National Survey of Length of Stays from Hospital Discharges between 2001-2010

Melvin Chan, MPH[1], Xibei Liu, BS[1], and Kevin Sanchez, MPH[1]

[1]University of Nevada School of Medicine, 1664 N Virginia Street, Reno, NV 89503

Introduction

Over the last few years, healthcare spending has outpaced inflation[1,2]. Unfortunately, this growth has not necessarily yielded greater quality of care[3]. Experts have called for reductions in this growth particularly in inpatient services, because it comprises of only 7% of utilization but accounts for 29% of spending[4].

The literature has been limited and shows mixed results on the progress of reducing inpatient stays, depending on the methodology. One study finds an increase in inpatient stays, using absolute numbers[5,6]. Another study has reported opposite results, as shown in Figure 1[7]. These two measurements, however, have weaknesses. Using total inpatient stays is prone to be affected by the aging population, whereas using inpatient use rate can be affected by the definition of an inpatient stay, which can change from year to year[8].

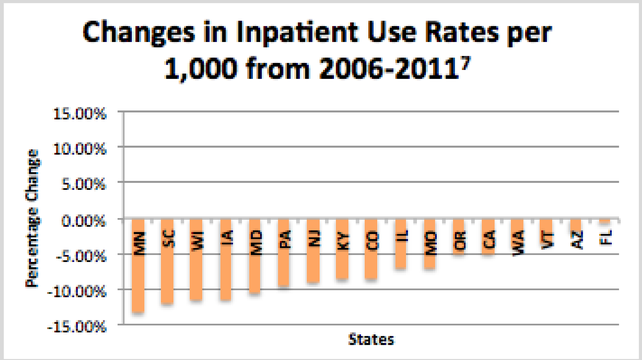


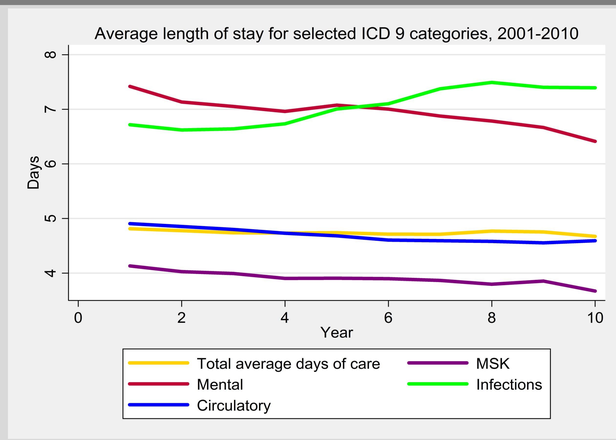
Figure 1

Using length of stay (LOS) may be a potential solution that can avoid these pitfalls, as patients are already admitted to the hospital. Previous studies have shown slight overall decreases in LOS through the National Inpatient Survey[5,6,9]. To the best of our knowledge, there have been no studies assessing LOS across diagnostic categories and years through the National Health Discharge Survey.

Methodology

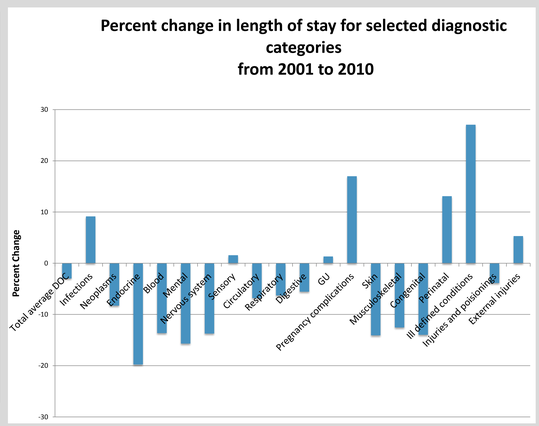
Data on hospital admissions was obtained from the National Health Discharge Survey (NHDS) dataset from 2001 to 2010. Average length of stay was calculated after grouping ICD-9 chapter categories for first listed patient diagnosis by using Stata version 12 (STATA Corp, College Station, TX).

Results



Admissions by ICD 9 categories, 2001-2010		
Total admissions	Percent	ICD 9 Category
82768	2.8	Infections
133144	4.5	Neoplasms
129364	4.4	Endocrine
37322	1.3	Blood
189652	6.1	Mental
41712	1.4	Nervous system
9802	0.3	Sensory
479992	16.3	Circulatory
262214	8.9	Respiratory
258471	8.8	Digestive
143433	4.9	GU
38430	1.3	Pregnancy complications
53396	1.8	Skin
148271	5.0	MSK
16968	0.6	Congenital
15577	0.5	Perinatal
13717	0.5	Ill defined conditions
212026	7.2	Injury and posining
687190	23.3	External injury

Average length of stay, 2001-2010			
		2010	
ICD 9 Category	2001 Average	Average	Percent change
Total average LOS	4.8	4.7	-3.0
Infections	6.7	7.4	9.2
Neoplasms	6.2	5.7	-8.3
Endocrine	4.5	3.8	-19.8
Blood	4.7	4.2	-13.6
Mental	7.4	6.4	-15.7
Nervous system	5.8	5.1	-13.7
Sensory	2.8	2.8	1.6
Circulatory	4.9	4.6	-6.8
Respiratory	5.5	5.1	-6.3
Digestive	5.0	4.7	-5.6
GU	3.8	3.9	1.3
Pregnancy complications	2.7	3.2	17.0
Skin	5.3	4.6	-14.1
Musculoskeletal	4.1	3.7	-12.5
Congenital	6.3	5.5	-14.0
Perinatal	11.1	12.8	13.1
Ill defined conditions	2.4	3.3	27.1
Injuries and poisionings	5.3	5.1	-3.9
External injuries	3.6	3.8	5.3



Results from this study show an overall decline in the average length of stay by about 3% from 2001-2010. The largest decreases came from diagnostic categories related to endocrine, mental, and dermatological disorders. Unfortunately, some categories did increase, including ill-defined conditions, pregnancy complications, perinatal problems, and infections.

There are limitations of using NHDS. Hospitals were chosen based on a geographic probability-sampling model to achieve national representativeness, but some hospitals chose not to participate, leading to potential bias in results. In 2010, the response rate was 79%. Also, while an automated data collection system was used in some hospitals, about 48% of hospitals used data collection forms processed by hospital staff, increasing the risk of data entry error[10]. Another issue was employing a cross sectional survey. NHDS did not provide longitudinal data on individual patient outcomes of interest, such as readmission rates. Finally, hospital data did not fully capture medical resource utilization patterns across the nation because medically underserved areas were not accurately represented in the data.

Discussion

The results of this study indicate an overall decline in the length of stay (LOS), consistent with previous research. Much of the decline can be attributed to efforts to move from a hospital-centric sick care to outpatient care across specialties via the aid of health navigators, home health service providers, and online/telephonic interactions[10].

More important than reductions in LOS is whether this decrease has translated into increased quality and decreased cost is not clear. A limitation of this study is not being able to capture these two variables. A review of the literature also fails to give an answer, especially on the topic of quality. Despite lacking data, reductions in LOS have not been associated with negative post-discharge events, as the 30-day readmission rate has not changed from 2007 to 2010 according to the Centers for Medicare and Medicaid Services[12].

In terms of costs, limited data shows that efforts to reduce LOS have either increased costs or been marginally cost-saving[5,6,9,13]. A study by the Agency for Healthcare Research and Quality (ARHQ) attributes increased costs to the use of more intensive services, which may or may not yield better outcomes[9]. However, the report also states that large LOS reductions have helped to dampen the cost curve, specifically in regards to diagnoses of osteoarthritis and mood disorders, indicating some benefits to reducing LOS[9]. Results from another study show that there is an insignificant saving from discharging early, because it only represents 2.4% of the total costs[13]. The authors of that study recommend optimizing work processes done at the beginning of admission to create greater cost-savings[13].

Taken altogether, our study indicates that efforts to reduce LOS from 2001-2010 have been effective, translating into a marginal cost-saving. However, future endeavors have to focus not only on reducing LOS but also providing a smooth inpatient care transition and implementing policies that aim to avoid unnecessary and costly procedures[9,13]. Additionally, more research has to be done to assess the relationship between LOS reductions and quality of care.

References (Chicago format)

1. Auerbach, DI, and AL Kellermann. 2011. "A Decade of Health Care Cost Growth Has Wiped out Real Income Gains for an Average US Family." *Health Affairs* 9 (9): 1630–36. http://content.healthaffairs.org/content/30/9/1630.short.
2. Sood, N, A Ghosh, and J Escarse. 2007. "The Effect of Health Care Cost Growth on the US Economy." *Office of the Assistant Secretary for ...*, 1–57. http://aspe.dhhs.gov/health/reports/08/healthcarecost/Report.html.
3. Schieber, SJ, CDK Bilyeu, and DR Hardy. 2009. "The Unsustainable Cost of Health Care." *Social Security Advisory ...*, no. September. http://ssab.gov/Documents/TheUnsustainableCostofHealthCare_508.pdf.
4. Pfuntner, A (Truven Health Analytics), Wier, LM (Truven Health Analytics), Steiner, C (AHRQ). Costs for Hospital Stays in the United States, 2010. HCUP Statistical Brief #146. January 2013. Agency for Healthcare Research and Quality, Rockville, MD. Available at http://www.hcup-us.ahrq.gov/reports/statbriefs/sb146.pdf.
5. Pfuntner A (Truven Health Analytics), Wier LM (Truven Health Analytics), Elixhauser A (AHRQ). Overview of Hospital Stays in the United States, 2011. HCUP Statistical Brief #166. November 2013. Agency for Healthcare Research and Quality, Rockville, MD. http://www.hcup-us.ahrq.gov/reports/statbriefs/sb166.pdf.
6. Weiss AJ (Truven Health Analytics), Elixhauser A (AHRQ). Overview of Hospital Stays in the United States, 2012. HCUP Statistical Brief #180. October 2014. Agency for Healthcare Research and Quality, Rockville, MD. http://www.hcup-us.ahrq.gov/reports/statbriefs/sb180-Hospitalizations-United-States-2012.pdf.
7. Grube, Mark, Kenneth Kaufman, and Robert York. "Decline In Utilization Rates Signals A Change In The Inpatient Business Model." Decline In Utilization Rates Signals A Change In The Inpatient Business Model. March 8, 2013. Accessed April 23, 2015. http://healthaffairs.org/blog/2013/03/08/decline-in-utilization-rates-signals-a-change-in-the-inpatient-business-model/.
8. Wright, Stuart. 2001. "Office of Inspector General." *Public Law* 27650: 27644–50. http://oai.dtic.mil/oai/oai?verb=getRecord&metadataPrefix=html&identifier=ADA371733
9. Stranges, E, (Thomson Reuters), Kowlessar, N, (Thomson Reuters), and Elixhauser, A (Agency for Healthcare Research and Quality). *Components of Growth in Inpatient Hospital Costs, 1997-2009.* HCUP Statistical Brief #123. November, 2011. Agency for Healthcare Research and Quality, Rockville, MD.http://www.hcup-us.ahrq.gov/reports/statbriefs/sb123.pdf
10. Centers for Disease Control and Prevention. National Center for Health Statistics. *National Hospital Discharge Survey, 2010, Public Use Data Documentation.* ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Dataset_Documentation/NHDS/
11. "Inpatient Patient Navigator Program Reduces Length of Stay." Harvard Business Review. November 12, 2013. Accessed April 22, 2015. https://hbr.org/2013/11/inpatient-patient-navigator-program-reduces-length-of-stay.
12. "National Medicare Readmission Findings: Recent Data and Trends Findings: Recent Data and Trends." Academyhealth.org. Accessed April 23, 2015. http://www.academyhealth.org/files/2012/sunday/brennan.pdf.
13. Taheri, Paul A, David A Butz, and Lazar J Greenfield. 2000. "Length of Stay Has Minimal Impact on the Cost of Hospital admission." *Journal of the American College of Surgeons* 191 (2): 123–30. doi:10.1016/S1072-7515(00)00352-5.