

CHAPTER

11

**Long-term care
hospital services**

R E C O M M E N D A T I O N

- 11** The Congress should eliminate the update to the payment rates under the long-term care hospital prospective payment system for fiscal year 2018.

COMMISSIONER VOTES: YES 17 • NO 0 • NOT VOTING 0 • ABSENT 0

Long-term care hospital services

Chapter summary

Long-term care hospitals (LTCHs) provide care to beneficiaries who need hospital-level care for relatively extended periods. To qualify as an LTCH for Medicare payment, a facility must meet Medicare’s conditions of participation for acute care hospitals and certain Medicare patients must have an average length of stay greater than 25 days. In 2015, Medicare spent \$5.3 billion on care provided in LTCHs nationwide. About 116,000 fee-for-service (FFS) beneficiaries had roughly 131,000 LTCH stays in about 426 LTCHs. On average, Medicare FFS beneficiaries account for about two-thirds of LTCHs’ discharges.

Assessment of payment adequacy

Beneficiaries’ access to care—We have no direct measures of beneficiaries’ access to needed LTCH services. Instead, we consider the capacity and supply of LTCH providers and changes over time in the volume of services they furnish. Trends suggest that access to care has been maintained.

- **Capacity and supply of providers**—Growth in the number of LTCHs filing Medicare cost reports slowed considerably in recent years because of two moratoriums. The first, imposed by the Medicare, Medicaid, and SCHIP Extension Act of 2007 and subsequent legislation, was in effect through December 28, 2012. The second moratorium was established in the Pathway to SGR Reform Act of 2013 and amended by the Protecting

In this chapter

- Are Medicare payments adequate in 2017?
- How should Medicare payments change in 2018?

Access to Medicare Act of 2014. This moratorium is effective from April 1, 2014, through September 30, 2017. Using cost report data, we estimate that the number of LTCHs and LTCH beds decreased by about 2 percent in 2015.

- **Volume of services**—From 2014 to 2015, the number of LTCH cases decreased by 2.1 percent. Controlling for the number of FFS beneficiaries, we found that the number of LTCH cases per beneficiary declined during this period by 2.0 percent, continuing a trend of decreasing per capita LTCH use that began in 2012.

Quality of care—LTCHs began submitting quality of care data to CMS starting in fiscal year 2013. CMS began releasing provider-level quality data publicly for two measures beginning in mid-December 2016 and plans to release two additional measures in the spring of 2017. Because quality data only recently became available, we continued to use claims data for our 2015 analysis. We found stable non-risk-adjusted rates of readmission, death in the LTCH, and death within 30 days of discharge across the top 25 LTCH diagnoses.

Providers' access to capital—For the past few years, the availability of capital to LTCHs has not reflected current Medicare payment rates but, rather, uncertainty regarding possible changes to Medicare's regulations and legislation governing LTCHs. The criteria to receive the higher LTCH payment rate specified in the Pathway for SGR Reform Act of 2013, beginning with cost reporting periods starting in fiscal year 2016, provide more long-term regulatory certainty for the industry compared with recent years. However, payment reductions implemented by CMS and a congressional moratorium on new LTCH beds and facilities through September 2017 continue to limit future opportunities for growth and reduce the industry's need for capital.

Medicare payments and providers' costs—From 2007 until 2012, LTCHs held cost growth below the rate of increase in the market basket index, a measure of inflation in the prices of goods and services LTCHs buy to provide care. Between 2012 and 2015, Medicare payments continued to increase, albeit more slowly than provider costs, resulting in an aggregate 2015 Medicare margin of 4.6 percent. Financial performance in 2015 varied across LTCHs, reflecting differences in cost control and responses to payment incentives. Marginal profit, an indicator of whether LTCHs with excess capacity have an incentive to admit more Medicare patients, equaled 20 percent in 2015, consistent with last year's analysis. We expect changes in admission patterns and cost structure will occur in response to the patient-specific criteria implemented beginning in fiscal year 2016.

We project that LTCHs' aggregate Medicare margin for these qualifying cases will be 5.4 percent in 2017, which reflects current policy. On the basis of these indicators, the Commission concludes that LTCHs can continue to provide Medicare beneficiaries with access to safe and effective care and accommodate changes in their costs with no update to LTCH payment rates in fiscal year 2018. This update recommendation applies to the Medicare LTCH prospective payment system base payment rate. That is, it applies to payments for discharges that meet the criteria specified in the Pathway for SGR Reform Act of 2013 and to the portion of the blended payment that reflects the LTCH payment rate for discharges that do not meet the specified criteria. ■

Background

Patients with chronic critical illness—those who exhibit metabolic, endocrine, physiologic, and immunologic abnormalities that result in profound debilitation and often ongoing respiratory failure—frequently need hospital-level care for extended periods. Some are treated in long-term care hospitals (LTCHs). These facilities can be freestanding or colocated with other hospitals as hospitals within hospitals (HWHs) or satellites. To qualify as an LTCH for Medicare payment, a facility must meet Medicare’s conditions of participation for acute care hospitals (ACHs) and certain Medicare patients must have an average length of stay greater than 25 days.¹ By comparison, the average Medicare length of stay in ACHs is about five days. In 2015, Medicare spent \$5.3 billion on care provided in LTCHs nationwide. About 116,000 beneficiaries had roughly 131,000 LTCH stays. On average, Medicare fee-for-service (FFS) beneficiaries account for about two-thirds of LTCHs’ discharges.

Since October 2002, Medicare has paid LTCHs prospective per discharge rates based primarily on the patient’s diagnosis and the facility’s wage index.² Under this prospective payment system (PPS), LTCH payment rates are based on the Medicare severity long-term care diagnosis related group (MS–LTC–DRG) patient classification system, which groups patients primarily according to diagnoses and procedures. MS–LTC–DRGs include the same groupings used in ACHs paid under the inpatient PPS (IPPS) but have relative weights specific to LTCH patients, reflecting the average relative costliness of cases in the group compared with that of the average LTCH case. The LTCH PPS has outlier payments for patients who are extraordinarily costly.³ The LTCH PPS pays differently for short-stay outlier cases (patients with shorter than average lengths of stay), reflecting CMS’s contention that Medicare should adjust payment rates for patients with relatively short stays to reflect the reduced costs of caring for them (see text box discussing short-stay outliers, pp. 294–295).

In fiscal year 2016, CMS began phasing in a payment change for LTCH cases that do not meet certain criteria specified in the Pathway for SGR Reform Act of 2013 (see text box discussing LTCH legislation, pp. 296–297). Under the new dual payment structure, qualifying Medicare cases will be paid under the LTCH PPS if

the patient had an immediately preceding ACH stay that included 3 or more days in an intensive care unit (ICU) or if the patient received mechanical ventilation services for at least 96 hours in the LTCH. LTCH cases not meeting the specified criteria receive a “site-neutral” rate based on the lesser of an IPPS-comparable amount or 100 percent of the cost for the case. The Commission recommended in March 2014 that LTCH rates be paid only for cases that received eight or more days of care in an ICU or received prolonged mechanical ventilation services during the previous ACH stay (see text box discussing the Commission’s recommendations for LTCHs, p. 299).

The payment changes associated with the LTCH criteria policy are being phased in over three years beginning with cost reporting periods starting October 1, 2015.⁴ Cases not meeting the specified criteria receive payment equal to 50 percent of the LTCH PPS rate and 50 percent of the site-neutral rate for the first two full years of implementation. Fiscal year 2019 will be the first year the policy will be fully in effect for all LTCH facilities.

Are Medicare payments adequate in 2017?

To address whether payments for 2017 are adequate to cover the costs that providers incur in furnishing services to Medicare beneficiaries and how much providers’ costs are expected to change in the coming year (2018), we examine several indicators of payment adequacy. Specifically, we assess beneficiaries’ access to care (by examining the capacity and supply of LTCH providers and changes over time in the volume of services furnished), quality of care, providers’ access to capital, and the relationship between Medicare payments and providers’ costs.

Beneficiaries’ access to care: Growth over time in supply and volume suggests continued access to care

We have no direct measures of beneficiaries’ access to needed LTCH services. The absence of LTCHs in many areas of the country does not necessarily equate an inadequacy of supply since beneficiaries in areas without LTCHs have access to similar services in other settings, including ACHs and skilled nursing facilities (SNFs).

Payment for short-stay outliers in long-term care hospitals

In the long-term care hospital (LTCH) payment system, Medicare can adjust payments for cases with short stays. CMS defines a short-stay outlier (SSO) case as having a length of stay less than or equal to five-sixths of the geometric average length of stay for the case type. The SSO policy reflects CMS's contention that patients with lengths of stay similar to those in acute care hospitals (ACHs) should be paid at rates comparable with the cases paid under the ACH inpatient prospective payment system (IPPS). About 26.6 percent of LTCH discharges received SSO payment adjustments in fiscal year 2015, but this share varied across types of LTCHs. For example, in fiscal year 2015, 26.0 percent of for-profit LTCHs' cases were SSOs compared with 29.8 percent of nonprofit LTCHs' cases.

The amount Medicare pays to LTCHs for an SSO case is the lowest of:

- 100 percent of the cost of the case,
- 120 percent of the per diem amount for the Medicare severity long-term care diagnosis

related group (MS–LTC–DRG) multiplied by the patient's length of stay,

- the full MS–LTC–DRG payment, or
- a blend of the IPPS amount for the same type of case and 120 percent of the MS–LTC–DRG per diem amount. The LTCH per diem payment amount makes up more of the total amount as the patient's length of stay increases.

CMS applies a different standard to cases with “very short” lengths of stay—those with stays less than or equal to the IPPS average length of stay for the same type of case plus one standard deviation. These cases are called very short-stay outliers (VSSOs). VSSOs are also paid the lowest of four payment amounts: the first three listed previously or an amount comparable with the IPPS payment rate rather than a blended amount. In fiscal year 2015, about 12.2 percent of LTCH discharges were VSSOs; 45 percent of VSSOs received payment equal to 100 percent of costs, and another 45 percent received an amount equal to the IPPS per diem payment. As with SSOs, the share of

(continued next page)

Although we found LTCHs located in just 8.5 percent of counties, these LTCHs served beneficiaries from over 90 percent of counties nationwide. Based on the relatively clustered nature of the location of LTCHs, we consider the overall capacity and supply of LTCH providers and changes over time in the volume of services they furnish.

Capacity and supply of providers: Supply stabilized during the congressionally mandated moratorium

The Medicare, Medicaid, and SCHIP Extension Act of 2007 (MMSEA) and subsequent legislation imposed a limited moratorium on new LTCHs and new beds in existing LTCHs from December 29, 2007, through December 28, 2012. During this time, new LTCHs

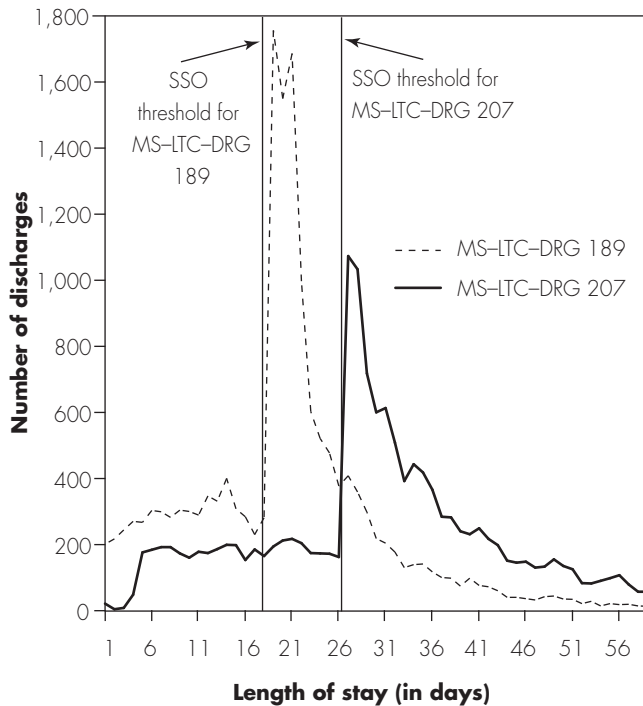
were able to enter the Medicare program only if they met specific exceptions to the moratorium.⁵ The Pathway for SGR Reform Act of 2013 and subsequent legislation implemented a new moratorium from April 1, 2014, through September 30, 2017.⁶ That moratorium originally provided exceptions that allowed the establishment of new LTCHs and new LTCH satellites (that is, the law permitted certain new LTCHs in their entirety); however, the 21st Century Cures Act expanded the exceptions to also permit increases in the number of certified beds in existing facilities.

It is difficult to determine the precise number of LTCHs because of variations in Medicare's data sources on these facilities. The Commission has found inaccuracies in the

Payment for short-stay outliers in long-term care hospitals (cont.)

FIGURE 11-1

Many LTCH cases in fiscal year 2015 were discharged in the period immediately following the short-stay outlier threshold



Note: LTCH (long-term care hospital), SSO (short-stay outlier), MS-LTC-DRG (Medicare severity long-term care diagnosis related group). Cases in MS-LTC-DRG 189 are those with pulmonary edema and respiratory failure. Cases in MS-LTC-DRG 207 are those with a respiratory system diagnosis that received prolonged mechanical ventilation.

Source: MedPAC analysis of Medicare Provider Analysis and Review data from CMS.

VSSOs varied across type of LTCH. For example, in fiscal year 2015, 12.0 percent of for-profit LTCHs' cases were VSSOs compared with 13.1 percent of nonprofit LTCH cases.

If we consider only the cases in 2015 that would meet the new criteria to receive the LTCH prospective payment system (PPS) standard federal rate, the Commission estimates that in fiscal year 2016, 28.6

percent of cases would be SSOs. Fifty-two percent of these SSO cases—or 15 percent of all LTCH cases that qualify to receive the LTCH PPS standard federal payment rate—would be VSSOs.

VSSO cases were more likely to be of an extreme severity level and to require prolonged mechanical ventilation compared with SSO and longer stay cases. Many LTCH SSO and VSSO cases were short because the beneficiary was readmitted to an ACH or died. In 2015, 26 percent of VSSO cases were readmitted to an ACH, while 14 percent of SSOs and only 5 percent of longer stay cases were readmitted. Similarly, 44 percent of VSSO cases died in the LTCH compared with 22 percent of SSO cases and 7 percent of longer stays. The remaining VSSO cases included beneficiaries discharged from the LTCH, typically to another post-acute care setting. Of these cases, only 25 percent were still living one year after discharge compared with about half of SSO and more than half of non-SSO cases.

Generally, for the same case type, the IPPS payment is substantially less than the LTCH payment under the LTCH PPS. For example, for a case assigned to the diagnosis group called respiratory system diagnosis with prolonged mechanical ventilation (MS-LTC-DRG 207), the standard IPPS payment in 2017 is \$31,821, while the standard LTCH payment is \$78,760. LTCHs therefore have a strong financial incentive to keep patients until their lengths of stay exceed the SSO threshold for the relevant case type, and they appear to respond to that incentive (Figure 11-1). Analysis of lengths of stay by MS-LTC-DRG for 2015 shows that the number of discharges rose sharply immediately after the SSO threshold. This pattern held true across MS-LTC-DRGs and for every category of LTCH. The data strongly suggest that LTCHs' discharge decisions are influenced by financial incentives in addition to clinical indicators. CMS could lessen these financial incentives by better aligning the incremental payments for short-stay cases to the provider's incremental costs. ■

Long-term care hospital legislation

The Pathway for SGR Reform Act of 2013 included several provisions related to long-term care hospitals (LTCHs), including changes to payment rates for some cases, changes to the 25-percent rule, and a moratorium on new LTCHs.

“Site-neutral” payments

The Pathway for SGR Reform Act of 2013 established “site-neutral” payments for specified cases in LTCHs, beginning in fiscal year 2016. Under the law, the LTCH payment rate applies only to qualifying LTCH discharges that had an acute care hospital (ACH) stay immediately preceding LTCH admission and for which:

- the ACH stay included at least 3 days in an intensive care unit or
- the discharge is assigned to a Medicare severity long-term care diagnosis related group (MS–LTC–DRG) based on the receipt of mechanical ventilation services for at least 96 hours.

All other LTCH discharges—including any discharges assigned to psychiatric or rehabilitation MS–LTC–DRGs, regardless of intensive care unit use—are paid an amount based on Medicare’s ACH inpatient prospective payment system (PPS) or 100 percent of the costs of the case, whichever is lower. These site-neutral payments are being phased in over a two-year period. In cost reporting periods starting fiscal year 2016, cases that do not meet the specified criteria receive a blended rate of one-half the standard LTCH payment and one-half the site-neutral payment. In cost reporting periods starting on or after October 1, 2017, these cases will receive 100 percent of the site-neutral payment rate. Given LTCHs’ varying cost reporting periods, the Commission expects fiscal year 2019 to be the first full year in which this policy is completely phased in.

New criteria to receive the LTCH payment rate

To qualify as an LTCH for Medicare payment, a facility must meet Medicare’s hospital conditions

of participation and certain Medicare patients must have an average length of stay greater than 25 days. Under the Pathway for SGR Reform Act of 2013, beginning in fiscal year 2016, CMS calculates the LTCH average length of stay only for Medicare fee-for-service cases that are not paid the site-neutral rate. In addition, for cost reporting periods starting on or after October 1, 2019, an LTCH must have no more than 50 percent of its cases paid at the site-neutral rate to continue to receive the LTCH payment rate for eligible cases.

The “25-percent rule”

In fiscal year 2005, CMS established the 25-percent rule to set a limit on the share of an LTCH’s cases that can be admitted from certain referring ACHs and reduce payments for some LTCHs that exceed the threshold. After the threshold is reached, the LTCH is paid the lesser of the LTCH PPS rate or an amount equivalent to the acute care hospital PPS rate for patients discharged from the host acute care hospital. CMS established the 25-percent rule in an attempt to prevent LTCHs from functioning as units of ACHs; decisions about admission, treatment, and discharge in both ACHs and LTCHs were to be made for clinical rather than financial reasons. The 25-percent rule uses payment adjustments to create disincentives for LTCHs to admit a large share of their patients from a single ACH.

The 25-percent rule initially applied only to LTCH hospitals within hospitals (HWHs) and LTCH satellites. In July 2007, CMS extended the rule to apply to freestanding LTCHs also. The Congress delayed full implementation of the 25-percent rule so that most HWHs and satellites were paid standard LTCH rates for eligible patients admitted from their host hospitals as long as the share of Medicare admissions from the host hospital did not exceed 50 percent (instead of the more restrictive 25 percent threshold) until cost reporting periods that began on or after July 1, 2016.

(continued next page)

Long-term care hospital legislation (cont.)

In its final 2017 payment rule, CMS revised the 25-percent rule for LTCHs without colocated facilities to apply to discharges that meet two criteria: first, the discharge must occur during fiscal year 2017; second, the discharge must occur during LTCH cost reporting periods that start on or after July 1, 2016. For LTCHs that include colocated facilities, the 25-percent rule applies to discharges that occurred starting in fiscal year 2017, in cost reporting periods beginning on or after October 1, 2016. In the 21st Century Cures Act, enacted on December 13, 2016, the Congress further delayed the implementation of the 25-percent rule for LTCHs until fiscal year 2018.

Moratorium on new LTCHs

The Protecting Access to Medicare Act of 2014 amended the Pathway for SGR Reform Act of 2013 by imposing a moratorium on new facilities and new beds in existing facilities beginning April 1, 2014. The moratorium allows certain exceptions for new LTCHs but not for increases in the number of certified beds in existing LTCHs or satellite facilities. The moratorium expires on September 30, 2017.⁷ Subsequently, the Congress expanded the exceptions to the moratorium in the 21st Century Cures Act to include increases in the number of certified beds in existing LTCHs or satellite facilities retroactive to April 1, 2014. ■

ownership data in Medicare's Provider of Services file, so we examine Medicare cost report data to assess the number of LTCH beds and facilities. We consistently found that growth in the number of LTCHs filing Medicare cost reports slowed considerably in the later years of the moratorium (Table 11-1, p. 298). However, between 2012 and 2013 and again between 2013 and 2014, a larger than usual number of facilities made changes to their cost reporting period. Cost report data indicate 391 LTCHs filed valid cost reports in 2015, 8 fewer than in 2014 on net.⁸ Twenty-one facilities were excluded from this year's analysis because of their submission of partial year cost reports—most of which were from two small LTCH chains.⁹ These data also show that the number of LTCH beds nationwide decreased about 1.5 percent in 2015. The anomalous cost reporting trends during this period make it difficult to accurately compare changes in the number of LTCH facilities and LTCH beds using cost report data. Using data from Medicare's Provider of Services file, the Commission found that a majority of the new LTCHs filing cost reports in 2014 were for-profit facilities.¹⁰ Consistent with historical trends, the Commission estimates that in 2015, more than 75 percent of LTCHs were for profit and 95 percent were located in urban areas. In our analysis of urban and rural facilities, the data presented for 2015 are not comparable with prior years because CMS adopted new core-based statistical

area (CBSA) codes based on the 2010 census for LTCHs beginning fiscal year 2015. This change reclassified as urban several facilities previously classified as rural. Applying the former CBSA codes to the 2015 data results in 368 facilities classified as urban and 23 facilities as rural.

Volume of services: Number of LTCH users decreased

Beneficiaries' use of LTCH services suggests that access is adequate. Growth in the number of FFS LTCH cases was high in the first years of the LTCH PPS, but the number of cases declined from 2005 to 2007 (Table 11-2, p. 300). Much of this decrease is consistent with the decline in beneficiaries' enrollment in FFS Medicare and their increased enrollment in Medicare Advantage plans. CMS regulations that reduced payments for LTCH services also likely slowed growth in LTCH admissions during that period and beyond. From 2007 to 2012, the number of LTCH cases per capita (per 10,000 FFS beneficiaries) increased by an annual average rate of 0.8 percent. Between 2012 and 2014, the number of LTCH cases per capita decreased by 3.0 percent, consistent with decreases in acute care hospital discharges and skilled nursing facility admissions. However, LTCH cases per 10,000 FFS beneficiaries further decreased by 2.0 percent between 2014 and 2015.

**TABLE
11-1**

The number of LTCHs has decreased since 2012

Type of LTCH	Congressionally imposed moratorium				Congressionally imposed moratorium			Average annual change		
	2009	2010	2011	2012	2013*	2014*	2015*	2009–2012	2012–2015	2014–2015
Hospitals with valid cost reports	411	417	421	426	411	399	391	1.2%	*	*
Hospitals in Provider of Services file	427	438	437	437	432	422	426	0.8	–0.8%	0.9%
Urban	389	392	397	401	385	373	372	1.0	**	**
Rural	22	25	24	25	26	26	19	4.4	**	**
Nonprofit	79	82	77	78	78	73	65	–0.4	*	*
For profit	313	314	324	328	315	308	310	1.6	*	*
Government	19	21	20	20	18	18	16	1.7	*	*

Note: LTCH (long-term care hospital). The Medicare, Medicaid, and SCHIP Extension Act of 2008 and subsequent legislation imposed a moratorium on new LTCHs and new LTCH beds in existing facilities from December 29, 2007, through December 29, 2012. The Pathway for SGR Reform Act of 2013 and subsequent legislation implemented a new moratorium from April 1, 2014, through September 30, 2017.

*Data for 2013 through 2015 should not be compared with prior years because of an anomalous number of facilities that underwent an acquisition and change in cost reporting period.

**CMS adopted new core-based statistical area (CBSA) codes for LTCHs beginning fiscal year 2015; this change reclassified as urban several facilities previously classified as rural, and therefore the number of facilities between 2014 and 2015 should not be compared. Applying the old CBSA definition to the 2015 data results in 368 facilities classified as urban and 23 facilities classified as rural.

Source: MedPAC analysis of cost report data and the Medicare Provider of Services file from CMS.

Compared with all Medicare beneficiaries, those admitted to LTCHs are disproportionately disabled (under age 65), over age 85, or diagnosed with end-stage renal disease. They are also more likely to be African American. The higher rate of LTCH use by African American beneficiaries may be due to the concentration of LTCHs in areas of the country with larger African American populations (Dalton et al. 2012, Kahn et al. 2010). Another contributing factor may be a greater incidence of critical illness in this population (Mayr et al. 2010). At the same time, African American beneficiaries may be more likely to opt for LTCH care since they are less likely to choose withdrawal from mechanical ventilation in the ICU, have do not resuscitate orders, or elect hospice care (Barnato et al. 2009, Borum et al. 2000, Diringer et al. 2001).

LTCH patient discharges are concentrated in a relatively small number of diagnosis groups. In fiscal year 2015, the top 25 LTCH diagnoses made up 66 percent of all LTCH discharges (Table 11-3, p. 302). The most frequently occurring diagnosis was pulmonary edema and respiratory

failure (MS–LTC–DRG 189). Respiratory system diagnosis with ventilator support for 96 or more hours (MS–LTC–DRG 207) was the second most frequently occurring diagnosis. Nine of the top 25 diagnoses, representing almost 36 percent of all LTCH cases, were respiratory conditions—a statistic that has been relatively stable since the 2008 implementation of the MS–LTC–DRGs.

Not unexpectedly, the MS–LTC–DRGs become even more concentrated when we consider only the cases that would have qualified to receive the LTCH PPS standard federal payment rate if the dual payment rate had been in effect at the time of discharge. The top 25 qualifying diagnoses would have accounted for approximately 78 percent of these cases.¹¹ More than half of these cases involved diagnoses that were respiratory conditions or involved prolonged mechanical ventilation. Given the implementation of criteria for receiving the LTCH PPS standard federal payment rate, we would expect to see an increase in the concentration of diagnoses over time.

Commission recommendations for long-term care hospitals

The Commission has maintained that long-term care hospitals (LTCHs) should serve only the most medically complex patients—the chronically critically ill (CCI)—and has determined that the best available proxy for intensive resource needs in LTCH patients is intensive care unit (ICU) length of stay during an immediately preceding acute care hospital (ACH) stay. The Commission has also long held that payments to providers should be properly aligned with patients’ resource needs. Further, subject to risk differentials, payment for the same services should be comparable regardless of where the services are provided. In March 2014, the Commission recommended that the LTCH payment system be reformed to better align payments for both CCI and non-CCI cases across LTCH and ACH settings.

The research supporting this recommendation consistently describes CCI patients as having long ACH stays with heavy use of intensive care services (Carson et al. 2008, Donahoe 2012, MacIntyre 2012, Nelson et al. 2010, Wiencek and Winkelman 2010, Zilberberg et al. 2012, Zilberberg et al. 2008). Further, in site visits and technical expert panel discussions conducted by Kennell and Associates Inc. and RTI under contract with CMS, LTCH representatives and ACH critical care physicians agreed that medically stable post-ICU patients are appropriate candidates for LTCH care (Centers for Medicare & Medicaid Services 2013, Dalton et al. 2012). In CMS’s Post-Acute Care Payment Reform Demonstration, length of stay in the ICU was significantly associated with post-acute care case complexity, and long ICU stays were a distinguishing characteristic of LTCH patients (Gage et al. 2011).

The Commission recommended that the Congress limit standard LTCH payments to cases that spent eight or more days in an ICU during an immediately preceding ACH stay. The Commission’s analysis of inpatient

prospective payment system (IPPS) claims data found that cases with eight or more days in an ICU accounted for about 6 percent of all Medicare discharges and had a geometric mean cost per discharge that was four times that of IPPS cases with seven or fewer ICU days. Further, these cases were concentrated in a small number of Medicare severity diagnosis related groups that correspond with the “ideal” LTCH patients described by LTCH representatives and critical care clinicians (Dalton et al. 2012).

Setting the ICU length of stay threshold for CCI cases at eight days captures a large share of LTCH cases requiring prolonged mechanical ventilation—a service specialty of many LTCHs. However, the Commission was concerned that LTCH care could be appropriate for some patients requiring mechanical ventilation even if they did not spend eight or more days in an ICU during an immediately preceding ACH stay. For LTCH cases that did not spend eight or more days in an ICU during an immediately preceding ACH stay, the Commission recommended that the Secretary of Health and Human Services set the payment rates equal to those of ACHs. The Commission recommended that savings from this policy be used to create additional inpatient outlier payments for CCI cases in IPPS hospitals.

The Pathway for SGR Reform Act of 2013 mandated changes to the LTCH prospective payment system, including limiting standard LTCH payments to cases that spent at least three days in an ICU during an immediately preceding ACH stay or to discharges that received an LTCH principal diagnosis indicating prolonged mechanical ventilation. The Commission remains concerned that a threshold of fewer than eight days is too low to distinguish truly CCI patients and thus will allow Medicare to continue to pay too much for many cases that could be cared for appropriately in other settings at a lower cost to the program. ■

Quality of care: Meaningful measures not available, but trends for gross indicators are improving

LTCHs began reporting a limited set of quality measures to CMS in fiscal year 2013 (see text box discussing quality

measures, p. 301). CMS intended to begin reporting quality data publicly on four measures in the fall of 2016; however, public reporting of two of these measures has been delayed until the spring of 2017. Public reporting on two other measures, the rate of pressure ulcers that

**TABLE
11-2**

The number of Medicare LTCH cases and users continued to decrease between 2014 and 2015

	2004	2005	2007	2012	2013	2014	2015	Average annual change		
								2007-2012	2012-2014	2014-2015
Cases	121,955	134,003	129,202	140,463	137,827	133,984	131,134	1.7%	-2.3%	-2.1%
Cases per 10,000 FFS beneficiaries	33.4	36.4	36.2	37.7	36.6	35.4	34.7	0.8	-3.0	-2.0
Spending (in billions)	\$3.7	\$4.5	\$4.5	\$5.5	\$5.5	\$5.4	\$5.3	4.3	-1.7	-0.4
Spending per FFS beneficiary	\$101.3	\$122.2	\$126.0	\$148.8	\$146.6	\$141.7	\$141.4	3.4	-2.4	-0.2
Payment per case	\$30,059	\$33,658	\$34,769	\$39,493	\$40,070	\$40,015	\$40,718	2.6	0.7	1.8
Average length of stay (in days)	28.5	28.2	26.9	26.2	26.5	26.3	26.6	-0.5	0.2	1.0
Users	108,814	119,282	114,299	123,652	121,532	118,288	116,088	1.6	-2.2	-1.9

Note: LTCH (long-term care hospital), FFS (fee-for-service).

Source: MedPAC analysis of Medicare Provider Analysis and Review data from CMS and the annual report of the Boards of Trustees of the Medicare trust funds.

are new or worsened and the rate of unplanned hospital readmission within 30 days after discharge from an LTCH, began in mid-December of 2016. Because of the timing of this data release, the Commission continues this year to assess aggregate trends in the quality of LTCH care by examining in-facility mortality rates, mortality within 30 days of discharge, and readmissions from LTCHs to ACHs. LTCH cases are highly concentrated in a few MS-LTC-DRGs, and the vast majority of LTCH patients have multiple diagnoses and comorbidities.

For this report, we analyzed unadjusted readmission and mortality rates for the top LTCH diagnoses from 2010 to 2015. Although rates of readmission and death can vary from year to year, over the 5-year period, we found stable or declining rates of readmissions to ACHs and stable or declining mortality rates for these diagnoses, both in the facility and 30 days postdischarge. However, we caution that these measures are not risk adjusted and, therefore, trends may be muted or exaggerated by changes in patient mix over time.

In aggregate, in 2015, 9 percent of LTCH cases were readmitted to an ACH directly from the LTCH, 13 percent

died in the LTCH, and another 12 percent died within 30 days of discharge from the LTCH. Mortality rates varied markedly by diagnosis group. For example, among patients with a principal diagnosis of septicemia with prolonged ventilator support (MS-LTC-DRG 870), 32 percent died in the LTCH and 14 percent died within 30 days of discharge. By comparison, among patients assigned to the diagnosis group called “aftercare, musculoskeletal system and connective tissue with complication or comorbidity” (MS-LTC-DRG 560), only 1 percent died in the LTCH and an additional 2 percent died within 30 days of discharge. Among the highest volume MS-LTC-DRGs in 2015, patients with a diagnosis of complications of treatment with major complication or comorbidity (MS-LTC-DRG 919) had the highest readmission rate (15 percent).¹²

If we consider only cases that would have qualified to receive the LTCH PPS standard federal payment rate if the dual payment structure had been in effect at the time of discharge, the unadjusted rates of readmission directly from the LTCH, death in the LTCH, and death within 30 days of discharge would have been higher for a vast majority of highest volume MS-LTC-DRGs compared with all cases. This difference is expected given the greater severity of

Quality measures for long-term care hospitals

The Patient Protection and Affordable Care Act of 2010 required CMS to establish a quality reporting program for long-term care hospitals (LTCHs) by fiscal year 2014 and further stipulated that LTCHs not participating in the program would have their annual payment update reduced by 2 percentage points starting in 2014. Beginning October 1, 2013, LTCHs receive a full payment update only if they successfully report on three quality measures—catheter-associated urinary tract infections (CAUTIs), central line–associated bloodstream infections (CLABSIs), and new or worsened pressure ulcers. Data on incidences of CAUTIs and CLABSIs are collected through the National Healthcare Safety Network (NHSN), an Internet-based surveillance system maintained by the Centers for Disease Control and Prevention (CDC). The data elements needed to calculate the pressure ulcer measure are collected using a data collection instrument called the LTCH Continuity Assessment Record and Evaluation (CARE) Data Set. These data are not yet available for analysis.

In 2014, CMS added two measures to the LTCH quality reporting program: the share of LTCH patients assessed for and appropriately given an influenza vaccine and influenza vaccination coverage among facility health care personnel. Facilities collect data on patient vaccination using the LTCH CARE Data Set, while the CDC’s NHSN collects data on vaccination of LTCH health care personnel. Payment updates for fiscal year 2016 and after will be affected by LTCHs’ reporting on these two measures.

In 2015, LTCHs were required to begin reporting facility-acquired cases of *Clostridium difficile* and methicillin-resistant *Staphylococcus aureus* through the CDC NHSN. Reductions of LTCH payment updates for failing to report on these two measures will begin in fiscal year 2017. At that time, CMS plans to start using claims data to calculate LTCHs’ rates of all-cause unplanned readmissions to acute care hospitals.

CMS intends to add 4 more measures to the program beginning in fiscal year 2018, which will bring the total number of measures to 12. In January 2016, LTCHs began reporting on ventilator-associated events (such as pneumonia, sepsis, and pulmonary embolism) through the CDC NHSN. In April 2016, CMS began collecting data on the following three measures using the LTCH CARE Data Set: share of patients experiencing one or more falls resulting in major injury, change in mobility among LTCH patients who require ventilator support, and share of LTCH patients with an admission and discharge assessment and care plan that address patient function.

In its fiscal year 2017 final rule, CMS finalized three additional measures for payment determinations beginning in fiscal year 2018 to meet the requirements specified by the Improving Medicare Post-Acute Care Transformation Act of 2014 (IMPACT). CMS developed measures of total estimated Medicare spending per beneficiary, discharge to community, and potentially preventable 30-day postdischarge readmission measures for post-acute care providers to meet IMPACT’s requirements to develop measures regarding resource use and other indicators. CMS also finalized a quality measure to address IMPACT’s requirement to develop a quality measure regarding medication reconciliation for use beginning with 2020 payment determination. This measure requires facilities to conduct drug regimen reviews with follow-up for identified issues.

CMS began public reporting of two LTCH quality measures in mid-December of 2016, including the share of patients with pressure ulcers that are new or worsened and the rate of the all-cause unplanned readmissions. The Commission has not yet analyzed these data. CMS intends to begin public reporting on the CAUTI and CLABSI measures in the spring of 2017. ■

illness and case mix for this group of beneficiaries. In 2015, 10 percent of LTCH cases that would have qualified to receive the LTCH PPS standard federal rate under the dual payment structure were readmitted to an ACH directly from

the LTCH, 17 percent died in the LTCH, and another 13 percent died within 30 days of discharge from the LTCH. Mortality rates for qualifying cases continued to vary markedly by diagnosis group.

**TABLE
11-3**

The top 25 MS-LTC-DRGs made up two-thirds of LTCH discharges in 2015

MS-LTC-DRG	Description	Discharges	Percentage
189	Pulmonary edema and respiratory failure	16,685	12.7%
207	Respiratory system diagnosis with ventilator support 96+ hours	15,024	11.5
871	Septicemia without ventilator support 96+ hours with MCC	8,946	6.8
177	Respiratory infections and inflammations with MCC	3,462	2.6
592	Skin ulcers with MCC	3,458	2.6
539	Osteomyelitis with MCC	3,064	2.3
208	Respiratory system diagnosis with ventilator support <96 hours	2,801	2.1
682	Renal failure with MCC	2,612	2.0
949	Aftercare with CC/MCC	2,540	1.9
919	Complications of treatment with MCC	2,265	1.7
559	Aftercare, musculoskeletal system and connective tissue with MCC	2,083	1.6
314	Other circulatory system diagnoses with MCC	1,940	1.5
870	Septicemia with ventilator support 96+ hours	1,852	1.4
4	Tracheostomy with ventilator support 96+ hrs or primary diagnosis except face, mouth and neck without major OR procedure	1,828	1.4
862	Postoperative and post-traumatic infections with MCC	1,823	1.4
166	Other respiratory system OR procedures with MCC	1,758	1.3
190	Chronic obstructive pulmonary disease with MCC	1,723	1.3
853	Infectious and parasitic diseases with OR procedure with MCC	1,694	1.3
193	Simple pneumonia and pleurisy with MCC	1,690	1.3
291	Heart failure and shock with MCC	1,641	1.3
570	Skin debridement with MCC	1,634	1.2
638	Diabetes with CC	1,598	1.2
981	Extensive OR procedure unrelated to principal diagnosis with MCC	1,576	1.2
560	Aftercare, musculoskeletal system and connective tissue with CC	1,421	1.1
602	Cellulitis with MCC	1,376	1.0
	Top 25 MS-LTC-DRGs	86,494	66.0

Note: MS-LTC-DRG (Medicare severity long-term care diagnosis related group), LTCH (long-term care hospital), MCC (major complication or comorbidity), CC (complication or comorbidity), OR (operating room). MS-LTC-DRGs are the case-mix system for LTCH facilities. The sum of column components may not equal the stated total due to rounding.

Source: MedPAC analysis of Medicare Provider Analysis and Review data from CMS.

Providers' access to capital: Continued short-term uncertainty slows investment

Access to capital allows LTCHs to maintain, modernize, and expand their facilities. If LTCHs were unable to access capital, it might in part reflect problems with the adequacy of Medicare payments since Medicare accounts for about half of LTCH total revenues. However, for the past several years, the level of capital investment has reflected more about uncertainty regarding changes to regulations and legislation governing LTCHs than about current Medicare

payment rates. Although the criteria to receive the higher LTCH payment rate specified in the Pathway for SGR Reform Act of 2013 provide more long-term regulatory certainty for the industry compared with recent years, short-run uncertainties regarding the industry's ability to comply with the new patient criteria have resulted in low levels of capital investment. Further, payment reductions implemented by CMS and congressional moratoriums on new LTCH beds and facilities from December 2007 through December 2012 and again from April 2014 through

September 2017 continue to limit future opportunities for growth and reduce the industry's need for capital.

LTCHs and LTCH companies have been positioning themselves for the changing payment environment. For example, in this primarily for-profit industry, Kindred Healthcare Inc. (Kindred), which owns about 20 percent of LTCHs, has continued to pursue an “integrated care market” strategy and diversify its portfolio through ownership, operation, or networks of post-acute care providers and LTCHs in a single market (Kindred Healthcare 2013).^{13,14} This strategy is intended to improve the chain's ability to control its mix of patients and costs and limit the impact of payment policy changes in any one post-acute care sector. As part of this strategy, in 2015, Kindred acquired Gentiva Health Services, a large provider of home health and hospice care, and Centerre Healthcare Corporation, an inpatient rehabilitation hospital company (Cain Brothers 2014, Kindred Healthcare 2014). At the same time, Select Medical Corporation (Select), which operates about 25 percent of LTCH facilities, has also been diversifying its portfolio. For example, in June 2015, Select finalized the acquisition of Concentra Inc., a health care company that provides medical services to employers and patients through a joint venture. Concentra Inc., previously a subsidiary of Humana, provides services including urgent care, occupational medicine, physical therapy, primary care, and wellness programs (Select Medical 2015).

Both major LTCH chains have shifted their portfolios over the last year through closures and sales. For example, Kindred reduced the number of LTCHs in its portfolio from 95 to 82, while Select has reduced the number of LTCHs it operates from 109 to 104. During 2016, Kindred acquired five LTCHs from Select, and Select acquired three hospitals from Kindred. In addition, in October 2016, Kindred Healthcare Inc. completed an agreement to sell 12 LTCHs (a total of 783 licensed beds) to Curahealth (Kindred Healthcare 2016a, Kindred Healthcare 2016b, Select Medical 2016).

Medicare's payments and providers' costs: Cost growth exceeded payment growth

From 2007 until 2012, LTCHs held cost growth below the rate of increase in the market basket index, a measure of inflation in the prices of goods and services LTCHs buy to provide care. Beginning in 2009, payments increased at a faster rate than the rate of provider costs. Starting after 2012, however, Medicare payments increased more slowly

than the rate of provider costs. This trend has continued, resulting in an aggregate 2015 Medicare margin of 4.6 percent compared with 7.6 percent in 2012. Financial performance in 2015 varied across LTCHs, reflecting differences in cost control and response to payment incentives.

Reductions in the number of LTCH cases slowed spending growth in 2014 and 2015

In the first three years of the LTCH PPS, Medicare spending for LTCH services grew rapidly, climbing an average of 29 percent per year. CMS's subsequent changes to LTCH payment policies slowed growth in spending between 2005 and 2008 to less than 1 percent per year. MMSEA halted or rolled back the implementation of some CMS regulations designed to address issues of excessive payments to LTCHs. As a result, between 2008 and 2010, spending jumped more than 6 percent per year.¹⁵ Although some of the MMSEA provisions continued through fiscal year 2013, spending growth between 2010 and 2013 slowed to 2.1 percent per year on average, in part because of PPACA-mandated reductions in Medicare's LTCH payment rate beginning in 2011.¹⁶ Between 2013 and 2015, spending decreased by an average of just over 1 percent per year.

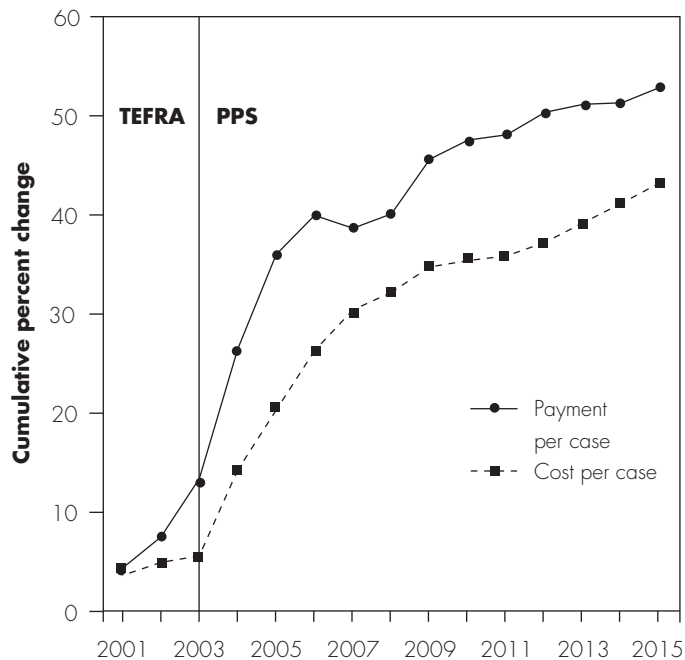
LTCHs continue to restrain cost growth

LTCHs appear to be responsive to changes in payment, adjusting their costs per case when payments per case change. In the first years of the PPS, cost per case increased rapidly after a surge in payment per case (Figure 11-2, p. 304). However, starting in 2007, growth in cost per case slowed considerably because regulatory changes to Medicare's payment policies for LTCHs slowed growth in payment per case.

For most of the past decade, LTCHs have held cost growth below the rate of market basket increases, likely because of ongoing concerns about possible changes to Medicare's payment policies for LTCH services. The slowest growth in average cost per case occurred between 2009 and 2011, when it increased less than 1 percent per year. Between 2012 and 2015, the average cost per case increased by about 2 percent per year, including 2.1 percent between 2014 and 2015 (Figure 11-2, p. 304).

Aggregate LTCH margins decreased

After the LTCH PPS was implemented in fiscal year 2003, margins rose rapidly for all LTCH provider types, climbing

**FIGURE
11-2****LTCHs' per case costs increased more than payments in 2015**

Note: LTCH (long-term care hospital), TEFRA (Tax Equity and Fiscal Responsibility Act of 1982), PPS (prospective payment system). Percentage changes are calculated based on consistent two-year cohorts of LTCHs.

Source: MedPAC analysis of Medicare cost report data from CMS.

to 11.9 percent in 2005 (data not shown in Table 11-4). At that point, margins began to fall as growth in payments per case leveled off. In 2008, LTCH margins averaged 3.7 percent, the lowest since the implementation of the LTCH PPS in 2003 (Table 11-4). From 2009 through 2012, LTCH margins began to climb again as providers consistently held cost growth below that of payment growth. CMS began implementing a downward adjustment in response to unexpected changes in coding practices that increased payments to LTCHs relative to CMS's estimates in the first year of the PPS, fiscal year 2003. These adjustments in 2013, 2014, and 2015 were intended to bring payments to LTCHs more in line with what would have been spent under the previous payment method, decreasing the standard federal payment rate by about 3.75 percent in total. In 2013, the aggregate LTCH margin fell from 7.6 percent to 6.8 percent, primarily because of the first year of a three-year phase-in of the downward adjustment for budget neutrality and the effect of budget sequestration beginning April 1, 2013 (Table 11-4). As anticipated, the

margin fell again in 2014 to 5.1 percent. In 2015, the third and final year of the downward adjustment for budget neutrality, the aggregate LTCH margin fell to 4.6 percent.

Differences in cost growth across the industry

Financial performance in 2015 varied across LTCHs. For-profit LTCHs (which account for more than three-quarters of all LTCHs and 84 percent of LTCH discharges) had the highest margins at about 6 percent. Margins for nonprofit LTCHs (which account for less than 20 percent of all LTCHs and 13 percent of LTCH discharges) were -6 percent. Between 2014 and 2015, the for-profit LTCH margin decreased by 0.5 percentage point, while the nonprofit LTCH margins fell by about 3.6 percentage points. These declines resulted from growth in cost that exceeded growth in payment per case. However, because this analysis includes all facilities with valid cost reports for 2015, some of the change is a result of different facilities reporting data in each of the years examined. If we constrain the analysis to the same cohort of providers for 2014 and 2015, the for-profit LTCH margin in those two years decreased by 0.5 percentage point, from 6.9 percent to 6.4 percent. In the same one-year period, nonprofit LTCH margins fell 2 percentage points, from -3.1 percent to -5.2 percent (data not shown).

With the exception of 2014, nonprofit LTCHs have generally experienced higher cost growth than for-profit entities. In 2015, nonprofit LTCHs again experienced a higher rate of cost growth compared with for-profit LTCHs. When we examine cumulative cost growth over the last decade, we find that for-profit facilities exhibited cost growth levels about one-third lower than that of nonprofit LTCHs.

The comparatively poor financial performance of nonprofit LTCHs reflects a number of differences in providers' ability to control their costs. First, though occupancy rates in 2014 for the two groups were fairly similar (65.7 percent for nonprofit LTCHs vs. 68.6 percent for for-profit LTCHs), nonprofit LTCHs were smaller and had fewer total cases than for-profit LTCHs (an average of 438 vs. 520, respectively). About 68 percent of nonprofit LTCHs had fewer than 50 beds compared with about half of for-profit LTCHs. Nonprofit LTCHs were therefore less likely than for-profit LTCHs to benefit from economies of scale. In addition, nonprofit LTCHs tend to be less able to control their input costs than for-profit LTCHs that are members of large chains. For-profit LTCH chains that own other types of post-acute care providers in a single market likely have a distinct advantage over other LTCHs because

**TABLE
11-4**

The aggregate LTCH Medicare margin fell slightly in 2015

Type of LTCH	Share of discharges	2008	2009	2010	2011	2012	2013	2014	2015
All	100%	3.7%	5.8%	6.7%	6.9%	7.6%	6.8%	5.1%	4.6%
Urban	95	4.0	6.1	7.0	7.1	7.7	7.0	5.1	4.6*
Rural	5	-4.0	-3.6	0.0	2.7	3.2	2.5	4.1	2.8*
Nonprofit	13	-2.5	-0.7	-0.3	0.3	-0.3	-1.1	-2.4	-6.0
For profit	84	5.3	7.4	8.3	8.4	9.2	8.6	6.9	6.4
Government	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Note: LTCH (long-term care hospital), N/A (not applicable). Margins for government-owned providers are not shown. They operate in a different context from other providers, so their margins are not necessarily comparable.
 *CMS adopted new core-based statistical area (CBSA) codes for LTCHs beginning fiscal year 2015; this change reclassified several facilities as urban that had previously been classified as rural, and therefore the margins across categories of urban and rural of facilities between 2014 and 2015 should not be compared. Applying the old CBSA definition to 2015, we calculated both an urban margin and a rural margin equal to 4.6 percent in 2015. The decrease in margin shown above is solely attributed to the change in facilities classified as urban and rural.

Source: MedPAC analysis of Medicare cost report data from CMS.

they are better able to control their mix of patients and lengths of stay (which is especially true if the providers are vertically integrated). Nonprofit LTCHs had a larger share of cases with extraordinarily high costs (21.3 percent of nonprofit LTCHs' cases qualified for high-cost outlier payments vs. 14.3 percent of for-profit LTCHs' cases), although it is not clear whether this difference stems from differences in efficiency, case complexity, or both. Nonprofit LTCHs had more short-stay outliers than for-profit LTCHs (29.8 percent vs. 26.0 percent, respectively). Nonprofit LTCHs also had a higher share of very short-stay outliers (13.1 percent compared with 12.0 percent in for-profit LTCHs), which typically pay less than short-stay outliers, and thus received reduced payments for a larger share of their Medicare patients.

Differences in case mix between nonprofit and for-profit LTCHs are difficult to evaluate. By some measures, nonprofit LTCHs appear to care for a somewhat sicker patient population. For example, a higher share of cases in nonprofit LTCHs qualified for high-cost outlier payments. Similarly, nonprofit LTCHs had a higher share of cases that were high-cost outliers during their immediately preceding ACH stay (17.2 percent compared with 14.5 percent of for-profit LTCHs' cases). Another indicator suggesting a sicker patient population is length of stay: The average Medicare-covered stay in nonprofit LTCHs was 2 days longer than in for-profit ones (28 days vs. 26 days, respectively). However, longer stays could also result from inefficient care. Other indicators

of patient mix suggest fewer differences between the two types of facilities. The average case mix in nonprofit and for-profit LTCHs was similar. Nonprofit and for-profit LTCHs also had similar shares of cases that had ICU stays lasting longer than three days during an immediately preceding ACH stay.

High-margin LTCHs had lower unit costs

In 2015, higher unit costs were the primary driver of differences in financial performance between LTCHs with the lowest and highest Medicare margins (those in the bottom and top 25th percentiles of Medicare margins) (Table 11-5, p. 306).¹⁷ After accounting for differences in case mix and local market input price levels, low-margin LTCHs had standardized costs per discharge that were 35 percent higher than high-margin LTCHs (\$37,789 vs. \$28,088, respectively). Low-margin LTCHs likely benefited less from economies of scale. Compared with their high-margin counterparts, low-margin LTCHs had fewer cases overall (an average of 426 compared with 503 for high-margin LTCHs) and lower occupancy rates (57 percent vs. 75 percent, respectively). Notably, high-margin LTCHs had a higher average share of Medicare discharges than did low-margin LTCHs (67 percent vs. 57 percent, respectively), which suggests that Medicare patients are financially desirable.

Outlier payments made up a larger share of total payments to low-margin LTCHs compared with high-margin LTCHs

**TABLE
11-5**

LTCHs in the top quartile of Medicare margins in 2015 had lower costs

Characteristics	High-margin quartile	Low-margin quartile
Mean margin	17.8%	-14.6%
Mean total discharges per facility (all payers)	503	426
Medicare patient share	67%	57%
Average length of stay (in days)	26	28
Occupancy rate	75%	57%
Mean CMI	1.17	1.13
Mean per discharge:		
Standardized costs	\$28,088	\$37,789
Standard Medicare payment*	38,254	35,896
High-cost outlier payments	2,060	6,700
Share of:		
SSO cases	25%	29%
Medicare cases from primary referring ACH	37	41
LTCHs that are for profit	83	59

Note: LTCH (long-term care hospital), CMI (case-mix index), SSO (short-stay outlier), ACH (acute care hospital). Includes only established LTCHs—those that filed valid cost reports in both 2014 and 2015. High-margin quartile LTCHs were in the top 25 percent of the distribution of Medicare margins. Low-margin quartile LTCHs were in the bottom 25 percent of the distribution of Medicare margins. Standardized costs have been adjusted for differences in case mix and area wages. Case-mix indexes have been adjusted for differences in short-stay outliers across facilities. The “primary referring ACH” is the acute care hospital from which the LTCH receives a plurality of its Medicare patients. Government providers were excluded. *Excludes outlier payments.

Source: MedPAC analysis of LTCH cost reports and Medicare Provider Analysis and Review data from CMS.

(5 percent compared with almost 16 percent). High-cost outlier payments per discharge for low-margin LTCHs averaged more than three times the amount paid to high-margin LTCHs (\$6,700 vs. \$2,060, respectively). When these outlier payments were removed from total payments, we found that the standard payment per discharge for low-margin LTCHs was 6.2 percent lower than that for high-margin LTCHs (\$35,896 vs. \$38,254, respectively). This difference was in part because the low-margin LTCHs had a lower average case mix (1.13 vs. 1.17 for high-margin LTCHs) and in part because they cared for a disproportionate share of short-stay outlier cases, which often are paid at reduced rates. Such cases made up 29

percent of low-margin LTCHs’ cases compared with 25 percent in high-margin LTCHs.

Financial incentives to serve Medicare beneficiaries across LTCHs

Another consideration in evaluating the adequacy of payments is to assess whether providers have a financial incentive to expand the number of Medicare beneficiaries they serve. In considering whether to treat a patient, the provider compares the revenue it will receive for treating one additional patient (i.e., the Medicare payment) with its marginal costs—that is, costs that vary with volume, in this case, to treat one additional patient. If Medicare payments are larger than the marginal costs of treating an additional beneficiary, a provider has a financial incentive to increase its volume of Medicare patients. On the other hand, if payments do not cover the marginal costs, the provider has a disincentive to admit Medicare beneficiaries. To operationalize this concept, we compare payments for Medicare services with marginal costs, approximated as:

$$\text{Marginal profit} = (\text{payments for Medicare services} - (\text{total Medicare costs} - \text{fixed building and equipment costs})) / \text{Medicare payments}$$

This comparison is a lower bound on the marginal profit because we ignore any labor costs that are fixed. In 2015, the average LTCH marginal profit was 19.6 percent across all Medicare cases. This share suggests that LTCHs with available beds have a financial incentive to increase their occupancy rates with Medicare beneficiaries and represents a positive indicator of access.

How should Medicare payments change in 2018?

We project LTCH margins for 2017 based on margins in 2015 and policy changes that take place in 2016 and 2017, including those in the Patient Protection and Affordable Care Act of 2010 (PPACA). Those changes that affect our estimate of the 2017 margin include:

- a market basket increase of 2.4 percent for fiscal year 2016, offset by PPACA-required reductions totaling 0.7 percentage point for a net update of 1.7 percent;¹⁸

- a market basket increase of 2.8 percent for fiscal year 2017, offset by PPACA-required reductions totaling 1.05 percentage points for a net update of 1.75 percent;¹⁹
- an increase in expected short-stay outlier payments based on an increase in costs; and
- high-cost outlier payment adjustments.

As required by PPACA, beginning in 2016, LTCH discharges for beneficiaries who do not meet the specified patient criteria are paid differently from the standard federal payment rate. Payment for these beneficiaries equals the lesser of an amount based on Medicare's ACH IPPS or 100 percent of cost. The Commission expects that substantial changes in provider behavior will mitigate the impact that the new payment methodology has on LTCH providers (see text box discussing the implementation of LTCH legislation, p. 309). The LTCH industry has repeatedly demonstrated its responsiveness to payment policy changes, and the Commission has no reason to believe that the response to these most recent changes will be any different. This responsiveness, combined with the multiyear policy phase-in, complicates the projection of future margins. For example, the two largest for-profit LTCH chains have taken different approaches to the new policy, which seem to be, based on limited data, either changing admission patterns significantly or reducing cost. There is less certainty regarding how LTCHs not included in large chains (including nonprofit LTCHs) will respond to the new patient-specific criteria. In addition, there is an industry-wide focus on lower cost sites of post-acute care through several initiatives, including the expansion of accountable care organizations and the ACH Value-Based Purchasing Program; therefore, it is reasonable to expect that changes in practice and referral patterns across the industry from these programs will result in lower LTCH use.

Given the recent trends in higher cost growth and the potentially increasing costs associated with treating a higher share of beneficiaries who qualify for the full LTCH standard payment rate, we expect cost growth to equal projected LTCH market basket levels, which are slightly higher than projected payment growth during 2016 and 2017.

Because of the uncertainty regarding the degree to which LTCHs can respond to the new patient-level criteria, and

because the payment for these cases relies on the update to the ACH IPPS rate or the individual LTCH's growth in cost, we have excluded cases not paid under the standard LTCH payment rate from our margin projections. Instead, we calculated a margin using only cases that would have qualified to receive the full LTCH standard payment rate. In 2013, 2014, and 2015, these cases were more profitable than other cases. Using the most recently available claims data combined with revenue center-specific cost-to-charge ratios for each LTCH, we calculated the 2015 margin for cases that would have qualified to receive the full LTCH standard payment rate to equal 6.8 percent, 2.2 percentage points higher than the total aggregate Medicare margin (4.6 percent), fairly consistent with our 2014 calculations.

Using the projected growth in the LTCH market basket, we project that LTCHs' aggregate Medicare margin for qualifying cases paid under the LTCH PPS will be 5.4 percent in 2017, reflecting current policy and cost structure for these cases. A conservative lower bound of this estimate is 3.2 percent if we assume that the margins of the qualifying cases will reflect the underlying cost and payment structure across all LTCH cases in 2015. This projection does not reflect all cases under the new payment rules; instead, LTCHs' 2017 total aggregate Medicare margin will differ from this projection to the extent that providers furnish care for beneficiaries who do not qualify for the full LTCH standard payment rate since we expect these cases to be less profitable under the new payment structure.

On the basis of these indicators, the Commission concludes that LTCHs can continue to provide Medicare beneficiaries with access to safe and effective care and accommodate changes in their costs with no update to LTCH payment rates in fiscal year 2018. Like we done have historically, we plan to assess both our cost growth assumptions and methodology for calculating the margin on cases that would qualify for the standard LTCH payment rate as the policy is phased in and data reflecting the new policy become available.

This update recommendation applies to the Medicare LTCH PPS base payment rate. That is, it applies to payments for discharges that meet the criteria specified in the Pathway for SGR Reform Act of 2013 and to the portion of the blended payment that reflects the LTCH payment rate for discharges that do not meet the specified criteria (applicable during the policy's phase-in period).

RECOMMENDATION 11

The Congress should eliminate the update to the payment rates under the long-term care hospital prospective payment system for fiscal year 2018.

RATIONALE 11

We estimate that the supply of LTCH facilities and beds decreased slightly during 2015. Although the number of LTCH stays decreased, both in total and per capita, LTCH occupancy rates are well under capacity, suggesting that access to care in LTCHs has been maintained. While the limited quality trends that we measure appear to be stable across all cases, we will continue to monitor these trends under the new dual payment system. We will also begin to evaluate the utility of the new CMS LTCH quality measures once they have sufficiently matured. The availability of capital to LTCHs does not reflect current payment rates but, rather, the implementation of a moratorium on new facilities and beds and the short-term uncertainties related to the implementation of the dual payment system. The aggregate Medicare margin for 2015 was positive, suggesting that LTCHs are able to operate

under current payment rates. We continue to expect LTCHs to respond to the new payment incentives quickly and dramatically. Based on the historical trends and the increase in acuity of the beneficiaries who would now qualify for the full LTCH standard payment rate, we also expect to see increases in cost growth in 2016 and 2017 as the policy is implemented. Given the projected positive margin for qualifying cases, the 2018 LTCH base payment rate should be the same as the 2017 rate.

IMPLICATIONS 11

Spending

- This recommendation would decrease federal program spending relative to the statutory payment update by between \$50 million and \$250 million in 2018 and by less than \$1 billion over five years.

Beneficiary and provider

- This recommendation is not expected to affect Medicare beneficiaries' access to care or providers' willingness or ability to furnish care. ■

Implementation of long-term care hospital legislation

The Pathway for SGR Reform Act of 2013 established “site-neutral” payments for specified cases in long-term care hospitals (LTCHs), beginning in fiscal year 2016. Since 2016, only qualifying cases are eligible to receive the full LTCH prospective payment system (PPS) standard payment rate. It will be some time before we see LTCHs’ full response to the legislation because this policy is being implemented based on the start of each LTCH’s fiscal year, which varies across LTCHs. Further, it is phased in at 50 percent of the LTCH PPS standard payment rate and 50 percent of the site-neutral payment rate.

In discussing LTCH strategies to maintain profitability following implementation, the Commission has heard a variety of responses from the industry. For example, LTCHs in one large for-profit chain are admitting only beneficiaries that qualify to receive the full LTCH PPS standard payment rate. Using data through September 30, 2016, this LTCH chain reported that close to 100 percent of Medicare discharges met the criteria to receive the full LTCH PPS standard rate. The average daily census across these LTCHs has dropped by about 2.5 patients per hospital per day; however, the admitted Medicare cases have higher case mix and thus result in higher revenue per day compared with before the

implementation of the dual payment policy (Select Medical 2016).

Another large for-profit chain began receiving Medicare payment for discharges under the dual payment structure beginning September 1, 2016. In its third quarter 2016 earnings release, this chain reported a slight decrease in Medicare admissions, but an increase in total admissions compared with the third quarter of 2015. Medicare revenue per admission decreased by about 5 percent compared with the same quarter last year. This chain continues to take Medicare beneficiaries that qualify to receive the full LTCH standard payment amount and beneficiaries paid under the site-neutral rate. This chain reported about a one-day decrease in the average length of stay, predominantly from reductions in lengths of stay for cases paid under the site-neutral rate (Kindred Healthcare 2016b).

LTCHs have discussed other strategies, including expanding their market presence, expanding the payer mix to include more managed care, and reducing costs for nonqualifying cases through changes in staff mix. The success of these strategies will likely vary by facility and market area, and it will be another several years before the data reflect facilities’ responses to this new policy. ■

Endnotes

- 1 The Medicare, Medicaid, and SCHIP Extension Act of 2007 also requires LTCHs to have a patient review process that screens patients to ensure appropriateness of admission and continued stay, physician on-site availability on a daily basis, and interdisciplinary treatment teams of health care professionals. The Pathway for SGR Reform Act of 2013 specifies that beginning in fiscal year 2020, LTCHs will also be required to maintain a certain share of beneficiaries who qualify to receive the full LTCH standard payment rate.
- 2 More information on the prospective payment system for LTCHs is available at http://www.medpac.gov/docs/default-source/payment-basics/medpac_payment_basics_16_ltch_final.pdf?sfvrsn=0.
- 3 Medicare pays LTCHs outlier payments for patients who are extraordinarily costly. High-cost outlier cases are identified by comparing their costs with a threshold that is the MS–LTC–DRG payment for the case plus a fixed loss amount (\$14,972 in 2015). Medicare pays 80 percent of the LTCH’s costs above the threshold. In fiscal year 2015, high-cost outlier payments were made for about 16 percent of LTCH cases. The prevalence of high-cost outlier cases varied by LTCH ownership. About 14 percent of cases in for-profit LTCHs were high-cost outliers compared with 21 percent of cases in nonprofit LTCHs. Historically, some case types have been far more likely to be high-cost outliers than others. For example, almost a quarter of cases assigned to MS–LTC–DRG 4 (tracheostomy with prolonged mechanical ventilation) typically receive high-cost outlier payments each year.
- 4 Not all LTCHs’ cost reporting start dates are the same, so the dual payment structure began for LTCHs throughout fiscal year 2016.
- 5 MMSEA and subsequent legislation allowed exceptions to the moratorium for (1) LTCHs that began their qualifying period (demonstrating an average Medicare length of stay greater than 25 days) on or before December 29, 2007; (2) entities that had a binding or written agreement with an unrelated party for the construction, renovation, lease, or demolition of an LTCH, with at least 10 percent of the estimated cost of the project already expended on or before December 29, 2007; (3) entities that had obtained a state certificate of need on or before December 29, 2007; (4) existing LTCHs that had obtained a certificate of need for an increase in beds, issued on or after April 1, 2005, and before December 29, 2007; and (5) LTCHs that are located in a state with only one other LTCH and that sought to increase beds after the closure or decrease in the number of beds of the state’s other LTCH.
- 6 The Pathway for SGR Reform Act of 2013, as amended by the Protecting Access to Medicare Act of 2014, allows exceptions to the moratorium for (1) LTCHs that began their qualifying period (demonstrating an average Medicare length of stay greater than 25 days) on or before April 1, 2014; (2) entities that had a binding or written agreement with an unrelated party for the construction, renovation, lease, or demolition of an LTCH, with at least 10 percent of the estimated cost of the project already expended on or before April 1, 2014; and (3) entities that had obtained a state certificate of need on or before April 1, 2014.
- 7 The Pathway for SGR Reform Act of 2013 implemented a moratorium, with no exceptions, on the establishment of new LTCHs or additional beds at existing LTCHs from January 1, 2015, through September 30, 2017. Subsequently, the Protecting Access to Medicare Act of 2014 changed the moratorium extension start date to April 1, 2014, and allowed exceptions on the establishment and classification of new LTCHs. This law strictly prohibited increases in the number of Medicare-certified LTCH beds in existing facilities.
- 8 Thirty-five LTCHs included in the 2014 analysis were excluded from the 2015 analysis because of changes in cost reporting periods, closures, or status as an all-inclusive rate provider. Twenty-seven LTCHs that were not included in the 2014 analysis because of changes in cost reporting periods were included in the 2015 analysis. Combined, these facility changes resulted in eight fewer facilities in the 2015 analysis compared with 2014.
- 9 The Commission requires cost reports to span between 10 and 13 months for inclusion in the margin analysis.
- 10 Historically, the Commission has found that the Medicare Provider of Services (POS) file includes a larger number of facilities than are found in the cost report file. The cost report file provides a more conservative estimate of total capacity because some LTCHs may not yet have filed a cost report for the applicable year when we completed our analysis, while others may have been exempt from filing cost reports because of low Medicare volume or because they are paid under an all-inclusive rate. However, POS data may overstate the total number of LTCHs because facilities that close may not be immediately removed from the file.
- 11 Across the top 25 diagnoses for both qualifying cases and all cases, 21 MS–LTC–DRGs overlap. The diagnoses that do not overlap in the top 25 represent relatively low-volume MS–LTC–DRGs. Using a consistent definition of the top 25 MS–LTC–DRGs based on all cases also captures 78 percent of qualifying cases.

- 12 We observed a higher readmission rate (19.6 percent) for cases with respiratory diagnoses with mechanical ventilation lasting less than 96 hours (MS–LTC–DRG 208). However, a higher rate of readmission is expected for this group because it is defined in part by the length of time a service (mechanical ventilation) is received. Any patient with a principal respiratory diagnosis with use of mechanical ventilation who is readmitted to a short-term ACH within 4 days is assigned to MS–LTC–DRG 208, while a similar patient who stays in the LTCH for a longer period is likely assigned to “respiratory diagnosis with mechanical ventilation lasting more than 96 hours” (MS–LTC–DRG 207). When we combined cases assigned to MS–LTC–DRGs 207 and 208 and recalculated the rate of readmission, we found that 11.7 percent of these cases were readmitted in 2014.
- 13 In 2014, over 75 percent of LTCHs were for profit; these for-profit facilities accounted for approximately 85 percent of LTCH cases.
- 14 In its third quarter 2016 earnings release, Kindred announced its plan to exit the SNF business; Kindred currently owns about 90 SNFs (Kindred Healthcare 2016b).
- 15 Another factor was growth in the reported patient case-mix index (CMI), which measures the expected costliness of a facility’s patients (Centers for Medicare & Medicaid Services 2010, Centers for Medicare & Medicaid Services 2009, Centers for Medicare & Medicaid Services 2008, Centers for Medicare & Medicaid Services 2007, Centers for Medicare & Medicaid Services 2006). Refinements to the LTCH case-mix classification system, implemented in October 2007, likely led to more complete documentation and coding of the diagnoses, procedures, services, comorbidities, and complications that are associated with payment, thus raising the average CMI, even though patients may have been no more resource intensive than they were previously (Centers for Medicare & Medicaid Services 2009, Medicare Payment Advisory Commission 2009, RAND Corporation 1990). Although some of the increase in LTCHs’ CMI between 2008 and 2009 was due to growth in the intensity and complexity of the patients admitted, CMS estimated that the case-mix increase attributable to documentation and coding improvements was 2.5 percent (Centers for Medicare & Medicaid Services 2010, Centers for Medicare & Medicaid Services 2009). Those improvements contributed to growth in payments to providers without corresponding increases in providers’ costs. CMS reduced the update to the LTCH base payment rate in fiscal years 2010 and 2011 to partly offset payment increases due to documentation and coding improvements between 2007 and 2009.
- 16 PPACA specified that the annual update to the LTCH standard payment rate in 2011 be reduced by half a percentage point. That requirement, combined with a CMS offset to the 2011 update to account for past improvements in documentation and coding, resulted in a negative update to the LTCH payment rate in 2011. PPACA also mandated reductions in the LTCH standard payment rate of 1.1 percent in 2012, 0.8 percent in 2013, 0.8 percent in 2014, 0.7 percent in 2015, and 0.7 percent in 2016.
- 17 Many new LTCHs operate at a loss for a period after opening. For this analysis of high-margin and low-margin LTCHs, we examined only LTCHs that submitted valid cost reports in both 2014 and 2015. We excluded government-owned LTCHs.
- 18 The 2016 LTCH PPS market basket increase equaled 2.4 percent; then, as required by law, CMS applied a 0.7 percentage point reduction to account for multifactor productivity (0.5 percentage point) and an additional factor (0.2 percentage point).
- 19 The 2017 payment update equaled the LTCH PPS market basket increase of 2.8 percent, less the required multifactor productivity adjustment of 0.3 percentage point and less the required 0.75 percentage point reduction.

References

- Barnato, A. E., D. L. Anthony, J. Skinner, et al. 2009. Racial and ethnic differences in preferences for end-of-life treatment. *Journal of General Internal Medicine* 24, no. 6 (June): 695–701.
- Borum, M. L., J. Lynn, and Z. Zhong. 2000. The effects of patient race on outcomes in seriously ill patients in SUPPORT: An overview of economic impact, medical intervention, and end-of-life decisions. Study to Understand Prognoses and Preferences for Outcomes and Risks of Treatments. *Journal of the American Geriatrics Society* 48, no. 5, supplement (May): S194–198.
- Cain Brothers. 2014. Cain in the News: Kindred to Acquire VC-backed Centerre for about \$195 mln. News release. <https://www.cainbrothers.com/research/kindred-to-acquire-vc-backed-centerre-for-about-195-mln/>.
- Carson, S. S., J. Garrett, L. C. Hanson, et al. 2008. A prognostic model for one-year mortality in patients requiring prolonged mechanical ventilation. *Critical Care Medicine* 36, no. 7 (July): 2061–2069.
- Centers for Medicare & Medicaid Services, Department of Health and Human Services. 2013. Medicare program; hospital inpatient prospective payment systems for acute care hospitals and the long term care hospital prospective payment system and proposed fiscal year 2014 rates; quality reporting requirements for specific providers; hospital conditions of participation. Proposed rule. *Federal Register* 78, no. 91 (May 10): 27486–27823.
- Centers for Medicare & Medicaid Services, Department of Health and Human Services. 2010. Medicare program; hospital inpatient prospective payment systems for acute care hospitals and the long term care hospital prospective payment system changes and FY 2011 rates; provider agreements and supplier approvals; and hospital conditions of participation for rehabilitation and respiratory care services; Medicaid program: accreditation for provider of inpatient psychiatric services. Final rule. *Federal Register* 75, no. 157 (August 16): 50042–50677.
- Centers for Medicare & Medicaid Services, Department of Health and Human Services. 2009. Medicare program; changes to the hospital inpatient prospective payment systems for acute care hospitals and fiscal year 2010 rates; and changes to the long term care hospital prospective payment system and rate years 2010 and 2009 rates. Final rule. *Federal Register* 74, no. 165 (August 27): 43754–44236.
- Centers for Medicare & Medicaid Services, Department of Health and Human Services. 2008. Medicare program; prospective payment system for long-term care hospitals RY 2009; annual payment rate updates, policy changes, and clarifications; and electronic submission of cost reports: revision to effective date of cost reporting period. Final rule. *Federal Register* 73, no. 91 (May 9): 26787–26874.
- Centers for Medicare & Medicaid Services, Department of Health and Human Services. 2007. Medicare program; prospective payment system for long-term care hospitals RY 2008; annual payment rate updates and policy changes; and hospital direct and indirect graduate medical education policy changes. Final rule. *Federal Register* 72, no. 91 (May 11): 26870–27029.
- Centers for Medicare & Medicaid Services, Department of Health and Human Services. 2006. Medicare program; prospective payment for long-term care hospitals RY 2007; annual payment rate updates, policy changes, and clarification. Final rule. *Federal Register* 71, no. 92 (May 12): 27798–27939.
- Dalton, K., D. Kennell, S. Bernard, et al. 2012. *Determining medical necessity and appropriateness of care for Medicare long-term care hospitals (LTCHs): Report on site visits to IPPS critical care services and LTCHs*. Prepared under contract by Kennell and Associates Inc. and Research Triangle International for the Centers for Medicare & Medicaid Services. Baltimore, MD: CMS.
- Diringer, M. N., D. F. Edwards, V. Aiyagari, et al. 2001. Factors associated with withdrawal of mechanical ventilation in a neurology/neurosurgery intensive care unit. *Critical Care Medicine* 29, no. 9 (September): 1792–1797.
- Donahoe, M. P. 2012. Current venues of care and related costs for the chronically critically ill. *Respiratory Care* 57, no. 6 (June): 867–886.
- Gage, B., L. Smith, M. Morley, et al. 2011. *Post-Acute Care Payment Reform Demonstration: Report*. Prepared under contract to the Centers for Medicare & Medicaid Services. Baltimore, MD: CMS. http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/Reports/Research-Reports-Items/PAC_Payment_Reform_Demo_Final.html.
- Kahn, J. M., N. M. Benson, D. Appleby, et al. 2010. Long-term acute care hospital utilization after critical illness. *Journal of the American Medical Association* 303, no. 22 (June 9): 2253–2259.

Kindred Healthcare. 2016a. Kindred completes sale of 12 LTAC hospitals to Curahealth, advancing LTAC portfolio optimization strategy. News release. October 3. http://investors.kindredhealthcare.com/phoenix.zhtml?c=129959&p=irol-newsArticle_Print&ID=2208657.

Kindred Healthcare. 2016b. Kindred Healthcare updates strategy and reports third quarter 2016 results. News release. November 7. http://investors.kindredhealthcare.com/phoenix.zhtml?c=129959&p=irol-newsArticle_Print&ID=2220343.

Kindred Healthcare. 2014. Kindred announces definitive agreement to acquire Centerre Healthcare. News release. November 12. http://phx.corporate-ir.net/phoenix.zhtml?c=129959&p=irol-newsArticle_Print&ID=1988763.

Kindred Healthcare. 2013. Annual report (Form 10-K). Filing submitted to the Securities and Exchange Commission.

MacIntyre, N. R. 2012. Chronic critical illness: The growing challenge to health care. *Respiratory Care* 57, no. 6 (June): 1021–1027.

Mayr, F. B., S. Yende, W. T. Linde-Zwirble, et al. 2010. Infection rate and acute organ dysfunction risk as explanations for racial differences in severe sepsis. *Journal of the American Medical Association* 303, no. 24 (June 23): 2495–2503.

Medicare Payment Advisory Commission. 2009. *Report to the Congress: Medicare payment policy*. Washington, DC: MedPAC.

Nelson, J. E., C. E. Cox, A. A. Hope, et al. 2010. Chronic critical illness. *American Journal of Respiratory and Critical Care Medicine* 182, no. 4 (August 15): 446–454.

RAND Corporation. 1990. *Methodology for measuring case-mix change: How much change in the case mix is DRG creep?* E-90–5. Arlington, VA: RAND Corporation. April.

Select Medical. 2016. Select Medical Holdings Corporation announces results for third quarter ended September 30. http://www.selectmedical.com/uploadedFiles/Content/Investor_Relations/Earnings_Releases/2016-Q3-Earnings-Release.pdf.

Select Medical. 2015. Select Medical announces signing of definitive agreement to acquire Concentra Inc. Press release. March 23. http://www.selectmedical.com/uploadedFiles/Content/About/News/Press_Releases/Select-Medical-Announces-Signing-of-Definitive-Agreement-to-Acquire-Concentra-Inc.pdf.

Wienczek, C., and C. Winkelman. 2010. Chronic critical illness: Prevalence, profile, and pathophysiology. *AACN Advanced Critical Care* 21, no. 1 (January–March): 44–61.

Zilberberg, M. D., M. de Wit, and A. F. Shorr. 2012. Accuracy of previous estimates for adult prolonged acute mechanical ventilation volume in 2020: Update using 2000–2008 data. *Critical Care Medicine* 40, no. 1 (January): 18–20.

Zilberberg, M. D., R. S. Luippold, S. Sulsky, et al. 2008. Prolonged acute mechanical ventilation, hospital resource utilization, and mortality in the United States. *Critical Care Medicine* 36, no. 3 (March): 724–730.

