

Past Trends and Future Forecasts in a Volatile Healthcare Market

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Abstract

There is a large inpatient decline occurring across the nation today. As a commercialized population demands a convenient healthcare option, inpatient stays are becoming a thing of the past. The evidence of this is extremely prevalent in Pennsylvania, as an 11% decline in inpatient discharges has occurred since 2006. Hospitals need to understand the reasons for this decline in order to survive the profit loss from treating fewer inpatients. The best ways to thrive in the current market are to emphasize overall population health, expand into various outpatient practices and to increase the value, not the volume, of inpatient visits. The Lehigh Valley Health Network has been implementing these solutions, and has grown almost 30% since 2006. In the future, inpatient discharges within Pennsylvania are going to continue to decrease. The decline will slow and level out eventually, but it is impossible to know when that will occur. LVHN inpatient volumes have a more uncertain future, but it appears the overall market decline is catching up, and the growth has slowed.

Background

Beginning in approximately 2006, the quantity of inpatients seen within the United States began decreasing. Understanding the cause of this change is an important part of being able to thrive within it. The best explanations begin with a fundamental consumer change. As the population becomes more and more commercialized, patients demand convenience. This leads to a shift from inpatient to outpatient treatments as new technology allows former inpatient surgeries to be completed more easily and in a shorter time period. In the words of Brian Silverstein, M.D., vice president of Sg2, a Chicago research and consulting firm, “Many hospitals have put outpatient services on the front burner. The hospital profit base 10 years ago was 64 percent inpatient and 35 percent out. Today that’s flipped,” (Olson, 2015, para. 3). The focus of healthcare is also changing as a new emphasis is being put on quality instead of quantity. Hospitals are moving “from a system that thrives on illness to one that rewards health and wellness,” (Macfarlane, 2014, para. 13). Unfortunately, none of these changes are inexpensive. The new technologies that allow for this evolution are costly, making it difficult for isolated hospitals to survive on inpatients alone.

The healthcare market today is very different than what it was even five years ago, so the methods to thrive in it must change as well. A new focus needs to be placed on population health, and keeping people healthy instead of curing the sick. Singular hospitals will not flourish alone; support is needed throughout the entire healthcare system. “For years, the trend was hospital-to-hospital mergers and acquisitions. Today, it’s vertical integration. It’s, ‘Let’s buy the whole value chain’ — from home care to hospice to skilled nursing — and manage the entire ecosystem,” (Vesely, 2014, Managing the entire ecosystem section, para. 5). Within hospitals themselves, a new dedication to value needs to be seen. Value essentially is “delivering the best possible outcomes at a given level of cost,” (Smith & Ricci, 2015, Cost Savings vs. Quality Care section, para. 3). The goal should be for a health network to include more “covered lives” (Adamopoulos, 2014). Each of these lives can be taken care of throughout all stages of life, in hopes of identifying, and solving, health problems before they would reach an inpatient level.

Essentially, an ideological change is occurring throughout this industry. The new business model is “one that is transforming the delivery system from hospital-centric sick care to a super outpatient model that will emphasize community-based care,” (York, Kaufman & Grube, 2015, para. 1). The only way to thrive in the modern day healthcare market is to embrace these ideals, and change with the times.

Past Trends

Pennsylvania

Nationally a decrease in inpatients is occurring, and this decline is extremely evident within Pennsylvania hospitals. Between 2006 and 2013, an 11% decrease in the quantity of inpatient discharges and a 13% decrease in the utilization rate occurred throughout the state. This decline is seen in all age groups, and almost all product lines. The exceptions to the rule are Rehabilitation and Orthopedics, both of which have shown positive movement in recent years.

This decline is fueled by those ages 65 and older. This age group accounts for almost half of all Pennsylvania patients, but has a utilization rate that is decreasing rapidly. It dropped from 41% to 32% in the span of eight years, resulting in approximately 20,000 less patients each year. This older age group is predicted to grow significantly in the coming years as the Baby Boomer generation ages. This leads to a greater pool of people to draw from, but less and less of them are having inpatient stays.

Lehigh Valley Health Network

This network, unlike the rest of the country, is growing. As the state of Pennsylvania experienced an inpatient decline of 11%, LVHN inpatient bed utilization grew by 29% between CY06 and CY13. The growth is seen throughout all age groups, though a slightly different age distribution is seen in LVHN compared to the state. 38% of LVHN patients are 65+, which is lower than the state average. Not all product lines have seen such a steady pattern of growth. Some have grown, some have decreased, and many experience large jumps or drops in quantity from one year to the next. Though the individual product lines are not extremely smooth and predictable, the total of them all creates a curve with steady growth.

Future Forecasts

Future Direction

In general, Pennsylvania inpatient quantities are going to continue to decline. Since it reached its maximum of 1,891,905 inpatient discharges in 2006, the decline has not slowed. The lowest quantity of inpatients since these records began occurred in the most recent year, 2013, at 1,683,097 discharges. While making predictions from this very smooth curve is not difficult, knowing when the curve will change is. The decline cannot continue forever because there will never be a day where there are zero inpatients in Pennsylvania hospitals. At some point the decline will slow, and the curve will level out. Unfortunately, there is no way of predicting when this will happen. Because of this, it's very difficult to give any forecasts for more than a year or two into the future.

LVHN inpatient discharge quantities have a more uncertain future. Though the network has experienced significant growth in recent years, it did experience its first decline since FY01 in FY14. This being said, the decline was by only 82 patients, or 0.1% of the total volume, so it could be an abnormal year and the upward trend could continue within FY15. It also could be a sign that no one is immune to the market's decline forever. If the state of Pennsylvania is any indicator, the quantity of inpatient discharges should begin decreasing soon. This decline should not be seen as a bad thing though because there is more to the network than just the inpatients. The quantity of same day surgeries, an outpatient classification where many inpatient surgeries are shifting to, increased 28% between FY11 and FY14. This shows that the hospital is changing with the times. A decline may be occurring in one area, but a different area is growing in return.

Methods of Forecasting

In order to forecast future volumes for both the state of Pennsylvania and LVHN, many methods are used. These include averaging the distance between values on different intervals, different polynomial regressions, and using the last change that occurred in the data. These calculations then provide approximately six different predictions for the next data point. By looking at an average and a median of these values, two realistic numbers are obtained.

Accuracy can be evaluated for these forecasts, even though they are in the future. For the state of Pennsylvania, predictions are made for calendar year 2014 and 2015. Three of four quarters of 2014 data are

available for analysis, so by multiplying the yearly forecast by the percent of all inpatient discharges that normally occur in the first three quarters, we have a number we can compare to an actual. This allows percent error to be calculated, and accuracy to be quantitatively evaluated. All of these calculations are worked out for both the average and the median. The values utilized in the end are the values that had the lower percent error for 2014, whether it was the average or the median. The first two quarters of LVHN FY15 data is available as well, so a similar method of comparison can be used to end with one single value.

Forecasts

For Pennsylvania:

All Inpatients:

CY13 Actual: 1,683,097
CY14 Forecast: 1,642,581
CY15 Forecast: 1,564,351

By Age Group:

Ages 18-44*:

CY13 Actual: 229,662
CY14 Forecast: 221,529
CY15 Forecast: 210,934

Ages 45-64*:

CY13 Actual: 435,486
CY14 Forecast: 427,053
CY15 Forecast: 407,670

Ages 65+*:

CY13 Actual: 674,764
CY14 Forecast: 656,570
CY15 Forecast: 612,899

By Product Line:

Cardiac Services:

CY13 Actual: 205,345
CY14 Forecast: 194,685
CY15 Forecast: 179,330

ENT:

CY13 Actual: 21,520
CY14 Forecast: 21,642
CY15 Forecast: 20,043

General Medicine:

CY13 Actual: 594,055
CY14 Forecast: 581,946
CY15 Forecast: 551,491

General Surgery:

CY13 Actual: 122,803
CY14 Forecast: 119,496
CY15 Forecast: 113,417

Gynecology:

CY13 Actual: 18,800
CY14 Forecast: 16,176
CY15 Forecast: 13,506

Neurology

CY13 Actual: 83,304

CY14 Forecast: 81,263

CY15 Forecast: 76,885

Neurosurgery:

CY13 Actual: 12,769

CY14 Forecast: 12,595

CY15 Forecast: 12,151

Ophthalmology:

CY13 Actual: 2,213

CY14 Forecast: 2,046

CY15 Forecast: 1,793

Orthopedics:

CY13 Actual: 122,600

CY14 Forecast: 122,693

CY15 Forecast: 118,517

Rehabilitation:

CY13 Actual: 25,802

CY14 Forecast: 26,725

CY15 Forecast: 26,744

Spine:

CY13 Actual: 43,041

CY14 Forecast: 42,070

CY15 Forecast: 39,359

Thoracic Surgery:

CY13 Actual: 13,133

CY14 Forecast: 12,787

CY15 Forecast: 12,016

Transplant:

CY13 Actual: 2,827

CY14 Forecast: 2,813

CY15 Forecast: 2,800

Trauma:

CY13 Actual: 17,821

CY14 Forecast: 17,327

CY15 Forecast: 16,191

Urology:

CY13 Actual: 25,497

CY14 Forecast: 24,210

CY15 Forecast: 22,258

Vascular Services:

CY13 Actual: 34,221

CY14 Forecast: 32,416

CY15 Forecast: 19,813

For the Lehigh Valley Health Network:

All Inpatients:

FY14 Actual: 73,362

FY15 Forecast: 74,130

FY16 Forecast: 74,115

By Age Group:

Ages 0-17:

FY14 Actual: 8,682
FY15 Forecast: 8,802
FY16 Forecast: 8,922

Ages 18-44:

FY14 Actual: 15,549
FY15 Forecast: 15,755
FY16 Forecast: 15,993

Ages 45-64:

FY14 Actual: 20,185
FY15 Forecast: 20,374
FY16 Forecast: 20,495

Ages 65+:

FY14 Actual: 28,946
FY15 Forecast: 29,318
FY16 Forecast: 29,267

By Product Line:

Cardiac Services:

FY14 Actual: 7,779
FY15 Forecast: 6,619
FY16 Forecast: 4,782

ENT:

FY14 Actual: 943
FY15 Forecast: 933
FY16 Forecast: 913

General Medicine:

FY14 Actual: 18,594
FY15 Forecast: 17,810
FY16 Forecast: 16,747

General Surgery:

FY14 Actual: 6,871
FY15 Forecast: 7,025
FY16 Forecast: 7,207

Gynecology:

FY14 Actual: 368
FY15 Forecast: 250
FY16 Forecast: 142

Neurology:

FY14 Actual: 2,754
FY15 Forecast: 2,452
FY16 Forecast: 2,150

Neurosurgery:

FY14 Actual: 481
FY15 Forecast: 481
FY16 Forecast: 475

Ophthalmology:

FY14 Actual: 77
FY15 Forecast: 70
FY16 Forecast: 58

Orthopedics:

FY14 Actual: 4,482
FY15 Forecast: 4,567
FY16 Forecast: 4,711

Spine:

FY14 Actual: 1,711
FY15 Forecast: 1,662
FY16 Forecast: 1,647

Thoracic Surgery:

FY14 Actual: 492
FY15 Forecast: 490
FY16 Forecast: 472

Transplant:

FY14 Actual: 368
FY15 Forecast: 393
FY16 Forecast: 432

Trauma:

FY14 Actual: 1,434
FY15 Forecast: 1,336
FY16 Forecast: 1,223

Urology:

FY14 Actual: 6,500
FY15 Forecast: 6,692
FY16 Forecast: 7,287

Vascular Services:

FY14 Actual: 1,114
FY15 Forecast: 1,084
FY16 Forecast: 1,064

Note: A forecast for PA Ages 0-17 is not included. While a general downward trend is present for this curve, there is no real pattern from one data point to the next, making it difficult to have any sort of accurate prediction.

*Does not include normal newborns or deliveries.

Accuracy Discussion

The Pennsylvania forecasts were made with a high degree of accuracy. When the percent error was calculated comparing actual values to predicted values, for 14 of 17 product lines the percent error was less than two percent. The percent error for all inpatient totals was approximately 0.2%. Unless a large change occurs within Pennsylvania's inpatient market in the next two years, the forecasts made will be relatively accurate.

Lehigh Valley Health Network forecasts are harder to state with certainty. The percent error for these forecasts tends to be much higher than the forecasts for the state. The percent error for LVHN forecasts average around 10%, but can be as high as 44%. LVHN data is much more irregular than the state data. Even just one doctor switching locations can add or subtract thousands of patients from observed inpatient discharge volumes. These large changes are common, and can make accurate forecasting very difficult.

Conclusion:

As the healthcare market changes, it is essential that hospitals and health networks change with it. The quantity of inpatients being discharged from hospitals is declining nationwide, and the only way for hospitals to remain profitable is to realize this, alter their policies, and adapt. In order to grow in the future, hospitals need to emphasize population health, expand into outpatient practices, and emphasize the value of each inpatient visit they

do receive. These techniques will not stop the decline, but will give hospitals other ways to earn money. They need to shift their business instead of losing their business. The inpatient numbers seen within the state of Pennsylvania are going to continue to decrease, but that's not a bad thing. As long as hospitals, including the Lehigh Valley Health Network understand this and plan for it, the healthcare industry can continue to be a growing one.

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