbers of discharges. Most of this reduction involved Minor and Moderate severity of illness patients.

Additional reductions in medical-surgical discharges related to lengths of stay in the Syracuse hospitals concerned the Digestive and Pancreas Major Diagnostic Categories (28.6 percent), Circulatory Major Diagnostic Category (17.5 percent), and the Digestive and Neurology Major Diagnostic Categories. Hospital lengths of stay in all of these categories increased as lower severity of illness patients were moved to outpatient settings.

## 5. Discussion

This study focused on recent issues concerning health care utilization at the community level. It suggested that this subject is related to the efficiency and outcomes of care.

The study focused on developments in hospital inpatient lengths of stay and discharges. It demonstrated that developments in these indicators are changing health care in at least one metropolitan area.

The analysis in the study demonstrated that hospital adult medical-surgical lengths of stay in the metropolitan area of Syracuse, New York have increased by 25.0 percent between 2019 and 2023. This has been a notable increase in the movement of patients with this indicator. The analysis also demonstrated that numbers of inpatient discharges for these hospital services declined substantially during the same periods.

Review of the data suggested that this information has been related. The increases in hospital lengths of stay have been related to a rise in numbers of patients at high severity of illness. They have also been associated with a decline in numbers of patients at low severity. The analysis also suggested that these changes were also associated with changes in frequencies for different diagnoses.

The most important development related to changes in numbers of hospital inpatients involved those with orthopedic surgery and medicine. In the health care system of Syracuse during the past five years, a large number of patients with relatively low severity of illness have been moved from inpatient to outpatient care.

This has changed the case mix of those who remained as inpatients in hospitals. This information has suggested that numbers of patients in different settings need to be evaluated carefully before conclusions are developed. This information clearly identified different characteristics of hospital utilization at the community level.

---

## Conflicts of Interest

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

## References

- [1] Dentzler, S. (2011) Urgent Measures for an Old Problem. *Health Affairs*, **30**, 1626. <https://doi.org/10.1377/hlthaff.2011.0961>
- [2] Meyer, H. (2018) The Price Problem. *Modern Healthcare*, **48**, 20-24.
- [3] Cushing, W.T. (2004) Extra Hospital Days Can Cost You Plenty. *Medical Economics*, **81**, 83.
- [4] Friedman, B., De La Mare, J., Andrews, R. and McKenzie, D.H. (2002) Practical Options for Estimating the Cost of Hospital Stays. *Journal of Health Care Finance*, **291**, 1-12.
- [5] Anderson, G. and Knickman, J.R. (2001) Changing the Chronic Care System to Meet People's Needs. *Health Affairs*, **20**, 146-160. <https://doi.org/10.1377/hlthaff.20.6.146>
- [6] Weil, A.R. (2015) Hospital Costs and Quality. *Health Affairs*, **34**, 1263. <https://doi.org/10.1377/hlthaff.2015.0786>
- [7] Goozner, M. (2020) Big Data's Role in Addressing COVID-19. *Modern Healthcare*, **50**, 22.
- [8] Lagoe, R., Pasinski, T., Kronenberg P., Quinn, T. and Schaengold, P. (2006) Linking Health Services at the Community Level. *Canada Health Care Quarterly*, **9**, 60-65. <https://doi.org/10.12927/hcq.18229>