

# Developing Additional Hospital Capacity at the Community Level

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## Abstract

Hospitals in the United States are being challenged to provide the capacity for adult medicine and surgery care. The study suggested that the hospitals of Syracuse, New York have generated additional inpatient capacity through a number of efforts. One program involved moving some low severity of illness inpatient procedures to ambulatory care. A different approach has also avoided inpatient utilization by diverting incoming ambulances to different providers. The third program evaluated in the study, length of stay reduction, was a different type of initiative. It has generated additional inpatient capacity by reducing the amount of inpatient care provided. In effect, it has increased inpatient capacity by addressing the efficiency of care. These programs illustrate the potential for improving hospital capacity at the community level. Each of them was developed by acute care providers using local services.

## Keywords

Hospitals, Hospital Emergency Departments, Hospital Lengths of Stay

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## 1. Introduction

In the United States, increasing efforts are focusing on the development of hospital inpatient bed capacity. The need for additional inpatient beds has become a major challenge during recent years [1].

One of the most important causes of this need has been the onset of the coronavirus epidemic during 2020 and 2021. The virus has generated the need for additional hospital inpatient capacity to serve adult medicine inpatients. Hospitals in most areas of the nation have been unable to meet this need with existing staff resources [2] [3].

Part of this challenge has been generated by the changing nature of incidence of the virus. At least two waves of virus incidence have developed during 2020

and 2021. Each of them has been accompanied by substantial increases in the need for inpatient bed capacity.

Reductions in the availability of nursing staff have also challenged the ability of hospitals to operate inpatient capacity. Available evidence suggests that substantial demands on nursing staff time have caused many nurses to reduce their workloads or leave the profession entirely. These problems have apparently not been alleviated by increases in compensation or other benefits [4] [5].

The need for hospitals to provide inpatient acute care has also challenged the operation of other health care services at the community level. These include emergency services through emergency departments and long term care in nursing homes and home health care [6] [7] [8].

This study reviewed examples of efforts to address the need for inpatient care in the hospitals of Syracuse, New York. It identified efforts to improve this situation at the community level, where most inpatient care is delivered.

## 2. Population

This study reviewed recent efforts to develop and support additional inpatient hospital capacity in the metropolitan area of Syracuse, New York. This area includes three large acute care facilities, Crouse Hospital (19,611 inpatient hospital discharges, 2019); St. Joseph's Hospital Health Center (25,394 inpatient discharges, 2019); and Upstate University Hospital (32,877 inpatient discharges, 2019) [9].

These hospitals provide inpatient acute care services to an immediate service area with a population of approximately 600,000. They also provide referral center services to the eleven county Central New York Health Service Area.

In order to develop additional capacity, the Syracuse hospitals worked with the Hospital Executive Council. This was the planning organization developed by the three providers.

## 3. Method

The programs described in this study comprised a variety of approaches to the development of inpatient hospital capacity. The study focused on results of these programs in the Syracuse hospitals between July and September 2021 compared with the same months in previous years.

The study was based on simple descriptive statistics. Each of the data was based on different indicators.

The initial component of the study involved the development of increases in adult medicine inpatient capacity in two of the Syracuse hospitals through the movement of inpatients to ambulatory care. This program included patients with low severity of illness who were amenable to outpatient settings. For purposes of the study, severity of illness was defined according to the 3M™ All Patients Refined Diagnosis Related Group System.

The program focused on inpatients hospitalized for orthopedic surgery in the

Syracuse hospitals.

This specialty generated large numbers of patients in the hospitals. Within this population, many of these patients were at Minor or Moderate severity of illness.

Evaluation of the program involved comparison of numbers of discharges in the hospitals for July-September 2021 compared with numbers of discharges in the same months in 2017 and 2019. Discharges for all orthopedic surgery and hip and knee joint replacements were identified.

The second component of the study involved the development of additional inpatient capacity in one of the Syracuse hospitals through diversion of incoming ambulance patients to other acute hospitals. This program involved the use of emergency medical services ambulance dispatchers in the Syracuse hospital to direct ambulances to hospitals where additional capacity was available. In the Syracuse area, ambulances were dispatched from the Onondaga County 911 Center and from AMR, the largest ambulance service. Patients' demands for care were honored, regardless of the hospital that was requested.

Evaluation of this program focused comparison of numbers of hours on ambulance diversion for each of the hospitals and numbers of ambulances dispatched. These data were compared for July-September 2017, 2019, and 2021, the most recent time period available. This information provided estimates of the impact of ambulance diversion on hospital emergency department capacity. The numbers of ambulances diverted were not available.

The third component of the study involved the use of hospital length of stay reduction to generate hospital inpatient capacity in the Syracuse hospitals. This approach increased the capacity of the hospitals by reducing the duration of stays and generating the potential for serving additional inpatients. It involved reducing stays for adult medicine and adult surgery, the largest inpatient services in each of the hospitals.

The program was implemented through specific programs addressing patients with potential for extended stays in the hospitals. They included the Subacute and Complex Care Programs, which supported efforts by nursing homes to admit patients with extended intravenous services and wound care in the hospitals through program development funds. It was also supported through the weekly distribution of community wide data concerning Difficult to Place Patients in the community. Evaluation of the length of stay reduction program involved comparison of inpatient adult medicine and adult surgery lengths of stay in the hospitals for 2021, 2017, and 2019. Using this information, it was possible to quantify the additional amounts of inpatient capacity that were made available.

## 4. Results

The initial component of the study involved increasing hospital capacity by moving utilization to outpatient services. Relevant data are summarized in **Table 1**.

**Table 1.** Inpatient hospital discharges by severity of illness, Syracuse Hospitals, July-September 2107, 2019, 2021.

Orthopedic Surgery (APR DRGs 303 - 322)					
	Minor	Moderate	Major	Extreme	Total
July-September 2017	381	488	150	21	1040
July-September 2019	364	466	171	39	1040
July-September 2021	260	386	164	56	866
Difference 2017-2021	-121	-102	14	35	-174
Hip & Knee Joint Replacement (APR DRGs 301 - 302)					
	Minor	Moderate	Major	Extreme	Total
July-September 2017	516	408	37	10	971
July-September 2019	392	426	33	10	861
July-September 2021	153	210	31	17	411
Difference 2017-2021	-363	-198	-6	7	-560

Data include patients aged 18 years and over. Source: Hospital Executive Council.

This information demonstrated that between July-September 2017 and 2021, the Syracuse hospitals reduced the number of orthopedic inpatient discharges by 174. During the same period, the hospitals reduced the number of hip and knee joint replacement discharges by 560. The joint replacement patients that were eliminated would have generated 1465 patient days or an average daily census of 15.92 patients.

The study data also demonstrated that most of the reductions in inpatient utilization involved hospital inpatients with low severity of illness. For orthopedics, the reduction in discharges involved 121 Minor severity of illness and 102 Moderate severity of illness inpatients. For the hip and knee joint replacements, the change involved a reduction in discharges of 363 Minor severity of illness and 198 Moderate severity of illness inpatients.

Between July and September 2017 and 2021, much smaller changes occurred in orthopedic surgery and joint replacements at Major and Extreme severity of illness. Most of these changes resulted in slight increases in inpatient discharges.

Information related to the study data suggested that most of these changes resulted from the movement of hospital inpatients to ambulatory care by orthopedic surgeons. Regardless of the source of the changes, they made additional inpatient capacity available in the hospitals.

The second component of the study involved the development of additional inpatient capacity through ambulance diversion from emergency departments in the Syracuse hospitals. Related data are summarized in **Table 2**.

This information demonstrated that the use of ambulance diversion in the Syracuse hospitals increased substantially between July and September 2017 and 2021. The number of hours on ambulance diversion rose by 2474 between these time periods.

**Table 2.** Hospital emergency department utilization data, Syracuse Hospitals, July-September 2017, 2019, 2021.

	Hours on Ambulance Diversion	Ambulance Transports
July-September 2017	124	15,666
July-September 2019	285	16,899
July-September 2021	2598	17,331
Difference 2017-2021	2474	1665

Source: Hospital Executive Council.

Of the total hours on diversion, 1670, 67.5 percent involved one of the hospitals. This hospital employed the mechanism to shift adult medicine inpatients to other facilities. By increasing the use of ambulance diversion, the hospital increased capacity available for other services, such as elective surgery and treatment of patients with the Covid virus.

The impact of this change on inpatient utilization was limited by the fact that this hospital continued to admit some patients for services such as stroke and burn care. It was also limited somewhat by the fact that patient demands for each transport to each of the hospitals continued to support existing utilization patterns.

The third component of the study involved the use of length of stay reduction to increase inpatient capacity in the Syracuse hospitals. Relevant data are summarized in **Table 3**.

The comparisons of inpatient lengths of stay among the three hospitals demonstrated that these initiatives could generate substantial differences in utilization.

**Table 3.** Inpatient adult medicine and adult surgery mean length of stay (Days) by severity of illness, Syracuse Hospitals, July-September 2021.

	Adult Medicine					Adult Surgery				
	Minor	Moderate	Major	Extreme	Total	Minor	Moderate	Major	Extreme	Total
Mean Lengths of Stay										
Hospital A	2.63	3.91	6.17	11.19	5.89	2.35	4.23	8.79	16.37	5.46
Hospital B	2.23	3.06	5.01	9.17	4.70	2.16	3.60	6.90	14.34	5.43
Hospital C	2.89	3.71	5.35	10.16	5.45	2.83	4.19	8.62	18.46	7.26
Total	2.62	3.55	5.43	10.12	5.32	2.41	4.00	7.93	16.58	6.17
Number of Discharges										
Hospital A	252	762	809	397	2220	381	341	150	101	973
Hospital B	345	980	1138	472	2935	521	574	409	241	1745
Hospital C	476	1341	1643	790	4250	354	766	429	297	1846
Total	1073	3083	3590	1659	9405	1256	1681	988	639	4564

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

Separate analyses were developed for adult medicine and adult surgery. These differences generated opportunities for additional inpatient capacity.

This information demonstrated that inpatient adult medicine lengths of stay for one of the providers, Hospital B, were shorter than those of the other hospitals for all four levels of severity of illness. The lengths of stay for Hospital B were 1.19 days shorter than those of Hospital A. This difference amounted to 3493 patient days or an average daily census of 38.0 patients. The lengths of stay for Hospital B were 0.7 days shorter than those of Hospital C. This difference amounted to 2201 patient days or an average daily census of 23.9 patients.

This information also demonstrated that the adult surgery lengths of stay for Hospital B were shorter than those of the other hospitals for all four levels of severity of illness. The stays for Hospital B were 0.3 days shorter than those of Hospital A. This difference amounted to 52.4 patient days or an average daily census of 0.6 patients. The adult surgery stays for Hospital B were 1.83 days shorter than those of Hospital C. This amounted to 3193 patient days or an average daily census of 34.7 patients.

All of these differences produced increased inpatient utilization. They could be translated into capacity for additional inpatient services.

## 5. Discussion

Hospitals in the United States are being confronted with epidemics, staffing shortages, and the increased referrals from other services. They are being challenged to provide the capacity for adult medicine and surgery care. This study provided examples of efforts to address these needs in one community.

The study suggested that the hospitals of Syracuse, New York have generated additional inpatient capacity through a number of efforts. The most basic programs involved addressing the need by moving some low severity of illness inpatient procedures to ambulatory care. In the examples provided in this study, this approach was supported by physicians who developed their own programs to treat orthopedic patients.

A different approach has also avoided inpatient utilization by diverting incoming ambulances to different providers. These initiatives have created capacity for additional inpatients by moving some of them to other settings.

The third program evaluated in the study, length of stay reduction, was a different type of initiative. It has generated additional inpatient capacity by reducing the amount of inpatient care provided. In effect, it has increased inpatient capacity by addressing the efficiency of care. It has reduced numbers of inpatient acute care days without reducing numbers of hospital inpatients.

In the Syracuse hospitals, length of stay reduction was supported by cooperative efforts with area nursing homes. These programs shifted patient days from hospitals to long term care facilities.

These programs illustrate the potential for improving hospital capacity at the community level. Each of them was developed by acute care providers using lo-

cal services.

## Conflicts of Interest

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

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