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Children's hospitals do not acutely respond to high occupancy

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Abstract

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Acquisition of data: Hall.

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Context—High hospital occupancy may lead to overcrowding in emergency departments (ED) and inpatient units, adversely impacting patient care. It is not known how children's hospitals acutely respond to high occupancy.

Objective—To describe the frequency, direction and magnitude of children's hospitals' acute responses to high occupancy.

Design, Setting, and Participants—Patients discharged from 39 children's hospitals participating in the Pediatric Health Information System database during 2006 were eligible. Midnight census data were used to construct occupancy levels.

Main Outcome Measures—Acute response to high occupancy measured by 8 variables, including changes in hospital admissions (4 measures), transfers (2 measures), and length of stay (2 measures).

Results—Hospitals were frequently at high occupancy, with 28% of midnights at 85–94% occupancy and 42% of midnights at $\geq 95\%$ occupancy. While half of children's hospitals employed occupancy-mitigating responses, there was variability in responses and magnitudes were small. When occupancy was $>95\%$, no more than 8% of hospitals took steps to reduce admissions, 13% increased transfers out, and up to 58% reduced standardized length of stay. Two-day lag response was more common, but remained of too small a magnitude to make a difference in hospital crowding. Additional modeling techniques also revealed little response.

Conclusions—We found a low rate of acute response to high occupancy. When there was a response, the magnitude was small.

Keywords

Length of Stay; Patient Admission; Patient Discharge; Patient Transfer; Hospitalization; Hospitalized Child; Hospital Bed Capacity; Elective Surgical Procedures; Bed Occupancy; Pediatric Hospital

INTRODUCTION

High hospital occupancy (“crowding”) is a significant concern for health care professionals, administrators, policymakers and patients due to reduced access, poorer patient outcomes, and increased provider stress.^{1–8} Operations management suggests that systems function well until 85–90% of capacity is utilized.^{9–10} Up to that point, service-delivery is maximized while allowing for natural fluctuations in patient volume. Above that point, “rejections” and delays mount. For hospitals, staying below threshold occupancy is important to ensure high-quality clinical care, maintain staff satisfaction and enable educational missions.¹¹

Hospitals have a variety of ways to respond to high occupancy (Figure 1). This study focuses on acute responses. We hypothesized that hospitals do not alter any of the eight acute responses measured, including: 1) medical elective admissions, 2) surgical elective admissions, 3) short stay admissions, 4) low-severity admissions, 5) LOS for Non-ACSC conditions, 6) LOS for ACSC conditions, 7) transfers in from other hospitals, and 8) transfers out to other hospitals.

METHODS

DATA SOURCE

Data for this retrospective study were obtained from the Pediatric Health Information System (PHIS), a national administrative database containing resource-utilization data from

39 freestanding, tertiary-care children's hospitals. PHIS hospitals are located in non-competing markets of 23 states plus the District of Columbia and account for 20% of all general tertiary-care (rather than subspecialty) children's hospitals. These hospitals are affiliated with the business alliance, Child Health Corporation of America (CHCA, Shawnee Mission, KS). Data quality and reliability are assured through a joint effort between CHCA and participating hospitals. Admissions occurring between January 1 and December 31, 2006 were included. Due to variation in the presence of birthing, neonatal intensive care, and designated behavioral health units, these beds and associated patients were excluded. The protocol for the conduct of this study was reviewed and approved by The Children's Hospital of Philadelphia Committee for the Protection of Human Subjects.

Study Definitions

Inpatients enter hospitals in two ways: (1) as “scheduled” (i.e., elective or semi-elective) admissions; and (2) as “unscheduled” (i.e., emergent or urgent) admissions. Given that PHIS does not have this variable for each hospital, the Kids Inpatient Database (KID) 2006 from the Healthcare Cost and Utilization Project (HCUP) was used to characterize proportion of scheduled admissions.¹² Each patient encounter in KID includes a principal discharge diagnosis and procedure code (ICD-9) and a designation, made by the hospital, as “elective” or not. (Here, electives include a range of types of scheduled admissions, from chemotherapy to tonsillectomy.) Since admissions rather than diagnoses are elective, every principal diagnosis and procedure code in KID has a percentage elective (range, 0–100%). Proportions in KID were matched to the list of principal diagnoses in PHIS to derive the proportion of scheduled admissions. For example, in KID 28% of admissions with a primary diagnosis of “esophageal reflux” were coded as elective; we applied this percentage to that ICD9 code in PHIS, thereby designating each reflux admission as 28% scheduled and 72% unscheduled. The face validity of the proportion associated with the most common (≥ 100 occurrences in PHIS) diagnostic and procedure codes in KID was confirmed by a review by five pediatricians with full concordance. The convergent validity was assessed by comparing the total percent of scheduled admissions determined through direct standardization against data obtained directly from five participating hospitals.

Analysis

Each hospital's capacity was defined using CHCA data on the number of active (not licensed) beds (excluding perinatal and behavioral) at each hospital for 2006, and was confirmed by hospital administrative representatives at each participating hospital. The number of beds was assumed to be fixed and staffed for the entire year. Midnight census was used to calculate the percent occupancy for each day and all analyses were at the hospital level. The differences between peak and midnight occupancies were also assessed for 3 hospitals.

The dependent variables were selected to reflect measures available in PHIS for which change in value could be indicative of a hospital response. The eight measures were calculated independently for each day and included:

1. Number of medical scheduled admissions
2. Number of surgical scheduled admissions
3. Number of short-stay admissions (≤ 1 day)
4. Number of low-severity admissions from ED (lowest quartile of APR-DRG severity classification)¹³

5. Observed-to-expected length of stay for ambulatory-care sensitive conditions (ACSC), which are conditions for which ambulatory care may reduce, though not eliminate, the need for hospitalization¹⁴
6. Observed-to-expected length of stay for non-ACSC
7. Number of inbound transfers from another acute care hospital
8. Number of outbound transfers to another acute care hospital

We separated ACSC from non-ACSC to provide a greater level of detail about the patient population, particularly since strategies to handle such patients may vary. In order to accurately analyze dependent variables 5 and 6, we utilized the standardized LOS ratio (SLOS), as evaluating LOS alone fails to adequately account for differences in patient case mix and severity.^{15–18} SLOS is calculated by the ratio of observed LOS to the expected LOS based APR-DRG and severity level assigned by the hospital, using the Thomson Reuters LOS norms.¹⁹

Three approaches were used to determine response to high occupancy. First, normative threshold levels of midnight occupancy were set at 85%, 90%, and 95%. Hospital-specific generalized linear models were built independently for each threshold and dependent variable using, as a predictor, the prior day's midnight occupancy interacted with an indicator variable (set at 1 if the prior day's occupancy was over a threshold level and 0 otherwise). These models measured the direction and magnitude of each hospital's responses 1 day after the midnight occupancy threshold level was exceeded. A similar model was built to assess the effect 2 days later.

Second, to assess how each hospital responded relative to its own occupancy experience, we placed each midnight census into a percentile based on the hospital's data. We then used these percentiles as the response in hospital-specific generalized linear models. Again, direction and magnitude of response were measured for 1-day and 2-day lags.

Third, to determine whether or not each hospital made a holistic response across the covariates, we performed multivariate analysis using canonical correlation. This method simultaneously investigates the relationship between two sets of variables, but does not quantify response. We used the response variables listed above as the criterion measures and the prior day's percentile of midnight census as the only predictor to determine whether or not each hospital made a generally consistent response in measured covariates based on midnight census.

All statistical analyses were performed using SAS (version 9.1, SAS Institute, Inc, Cary, NC); p-values less than 0.05 were considered statistically significant.

RESULTS

Study Hospitals

The mean size of the hospitals was 195 beds (median, 190; inter-quartile range (IQR):156, 218). During the study period, there were 510,616 eligible admissions. The mean number of admissions per hospital was 13,092 (median, 12,512; IQR: 10,419, 15,348). Median LOS ranged across the hospitals from 1.0 to 4.0 days and SLOS ranged from 0.83 to 1.33. The hospitals were frequently at high occupancy at midnight: of 14,235 hospital-midnights included, 28% were at 85–94% and 42% were at ≥95% (Figure 2). Sixty-one percent (24) were >90% occupied on more than half of midnights. The rate of high occupancy was even greater when looking at weekdays only. At 3 hospitals assessed, peak daytime occupancy was always higher than midnight occupancy, with the former up to 13%-points higher.

Hospital Responses

First, when compared to normative standards of high occupancy, fewer than half of the hospitals responded in any way 1 day after occupancy of 85% (Table 1). Though most hospitals had changes 2 days after exceeding 95% occupancy (Table 2), the magnitude of changes were small. One day after exceeding 85% or 95% occupancy, the most common response was to alter LOS; for example, 56% of hospitals (22) had decreased SLOS for non-ACSC patients, but the mean decrease in the ratio was 0.12, which would amount to reductions of 2–12 hours on median LOS. Few hospitals appeared to change to transfers in or out. For scheduled admissions, 53% (20) had fewer scheduled medical admissions and 92% (35) had fewer scheduled surgical admissions 2 days after 95% occupancy, but the mean decrease was 1.17 for scheduled medical and 1.34 for scheduled surgical admissions.

The second method, hospital's response to its own occupancy experience, showed a similar pattern of little response across the 8 dependent variables at high levels of relative occupancy (Table 3).

Using the third approach of canonical correlation for holistic response, we found that only 3 of 39 hospitals had an appropriate (i.e. negative) canonical correlation between day n occupancy with day $n+1$ responses (dependent variables); 23 hospitals had a positive canonical correlation while 13 had no holistic response. For 2-day lag, 5 hospitals had a negative canonical correlation, 21 had a positive one and 13 had no holistic response.

DISCUSSION

In this study, we found that children's hospitals were frequently crowded, but rarely acutely responded in a meaningful way to high midnight occupancy, even when it was as high as 95%. We found considerable variability both within and across hospitals.

As a whole, PHIS hospitals were often at high occupancy, with 70% of all midnights above 85% occupancy, including 42% of midnights above 95%. Prior studies show that patient safety, quality, and efficiency can be adversely impacted by occupancy above 85–90%.^{7, 8, 10} While there may be debate about this threshold, occupancy levels >85–95% at midnight suggest an even higher level in daytime and raise concerns about quality, safety, and access. To ensure high-quality care – as well as optimal patient/family experiences, avoidance of rejected transports and referrals, lessened ED crowding, decreased staff stress, and ability to deliver on educational missions – hospitals can consider multiple strategies, like those described below, to better analyze and manage patient flow.

Scheduled admissions

During times of high occupancy, hospitals are not decreasing the number of medical or surgical scheduled admissions. This finding is not surprising given that canceling scheduled admissions at the last minute would likely upset patients, families, and providers. As an alternative strategy, flow experts joined by the American Hospital Association, the Institute of Medicine, and Institute for Healthcare Improvement argue hospitals should smooth scheduled admissions to accommodate known increases in unscheduled admissions by day-of-week and season.^{6, 20–23}

Short-stay and low-severity patients

At times of high-occupancy, hospitals had both increases and decreases of short-stay admissions (≤ 1 day). More than half of hospitals had increased admissions of low-severity patients during high-occupancy periods. This mixed response likely reflects the differing pressures experienced by inpatient and ED providers during high-occupancy periods. For

inpatient providers, there may be pressure to discharge patients quickly, whereas ED providers faced with ED crowding (correlated with times of high hospital occupancy) experience pressure to admit patients quickly to improve ED bed availability.²⁴ Taken together, our findings and others suggest that increasing ED admissions (especially for low-severity patients) may increase inpatient staff workload and ultimately reduce overall efficiency as staff appropriately divert attention away from discharging to caring for sicker and newer patients.³ Because a substantial proportion of pediatric hospitalizations are brief and in one national study, one-third of admissions stayed 0 or 1 night²⁵ – hospitals should devote resources to optimizing the efficiency of care for these patients in order to decrease their contribution to high hospital occupancy. To achieve this goal, potential strategies include extended-care ED units, short-stay inpatient units, streamlined paperwork and protocols, partnerships with community hospitals, as well as off-site urgent care facilities and extended hours for primary care practices.

Inter-facility transfers

Children's hospitals, particularly when serving as the sole pediatric facility in a region, may face difficulty in delaying or rejecting patients. In this study, several hospitals increased outgoing transfers, but incoming transfers did not vary. The relative stability of incoming transfers may reflect a *lower rate* of accepting transfers, as the number of other institutions seeking to transfer patients would be expected to rise in high-volume winter months. Though PHIS data did not include data on number of rejected and delayed transfers, it is likely that rejections occur at a higher rate during high-occupancy periods. To better handle transfer requests during high occupancy periods, tertiary-care children's hospitals may create formal relationships with community hospitals and transfer agreements in order to offload lower-severity patients while maintaining the supply of higher-acuity beds. Though two studies have demonstrated that transfers are safe, hospitals must weigh this against other studies showing families' preference not to be transferred.^{26, 27}

Length-of-stay

In this study, as many as one-third of hospitals showed a decrease in LOS (measured by SLOS_R) during times of high occupancy and the effect was seen more in non-ACSC than in ACSC diagnoses. This observation is consistent with hospital strategies to attempt to lessen crowding by being more efficient, such as by discharging prior to rounds (which can be modulated as needed). The many hospitals in PHIS with SLOS_R at or near 1 and short LOS, however, would have limited success in substantially increasing functional capacity in this manner. This also assumes reductions in LOS could be achieved without harming quality, safety, or patient satisfaction.

This study has several limitations. First, using administrative data precluded us from modeling the full complexity of possible hospital responses. Hospitals have different staffing models and those with high baseline provider-to-patient ratios may be better able to accommodate fluctuations in census without altering the dependent variables considered in our analysis. For this reason, our approach may have underestimated both the frequency and magnitude of hospitals' response to high census. Additionally, the smallest LOS increment was one day, which limited finer variation in SLOS_R and precluded measure of LOS less than one day.

Second, we assumed a fixed number of staffed beds for the whole year, which may not accurately reflect actual available bed count on specific days. This may fluctuate due to the periodic closing and opening of beds or units related to construction or flexing of staff. Furthermore, some hospitals may deliberately use non-traditional bed spaces during periods of high census. These strategies were out of scope of the paper and do not reduce overall

burden on hospitals or their staffs. Further, in some cases they require that patients stay in non-traditional areas of the hospital, which may not necessarily be aligned with delivering the highest quality care. The direction of systematic bias could be in either direction: overestimate days the hospital is at high occupancy if the denominator is too low if there are more staff beds or underestimate if beds are not staffed and not used, but appear in the denominator.

Third, the use of midnight census (instead of daily peak) would bias us away from overestimation. Midnight census is the only universally-available and reliable census data that is available within PHIS (and retrospectively at most hospitals), and as such it provides a standard snapshot of daily census overall. Even though it is known to be lower than peak census, due to continued evening and overnight admissions during the time when discharges slow and then cease to occur,²⁸ it is an accurate look at census at one point in time and can be used in the appropriate context for throughput decision making.

Fourth, we standardized admissions in PHIS as scheduled or unscheduled using KID proportions of admission type. To determine the extent and direction of misclassification, we compared the proportion of admissions designated as scheduled with actual data from a subset of 5 hospitals. The total proportion of admissions (surgical + medical) derived to be scheduled in the PHIS database was less than those coded as such by the hospitals; however, direct standardization overestimated the number of scheduled medical admissions, particularly for patients admitted on weekends. This would likely cause us to underestimate day-of-the-week fluctuations in scheduled medical admissions, thereby biasing to the null hypothesis. Conversely, KID had high proportions of surgical admissions being “elective”, which lends confidence to the estimates in our study.

Fifth, our model assumed hospitals responded to excess capacity by altering dependent variables 1–2 days later. It is possible that the hospital response occurred more than 2 days after a high-occupancy trigger. This would also result in underestimation of hospital response. However, even if a hospital responded several days later, such an approach would not address the immediate patient flow and safety issues associated with high occupancy.

Sixth, the terms “response” or “reaction” implies a degree of causality that can only be imputed from the temporal relationships. For example, it was impossible to know whether the rise in scheduled admissions was a *response to* or a *cause of* the corresponding midnight occupancy level. It is also possible that hospitals did not actively try to manage or respond to high occupancy. While out of scope from this study, surveying hospitals about what census-management strategies they attempt and which are successful would also be informative.

Finally, only free-standing children's hospitals were included in this study. It is uncertain whether children's hospitals located within tertiary care medical centers and non-children's hospitals that care for children would respond differently.

In summary, we found that among 39 children's hospitals, meaningful responses to high occupancy were rare, in that they would not substantially reduce inpatient crowding. Given that studies in adult hospitals have found increases in sentinel events and medical errors associated with crowding, our findings raise concerns about adverse effects on patient safety and quality of care in the pediatric inpatient population. Hospitals and clinicians need to better understand the exact thresholds for defining high occupancy and its effects on patient outcomes, quality of care, safety, staff stress and satisfaction, education and training, as well as short- and long-term referral patterns and finance. Beyond occupancy, dynamic measures like throughput or throughput-to-staff ratios may be more important to safety and quality and a better standard for hospitals to use for activating responses. There may be good clinical and business cases for targeting high occupancy or throughput – or their ratio to staff

and other resources – as a “never event” like other patient safety goals, which necessitates further research on the processes and outcomes involving patient flow at children's hospitals.

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Abbreviations

(ED)	emergency department
(PHIS)	Pediatric Health Information System
(CHCA)	Child Health Corporation of America
(KID)	Kids Inpatient Database
(HCUP)	Healthcare Cost and Utilization Project
(APR-DRG)	All Patient Refined Diagnosis Related Groups
(ICD-9)	International Classification of Diseases, 9th Revision
(ACSC)	ambulatory-care sensitive conditions
(LOS)	length-of-stay
(SLOS)	standardized LOS ratio
(IQR)	inter-quartile range

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Hospital Administrative and Clinical Responses:

A. Input

- a. Move inputs temporally
 - i. Smooth **scheduled admissions** so that admission rate varies inversely with predictable patterns in unscheduled admission rate
 - ii. Cancel **scheduled admissions** on a day-by-day basis
- b. Move inputs spatially
 - i. Instead of admitting **low-severity** and **short-stay unscheduled patients**, either observe them in the ED, short-stay units or other non-traditional space; or discharge them with/without home health care
 - ii. Transfer patients to another acute-care hospital.
 - iii. Refuse direct admissions and/or inbound **transfers from other facilities**.
 - iv. Expand hospital beds and/or staff, either at hospital or by expanding a network of hospitals
 - v. Improve/expand hospital resources to create more access to ambulatory care to reduce **ACSC ED admissions**

B. Output

- a. Improve efficiency of discharge process to decrease **LOS**
- b. Improve/expand hospital resources to create more access to home-health care

Bold items can be measured in PHIS

Figure 1.
Potential hospital responses to increasing demand for beds.

Figure 2. Annual hospital occupancy experience of hospitals (2006)

These boxplots for each hospital display annual hospital occupancy over the year. The ends of the shaded box represent the 25th and 75th percentile values of occupancy, while the line in the middle of the box represents the median value. The ends of the whiskers extend 1.5 times the inter-quartile range (75th percentile minus 25th percentile). Horizontal lines are at 85% and 100% of hospital occupancy.

Table 1

Hospital responses to >85% occupancy in normative model

The expected direction of response to high occupancy is shaded in gray, regardless of actual responses. Number of hospitals with *any* size response is reported and magnitude for each direction of response is provided ($p < 0.05$). Units on magnitude (mean increase or decrease) are reported as number of patients, except for the SLOS, which is reported as change in ratio (e.g. decrease of 0.13 corresponds to a 13% reduction in observed-to-expected LOS) for each 1% increase in occupancy over 85%.

Potential response	1-day lag				2-day lag			
	Increase		Decrease		Increase		Decrease	
	# hospitals (n=39)	Mean increase (range)	# hospitals (n=39)	Mean decrease (range)	# hospitals (n=39)	Mean increase (range)	# hospitals (n=39)	Mean decrease (range)
After # scheduled medical admits	6	0.62 (0.38, 0.96)	2	1.32 (1.27, 1.37)	2	0.44 (0.40, 0.47)	21	1.00 (0.29, 2.72)
After # scheduled surgical admits	5	1.08 (0.53, 1.77)	4	0.78 (0.36, 1.41)	0	-	32	1.32 (0.43, 4.20)
After # short-stay admissions	10	2.33 (1.05, 5.41)	0	-	2	1.14 (1.09, 1.18)	16	2.31 (1.01, 6.82)
After # low-severity ED admits	15	1.28 (0.43, 2.33)	0	-	16	1.21 (0.38, 2.25)	0	-
After # transfers in	4	0.66 (0.38, 0.86)	3	1.19 (0.60, 1.89)	4	0.73 (0.36, 0.99)	6	2.63 (0.62, 5.48)
After # transfers out	5	0.34 (0.11, 0.57)	1	0.11 (0.11, 0.11)	0	-	3	0.20 (0.17, 0.25)
After SLOS for non-ACSCs	4	0.15 (0.07, 0.26)	19	0.16 (0.07, 0.43)	12	0.13 (0.05, 0.29)	8	0.09 (0.05, 0.13)
After SLOS for ACSCs	4	0.16 (0.08, 0.26)	10	0.88 (0.07, 6.39)	9	0.14 (0.06, 0.32)	6	0.23 (0.09, 0.45)

Abbreviations: ACSCs, ambulatory care sensitive conditions; ED, emergency department; LOS, length of stay; SLOS, standardized length of stay ratio

Table 2

Hospital responses to >95% occupancy in normative model

The expected direction of response to high occupancy is shaded in gray, regardless of actual responses. For example, if hospitals were at >95% capacity at midnight, one might expect they would decrease low-severity admissions from the ED, but in this case, only 1 hospital did. Number of hospitals with *any* size response is reported and magnitude for each direction of response is provided ($p < 0.05$). Units on magnitude (mean increase or decrease) are reported as number of patients, except for the SLOS, which is reported as change in ratio (e.g. decrease of 0.13 corresponds to a 13% reduction in observed-to-expected LOS) for each 1% increase in occupancy over 95%.

Potential response	1-day lag				2-day lag			
	Increase		Decrease		Increase		Decrease	
	# hospitals (n=38)	Mean increase (range)	# hospitals (n=38)	Mean decrease (range)	# hospitals (n=38)	Mean increase (range)	# hospitals (n=38)	Mean decrease (range)
After # scheduled medical admits	7	0.73 (0.40, 1.06)	1	0.54 (0.54, 0.54)	2	0.59 (0.30, 0.88)	20	1.17 (0.45, 2.37)
After # scheduled surgical admits	3	0.98 (0.71, 1.47)	3	0.59 (0.32, 1.02)	0	-	35	1.34 (0.37, 3.98)
After # short-stay admissions	11	2.12 (0.95, 4.51)	1	0.77 (0.77, 0.77)	0	-	17	2.50 (0.86, 6.61)
After # low-severity ED admits	23	1.38 (0.54, 2.75)	1	0.53 (0.53, 0.53)	20	1.41 (0.52, 3.00)	1	0.34 (0.34,0.34)
After # transfers in	5	0.63 (0.24, 1.21)	3	0.95 (0.48, 1.80)	6	0.70 (0.28, 1.47)	6	2.10 (0.28, 4.46)
After # transfers out	8	0.35 (0.18, 0.71)	0	-	0	-	3	0.22 (0.13, 0.31)
After SLOS for med-ACSCs	7	0.14 (0.07, 0.24)	22	0.12 (0.04, 0.24)	14	0.13 (0.04, 0.29)	7	0.11 (0.04, 0.17)
After SLOS for ACSCs	9	0.13 (0.06, 0.27)	12	0.78 (0.06, 7.14)	12	0.16 (0.09, 0.34)	6	0.20 (0.07, 0.37)

Abbreviations: ACSCs, ambulatory care sensitive conditions; ED, emergency department; LOS, length of stay; SLOS, standardized length of stay ratio

Table 3
Hospital responses in relation to high midnight occupancy (relative)

Values represent the number of hospitals that responded when moving from its own 90 to 100th percentile of occupancy. Data from all 39 hospitals are included. The expected direction of response to high occupancy is shaded in gray, regardless of actual responses. Number of hospitals with *any* size response is reported and magnitude for each direction of response is provided ($p < 0.05$). Units on magnitude (mean increase or decrease) are reported as number of patients, except for the SLOS, which is reported as change in ratio (e.g. decrease of 0.13 corresponds to a 13% reduction in observed-to-expected LOS) for each 1% increase in percentile.

Potential response	1-day lag				2-day lag			
	Increase		Decrease		Increase		Decrease	
	# hospitals (n=39)	Mean increase (range)	# hospitals (n=39)	Mean decrease (range)	# hospitals (n=39)	Mean increase (range)	# hospitals (n=39)	Mean decrease (range)
After # scheduled medical admits	8	0.12 (0.08, 0.18)	1	0.13 (0.13, 0.13)	2	0.13 (0.11, 0.15)	11	0.20 (0.12, 0.28)
After # scheduled surgical admits	2	0.16 (0.09, 0.24)	3	0.13 (0.09, 0.20)	0	-	30	0.22 (0.07, 0.49)
After # short-stay admissions	8	0.40 (0.25, 0.81)	1	0.18 (0.18, 0.18)	2	0.33 (0.30, 0.35)	11	0.40 (0.17, 0.77)
After # low-severity ED admits	25	0.27 (0.10, 0.68)	1	0.92 (0.92, 0.92)	20	0.30 (0.08, 0.74)	1	0.08 (0.08, 0.08)
After # transfers in	4	0.24 (0.05, 0.56)	5	0.26 (0.06, 0.69)	4	0.25 (0.01, 0.63)	3	0.61 (0.38, 0.94)
After # transfers out	5	0.07 (0.05, 0.10)	0	-	1	0.06 (0.06, 0.06)	1	0.06 (0.06, 0.06)
After SLOS for non-ACSCs	4	0.04 (0.03, 0.06)	14	0.02 (0.01, 0.07)	10	0.03 (0.01, 0.07)	5	0.03 (0.01, 0.04)
After SLOS for ACSCs	7	0.03 (0.01, 0.05)	9	0.20 (0.02, 1.51)	11	0.03 (0.01, 0.06)	7	0.03 (0.01, 0.06)

Abbreviations: ACSCs, ambulatory care sensitive conditions; ED, emergency department; LOS, length of stay; SLOS, standardized length of stay ratio