Scientific Research Publishing

Case Reports in Clinical Medicine, 2021, 10, 39-45
https://www.scirp.org/journal/crcm
ISSN Online: 2325-7083
ISSN Print: 2325-7075

Reducing Hospital Lengths of Stay in the Epidemic

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How to cite this paper: Lagoe, R., Murphy, M. and Littau, S. (2021) Reducing Hospital Lengths of Stay in the Epidemic. *Case Reports in Clinical Medicine*, **10**, 39-45.
https://doi.org/10.4236/crcm.2021.102006

Received: January 6, 2021
Accepted: February 22, 2021
Published: February 25, 2021

Abstract

The need for efficiency has been a major challenge for hospitals in the United States. The efficiency of these providers is directly related to their inpatient lengths of stay. The coronavirus epidemic has challenged the ability of hospitals in the United States to reduce stays and provide efficient care. This study described the impact of the epidemic on inpatient lengths of stay in the hospitals of Syracuse NY between March-November 2020 compared with the same periods in previous years. It demonstrated that, during this period, adult medicine lengths of stay increased by 4.5 percent and adult surgery stays increased by 5 - 6 percent. These increases were not large; however, they challenged the ability of hospitals to provide efficient care at a time when additional capacity was needed to deal with the epidemic. The results of the study suggested that the coronavirus epidemic should not limit the effectiveness of hospital programs that support efficiency and protect needed health care resources at the community level.

Keywords

Hospitalization, Hospital Lengths of Stay, Coronavirus Epidemic

1. Introduction

Historically, the need for improved efficiency has been a major challenge for the health care providers of the United States. Health care expenses have increased at a higher rate than the cost of living for many years [1].

Much of this challenge has been related to inpatient hospitals. As the most expensive component of the health care system, acute care providers have frequently struggled to maintain efficient utilization.

At the community level, the most expensive health care services are performed

in acute hospitals. These include inpatient surgery, as well as adult medicine services such as intravenous therapy and total parenteral nutrition [2] [3] [4].

The coronavirus epidemic has increased this challenge for hospitals in the United States. During March, April, and May 2020, it reduced numbers of admissions for many adult medicine and adult surgery patients, limiting revenue and increasing expenses for many providers [5] [6].

Addressing hospital expenses has generated the need for increased efficiency among these providers of care. The efficiency of hospitals is directly related to their inpatient lengths of stay. Shorter stays are associated with improved use of resources and high efficiency [4].

The development of increased hospital efficiency and shorter stays has been related to the movement of patients to their homes and to health care providers at the community level. These providers include skilled nursing facilities and home health care [7].

The impact of the coronavirus epidemic has diverted attention from the continuing need for efficiency of inpatient utilization in hospitals. Continued emphasis on the need for inpatient efficiency can help patients receive timely care and support hospital finances during the epidemic [8] [9].

2. Population

This study described the implementation of programs to improve inpatient efficiency in the metropolitan area of Syracuse, New York before and during the coronavirus epidemic. This area includes three large inpatient acute care facilities, Crouse Hospital (18,863 inpatient discharges, 2019), St. Joseph's Hospital Health Center (25,252 inpatient discharges, 2019), and Upstate University Hospital (34,216 inpatient discharges, 2019).

These three acute hospitals provide a full range of acute care services to an immediate service area with a population of approximately 600,000. They also provide tertiary acute care services to the Central New York Health Service area with a population of 1,400,000.

Historically, the Syracuse hospitals have worked cooperatively to improve the efficiency and outcomes of care in Central New York. A number of these programs have been developed through the Hospital Executive Council [10].

3. Method

This study described the impact of programs to support the efficiency of inpatient hospital utilization in the Syracuse hospitals during the coronavirus epidemic. This included the period of the epidemic, between March and November 2020.

The impact of the epidemic was based on adult medicine and adult surgery discharges and lengths of stay for the combined hospitals. Adult medicine and adult surgery are the inpatient services with the largest numbers of discharges. This population was defined as inpatients aged 18 years or more excluding ob-

stetrics, mental health, pediatrics, and neonates.

Information concerning numbers of medical-surgical discharges and lengths of stay in the Syracuse hospitals was collected from data produced by the Hospital Executive Council. These data were based on inpatient utilization for March-November 2020, the period of the epidemic, compared with data for the same months in 2018 and 2019. By focusing on these time periods, the study avoided most of the seasonal influenza season, including January and February, in Central New York. This enabled the analysis to focus on the impact of the coronavirus on hospital utilization.

The hospital discharge data identified changes in the sizes of the adult medicine and adult surgery inpatient populations before and during the coronavirus epidemic. This information included changes in these populations related to the epidemic. In New York State and the service area of the Syracuse hospitals, the epidemic resulted in reductions in inpatient hospital admissions, especially scheduled surgery.

Most importantly, the study data also identified inpatient hospital lengths of stay during these intervals. This information included mean stays for the combined hospitals for the medical-surgical population.

The data concerning lengths of stay identified the impact of the coronavirus epidemic on the inpatient efficiency based on inpatient lengths of stay in the Syracuse hospitals. They also identified the impact of the epidemic on inpatient programs developed to improve efficiency. Consent for use of these data was provided by the hospitals through Business Associate agreements with the Hospital Executive Council.

These programs included the Difficult to Place and Complex Care Programs. In the period before the epidemic, these programs addressed sources of inefficiency and extended stays in the hospitals. They have also addressed delays in discharges to nursing homes in the community and extended acute care stays produced by intravenous therapy, wound care, and other services.

The Difficult to Place Program has focused on reducing hospital lengths of stay for discharges to nursing homes. It has included the identification of patients in the hospitals who experienced delays in this process. Lists of these patients have been developed by the Hospital Executive Council and sent to all hospitals and nursing homes in the area. The program has also included the development and distribution of monthly reports concerning Difficult to Place admissions.

The Complex Care Programs have included the provision of grants from the hospitals to nursing homes that admit patients who need extended care for inpatient services such as intravenous therapy, total parenteral nutrition, and wound care. These programs are coordinated by the Hospital Executive Council.

4. Results

The first component of the study focused on inpatient discharges for adult med-

icine and adult surgery in the Syracuse hospitals for March-November 2020 compared with discharges in the same months for 2018 and 2019. Relevant data are summarized in Table 1.

This information demonstrated that inpatient discharge volumes in the hospitals for 2018 and 2019 were similar, while inpatient discharge volumes declined substantially between the nine-month periods in 2020, compared with discharges in 2018 and 2019. These reductions were identified for the entire period, as well as for individual months. These data suggest that changes occurred between the first two years and 2020. This coincides with the coming of the coronavirus.

For adult medicine, discharges in the Syracuse hospitals declined by 12.7 percent between March-November 2018 and 2020 and by 13.4 percent between March-November 2019 and 2020. For individual months, the largest adult medicine reductions occurred in April 2020, 1046 - 1174 or 33.9 - 36.5 percent and May, 756 - 778 or 23.3 - 23.8 percent. This was the initial period of the epidemic in Syracuse.

The reductions in discharges declined in later months but remained higher than 200 discharges between June and August and higher than 100 discharges between September and November. These data reflected the slow recovery of adult medicine from the initial wave of the epidemic.

For adult surgery, discharges in the Syracuse hospitals declined by 17.7 percent between March-November 2018 and 2020 and by 16.5 percent between March-November 2019 and 2020. For individual months, the largest adult surgery reductions occurred in May 2020, 894 - 914 or 46.9 - 47.5 percent, and April 2020, 617 - 639 or 35.3 - 36.1 percent, the initial period of the epidemic.

The large reductions in May and April reflected the cancellation of large numbers of elective surgery procedures at the beginning of the epidemic. The smaller reductions in subsequent months were produced by the recovery of surgery from the initial wave of the epidemic and the beginning of a second wave in October and November 2020.

The second component of the analysis focused on the impact of the epidemic on efforts to reduce inpatient lengths of stay in the Syracuse hospitals. Relevant data are summarized in Table 2.

As previously noted, length of stay reduction can contribute to improvements in hospital efficiency and outcomes. In the coronavirus epidemic it also had the potential for reducing inpatient census levels and making additional inpatient capacity available.

The data in Table 2 demonstrated that, in the Syracuse hospitals, the months of the epidemic have been characterized by limited increases in adult medicine and adult surgery lengths of stay. During the period between March and November 2020, adult medicine lengths of stay increased by 0.2 inpatient days, or 4.0 - 4.2 percent, and adult surgery lengths of stay increased by 0.3 inpatient days or 5.4 - 5.7 percent.

Table 1. Inpatient hospital discharges, adult medicine and adult surgery, Syracuse hospitals, Mach-November 2018-2020.

	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Total
Adult Medicine										
2018	3101	3089	3246	3132	3202	3256	2885	3235	2992	28,138
2019	3207	3217	3268	3062	3248	3183	3016	3212	2947	28,360
2020	2797	2043	2490	2725	2977	2967	2844	2911	2818	24,572
Difference 2018-2020	−304	−1046	−756	−407	−225	−289	−41	−324	−174	−3566
Difference 2019-2020	−410	−1174	−778	−337	−271	−216	−172	−301	−129	−3788
Adult Surgery										
2018	1853	1747	1906	1844	1746	1893	1812	1941	1745	16,487
2019	1791	1769	1926	1679	1817	1856	1724	1922	1757	16,241
2020	1494	1130	1012	1552	1751	1638	1729	1730	1530	13,566
Difference 2018-2020	−359	−617	−894	−292	5	−255	−83	−211	−215	−2921
Difference 2019-2020	−297	−639	−914	−127	−66	−218	5	−192	−227	−2675

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. Source: Hospital Executive Council.

Table 2. Inpatient hospital mean lengths of stay (patient days), adult medicine and adult surgery, Syracuse hospitals, March-November 2018-2020.

	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Total
Adult Medicine										
2018	4.9	4.7	4.8	4.5	4.9	4.8	4.7	4.9	4.8	4.8
2019	4.9	4.9	4.6	4.9	4.5	4.9	4.8	4.7	4.7	4.8
2020	4.9	4.8	5.1	5.2	4.8	4.9	5.0	5.0	5.2	5.0
Difference 2018-2020	0.0	0.1	0.3	0.7	−0.1	0.1	0.3	0.1	0.4	0.2
Difference 2019-2020	0.0	−0.1	0.5	0.3	0.3	0.0	0.2	0.3	0.5	0.2
Adult Surgery										
2018	5.6	5.5	5.0	4.9	5.3	5.3	5.1	5.5	5.6	5.3
2019	5.5	5.5	5.4	5.1	5.4	5.3	5.3	5.1	5.1	5.3
2020	5.8	6.5	5.9	5.5	5.3	5.7	5.8	5.2	5.6	5.6
Difference 2018-2020	0.2	1.0	0.9	0.6	0.0	0.4	0.7	−0.3	0.0	0.3
Difference 2019-2020	0.3	1.0	0.5	0.4	−0.1	0.4	0.5	0.1	0.5	0.3

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. Source: Hospital Executive Council.

For adult medicine, inpatient lengths of stay increased in six of the nine months of the epidemic. The largest increases, 0.5 patient days or 10 - 11 per-

cent, occurred in May and November, the first and the possible second waves of the epidemic. No increases occurred in March, April, and August.

For adult surgery inpatient lengths of stay increased in eight of the nine months of epidemic. The largest increases, 1.0 patient days or 15 - 18 percent, occurred at the beginning of the epidemic in April, the second wave in September and November. No increase occurred in July.

It was recognized that part of the increase in adult medicine and adult surgery lengths of stay resulted from regulatory limitations on the access of hospital discharges to nursing homes during the epidemic. These limitations extended hospital stays by reducing the access of some coronavirus patients to long term care services.

Additional inpatient length of stay data by severity of illness demonstrated that, despite the longer inpatient stays that occurred in the Syracuse hospitals during the epidemic, actual utilization remained below comparative levels at the end of the study. At the end of the study, in November 2020, inpatient stays for the combined Syracuse hospitals were 1570 patient days shorter than national averages for adult medicine and 1856 patient days shorter for adult surgery. This amounted to a reduction of 114 patients in the combined average daily census of the hospitals.

5. Discussion

In the United States and elsewhere, the coronavirus epidemic has challenged the ability of hospitals to meet the health care needs of the communities that they serve. An important aspect of this situation is the need for hospitals to provide efficient care. This ability can contribute to their ability to serve coronavirus patients as well as others who need inpatient medical and surgical care.

This study described the impact of the coronavirus epidemic on the utilization of inpatient adult medicine and adult surgery in the combined Syracuse hospitals between March and November 2020, the period of the epidemic, compared with the same periods in previous years. It identified increases in both inpatient discharges and lengths of stay during this time period.

The study identified large increases in inpatient discharges at the onset of the epidemic. These increases were mitigated, but still evident, eight to nine months later.

Most importantly, the study also identified increases in hospital lengths of stay, reflecting declines in efficiency, during the epidemic. For adult medicine, these increases were limited, 4 - 5 percent between March and November 2020 and 9 - 10 percent for some individual months. For adult surgery, these increases were also limited, 5 - 6 percent.

Although limited, the increases in lengths of stay generated declines in hospital efficiency at a time when resources were needed most. At a time when additional capacity was needed to deal with the epidemic, longer inpatient stays generated additional inpatient days and contributed to census levels for the largest hospital services. The increased census levels limited the ability of hospitals to

accommodate coronavirus patients.

It is recognized that the magnitude of the epidemic has created major distractions for health care providers. The results of this study suggest, however, that it should not limit the effectiveness of hospital programs, such as length of stay reduction, that have the ability to support efficiency and protect needed health care resources. These programs need to be supported and expanded. As the demand for inpatient care continues at a high level, efficiency in the delivery of these services will be more, not less important.

Conflicts of Interest

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

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