CHAPTER 11

Long-term care hospital services

RECOMMENDATION

11 The Secretary should eliminate the update to the payment rates for long-term care hospitals for fiscal year 2014.

COMMISSIONER VOTES: YES 16 • NO 0 • NOT VOTING 0 • ABSENT 1

CHAPTER 11

Long-term care hospital services

Chapter summary

Long-term care hospitals (LTCHs) furnish 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 its Medicare patients must have an average length of stay greater than 25 days. In 2011, Medicare spent $5.4 billion on care furnished in 424 LTCHs nationwide. About 123,000 beneficiaries had almost 140,000 LTCH stays. On average, Medicare accounts for about two-thirds of LTCHs' discharges.

Assessment of payment adequacy

***Beneficiaries' access to care*—**We have no direct measures of beneficiaries' access to LTCH services. Instead, we consider the capacity and supply of LTCH providers and changes over time in the volume of services they furnish.

- ***Capacity and supply of providers*—**In spite of the moratorium imposed by the Medicare, Medicaid, and SCHIP Extension Act of 2007 (MMSEA) and subsequent amendments, the number of LTCHs filing Medicare cost reports increased 9.3 percent between 2008 and 2011.
- ***Volume of services*—**Controlling for growth in the number of fee-for-service beneficiaries, we found that the number of LTCH cases rose 2.8 percent between 2010 and 2011, suggesting that access to care increased during this period.

In this chapter

- Are Medicare payments adequate in 2013?
- How should Medicare payments change in 2014?

***Quality of care*—**LTCHs only recently began submitting quality data to CMS. Those data are not yet available for analysis. Using claims data, we found stable or declining rates of readmission, death in the LTCH, and death within 30 days of discharge for almost all of the top 25 diagnoses in 2011.

***Providers' access to capital*—**For the past few years, the availability of capital to LTCHs has not reflected current reimbursement rates but rather uncertainty regarding possible changes to Medicare's regulations and legislation governing LTCHs. Since 2007, a moratorium imposed by the MMSEA and subsequent amendments on new beds and facilities has reduced opportunities for expansion and the need for capital. With the expiration of the moratorium at the end of 2012, it is unclear whether LTCH companies will act quickly to open new facilities or proceed cautiously, given the continued scrutiny of Medicare spending on LTCH care. Companies may opt to focus on relatively low-risk capital investment, such as bed expansions.

***Medicare payments and providers' costs*—**Between 2008 and 2009, growth in payments per case accelerated to 5.5 percent, more than twice as much as the growth in costs. This surge was due in part to congressional actions that halted or rolled back the implementation of CMS regulations designed to address overpayments to LTCHs. Between 2009 and 2011, growth in payments slowed to an average of 1.6 percent per year, while growth in costs increased less than 1 percent per year. In 2011, the aggregate LTCH margin rose to 6.9 percent. With the expiration of legislative provisions offering temporary relief from some of CMS's payment regulations, payment growth is likely to slow. We expect that LTCHs will continue to constrain their costs and project that cost growth will be modest—roughly similar to the latest forecast of the market basket for 2013 of 2.6 percent. We estimate that LTCHs' aggregate Medicare margin will be 5.9 percent in 2013. ■

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 relatively extended periods. Nationwide, most chronically critically ill (CCI) patients are treated in acute care hospitals (ACHs), but a growing number are treated in long-term care hospitals (LTCHs). These facilities can be freestanding or co-located with other hospitals, as hospitals-within-hospitals or satellites. To qualify as an LTCH for Medicare payment, a facility must meet Medicare's conditions of participation for ACHs, and its Medicare patients must have an average length of stay greater than 25 days. (By comparison, the average Medicare length of stay in ACHs is about five days.) There are no other criteria defining LTCHs, the level of care they provide, or the patients they treat.[1] Because of the relatively long stays and the level of care provided, care in LTCHs is expensive. In 2011, Medicare's average payment per case was almost $39,000. In total, Medicare spent $5.4 billion on care provided in an estimated 424 LTCHs nationwide. About 123,000 beneficiaries had almost 140,000 LTCH stays. On average, Medicare accounts for about two-thirds of LTCHs' discharges.

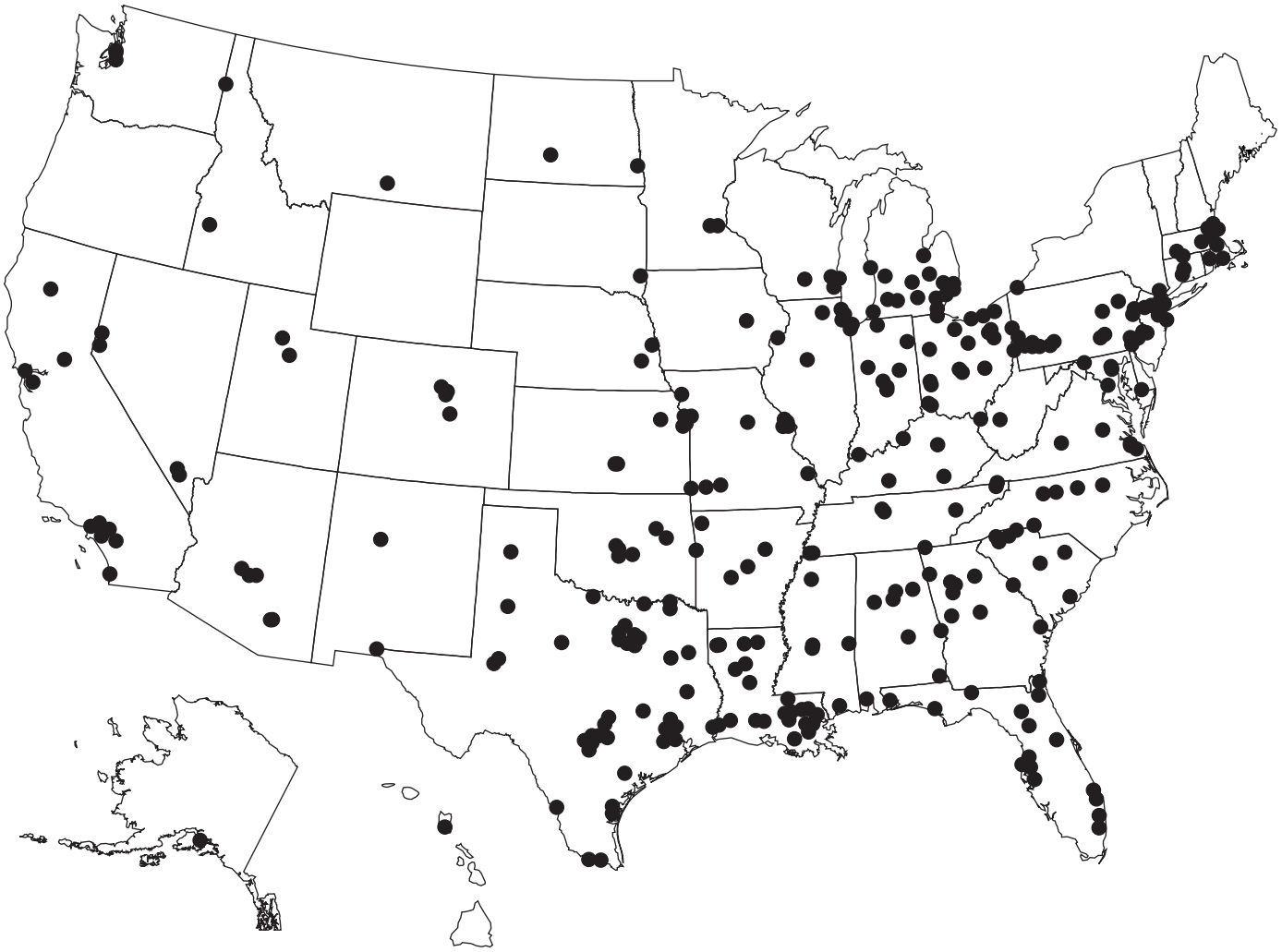
Since October 2002, Medicare has paid LTCHs' prospective per discharge rates based primarily on the patient's diagnosis and the facility's wage index.[2] Under this prospective payment system (PPS), LTCH payment rates are based on the Medicare severity long-term care diagnosis related group (MS–LTC–DRG) patient classification system, which groups patients based primarily on diagnoses and procedures. MS–LTC–DRGs are the same groups used in the acute inpatient PPS 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 PPS pays differently for short-stay outlier cases (patients with shorter than average lengths of stay), reflecting CMS's contention that Medicare should pay adjusted rates for patients with relatively short lengths of stay to reflect the reduced costs of caring for them (see text box, pp. 242–243).

As medical technologies have advanced, researchers and clinicians have noted the growing prevalence of CCI patients (Carson et al. 2008, Macintyre 2012, Nelson et al. 2010, Zilberberg et al. 2012, Zilberberg et al. 2008) (see text box, pp. 245–246). CCI patients often require prolonged mechanical ventilation (PMV); as a result, many studies of the CCI population have used the need for PMV as a defining characteristic. The Commission's analysis of claims data found that 19 percent of LTCH patients used at least one ventilator-related service in 2011. Another way researchers define this patient population is by the extended use of intensive care services. Our analysis of ACH claims from 2010 found that 5.7 percent of cases spent eight or more days in an intensive care unit (ICU) or cardiac care unit (CCU), and almost half of these cases went on to use an institutional provider of post-acute care, such as a skilled nursing facility (SNF), an inpatient rehabilitation facility (IRF), or an LTCH.[4] Nationwide, 12 percent of the CCI cases discharged to institutional post-acute care providers used an LTCH, but use is higher in states with high concentrations of LTCH beds.[5] In Louisiana and Massachusetts, about a third of CCI cases discharged to post-acute care had an LTCH stay. In Texas and Nevada, one-quarter of CCI cases discharged to post-acute care used an LTCH.

Most CCI patients remain in the ACH for long periods until they can be transferred to a lower level of care. Nevertheless, over the past decade, both the number and the share of critically ill patients transferred from ACHs to LTCHs have grown markedly. Kahn and colleagues found that, though the overall number of Medicare admissions to ACH ICUs fell 14 percent between 1997 and 2006, the number of Medicare ICU patients discharged to LTCHs almost tripled (Kahn et al. 2010).[6]

The number of LTCHs has grown in concert. Indeed, between 1990 and 2005, LTCHs were one of the fastest growing providers in the Medicare program. Due in part to state certificate-of-need programs that prevent or limit the opening of certain types of health care facilities, many new LTCHs have located in markets where LTCHs already existed instead of in markets with few or no direct competitors. As a result, LTCHs are not distributed evenly across the country (Figure 11-1, p. 240). Some areas have no LTCHs, underscoring the fact that medically complex patients can be treated appropriately in other settings.[7] At the same time, some areas have many LTCHs. This concentration has financial implications for the Medicare program because an oversupply of LTCH beds may result in admissions to LTCHs of less complex cases that could appropriately be treated in less costly settings. Commission analysis of LTCH claims from 2010 found that, in markets where LTCHs are used most frequently,

FIGURE 11–1 **Long-term care hospitals are not distributed evenly across the nation, 2011**



Source: MedPAC analysis of cost report data from CMS.

the average LTCH case mix was lower than in markets where LTCHs are used less often.[8] Further, our analysis of ACH discharges that went on to use LTCHs in 2010 found that 47 percent spent three or fewer days in the ACH ICU or CCU before discharge. While severity of illness cannot be measured solely by a patient's use of ICU or CCU services, this finding raises concerns about the extent to which LTCH care is provided unnecessarily.

The fact that Medicare pays more for LTCH services than for similar services provided elsewhere has likely encouraged growth in the number of LTCHs and use of these facilities. But in many cases it is not clear what Medicare is purchasing with its higher LTCH payments. Research on outcomes for beneficiaries who receive care in LTCHs is mixed, with some studies suggesting that LTCH care may have value for very sick patients but not for those who are less severely ill. A previous Commission analysis of 2001 claims found lower readmission rates for the most medically complex beneficiaries who used LTCHs compared with similar patients who did not have an LTCH stay (Medicare Payment Advisory Commission 2004). CMS's Post-Acute Care Payment Reform Demonstration compared beneficiaries using LTCHs with those using SNFs and IRFs and found that, after controlling for differences in case mix, LTCH patients had a lower risk of readmission within 30 days of discharge from the ACH (Gage et al. 2011). That LTCH patients

would have lower readmission rates is not unexpected since LTCHs must meet the conditions of participation for ACHs and thus can provide a higher level of care than can most other post-acute care providers. However, in a related study using data from the CMS demonstration, researchers found that LTCH cases were more likely than other post-acute care cases to be readmitted to the ACH on day 30 and beyond (Morley et al. 2011). Regarding mortality, the Commission's analysis of 2001 claims found no clear benefit for beneficiaries who use LTCHs (Medicare Payment Advisory Commission 2004). But another study, conducted by RTI International under a CMS contract, found that for the most complex ventilator patients in Texas, Louisiana, and Oklahoma (three states with a history of high LTCH use), mortality was lower for those who used an LTCH (Kennell and Associates 2010). This study (which used 2004 claims data from the three states to construct episodes of care for beneficiaries assigned to ventilator-related diagnoses during initial ACH admissions and compared outcomes for beneficiaries who went on to use LTCHs with those who did not) also found that the most complex ventilator patients who used LTCHs were more likely to be discharged home than similar patients who did not use LTCHs. But for the least complex ventilator cases, the researchers found that outcomes were worse for beneficiaries who used LTCHs. In yet another study, Kahn and colleagues examined claims data from 2002 through 2006 for beneficiaries requiring mechanical ventilation who spent at least 14 days in an ACH ICU and found no differences in mortality one year after discharge for beneficiaries who were subsequently transferred to an LTCH compared with those who were not (Kahn et al. 2013).

Studies by the Commission and others have also examined whether spending for LTCH care reduces spending for other services. In its analysis of data from 2001, the Commission found that Medicare pays more for episodes that include LTCH care but that the payment differences were not statistically significant when LTCH care was targeted at the most severely ill patients (Medicare Payment Advisory Commission 2004). The CMS-sponsored, RTI International analysis of 2004 claims data from three states with high LTCH use found that for the most complex ventilator patients, Medicare payments for the episode of care were the same or lower for those who used an LTCH than for those who did not; for the least complex ventilator patients, Medicare payments were considerably higher for the beneficiaries who used LTCHs than for those who did not (Kennell and Associates 2010). However, a more recent study by RTI for CMS looked at 2007 claims nationwide and identified 74 ACH diagnosis groups in which LTCH referral is most common (Kandilov and Dalton 2011). The researchers created episodes of care for beneficiaries admitted to the ACH with these diagnoses and compared Medicare payments for episodes that included LTCH care with those that did not. This analysis found that Medicare payments and provider costs were higher for episodes that included LTCH stays, even for ventilator patients, although the difference in payment was smallest for this group.[9] By contrast, Kahn and colleagues found that, for beneficiaries who spent at least 14 days in an ACH ICU, transfer to an LTCH was associated with lower total provider costs but higher total Medicare payments (Kahn et al. 2013). These studies, though conflicting, suggest that LTCH care may have value for very sick patients but not for those who are less severely ill.

Medicare must ensure that its payments to providers are properly aligned with the resource needs of beneficiaries. Inaccurate payments can influence providers' decisions about admission, service delivery, transfer, and discharge, and thus can result in inappropriate care, unnecessary use of services, and program overpayments. Attractive payment rates for LTCH care may have resulted in an oversupply of facilities in some areas and unwarranted use of LTCH services by less severely ill patients. At the same time, in areas of the country without LTCHs, ACHs may incur costs in caring for CCI beneficiaries that are not accrued by their counterparts in areas with LTCHs. The Commission has long held that payment for the same set of services should be the same regardless of where the services are provided to help ensure that beneficiaries receive appropriate, high-quality care in the least costly setting consistent with their clinical conditions (Medicare Payment Advisory Commission 2009). The Commission has therefore begun investigating ways to rationalize Medicare's payments for CCI beneficiaries.

Are Medicare payments adequate in 2013?

To address whether payments for 2013 are adequate to cover the costs providers incur and how much providers' costs should change in the coming year (2014), we examine several indicators of payment adequacy. Specifically, we assess beneficiaries' access to care by examining the capacity and supply of LTCH providers and

Short-stay outlier cases in long-term care hospitals

In the long-term care hospital (LTCH) payment system, a short-stay outlier (SSO) is a case with a length of stay that is less than or equal to five-sixths of the geometric average length of stay for the case type.[10] 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 to those under the ACH inpatient prospective payment system (IPPS). About 28 percent of LTCH discharges receive SSO payment adjustments, but this share varies across types of cases. For example, about 32 percent of cases with pulmonary edema and respiratory failure were SSOs in fiscal year 2011, compared with about 25 percent of cases with skin ulcers and major comorbidities/complications.

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 Medicare severity long-term care diagnosis related group (MS–LTC–DRG) specific per diem amount multiplied by the patient's length of stay,
- the full MS–LTC–DRG payment, or
- a blend of the IPPS amount for the Medicare severity–diagnosis related group (MS–DRG) and 120 percent of the MS–LTC–DRG per diem amount.[11]

Generally, for the same MS–DRG, the IPPS payment is substantially less than the payment under the LTCH PPS. As an example, for a case assigned to MS–LTC–DRG 189 (pulmonary edema and respiratory failure), the IPPS payment in 2013 might be $6,665 while the LTCH payment would be $37,639. LTCHs therefore have a strong financial incentive to keep patients until their lengths of stay exceed the SSO threshold for the relevant case type. As shown in Figure 11-2, LTCHs appear to respond to that incentive. Analysis of lengths of stay for the two most common case types in 2011 shows that the number of discharges rises sharply immediately after the SSO threshold. The data strongly suggest that LTCHs' discharge decisions may be influenced at least as much by financial incentives as by clinical indicators.

Beginning on December 29, 2012, Medicare applies a different standard for very short-stay outlier cases (VSSOs).[12] VSSO cases are those in which the length of stay is less than or equal to the IPPS average length of stay for the same case type plus one standard deviation. For these cases, LTCHs are paid the lowest of:

- 100 percent of the cost of the case,
- 120 percent of the MS–LTC–DRG-specific per diem amount multiplied by the patient's length of stay,
- the full MS–LTC–DRG payment,
- the IPPS per diem amount multiplied by the length of stay for the case, or
- the full IPPS payment for the MS–DRG.

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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 increased access for most beneficiaries

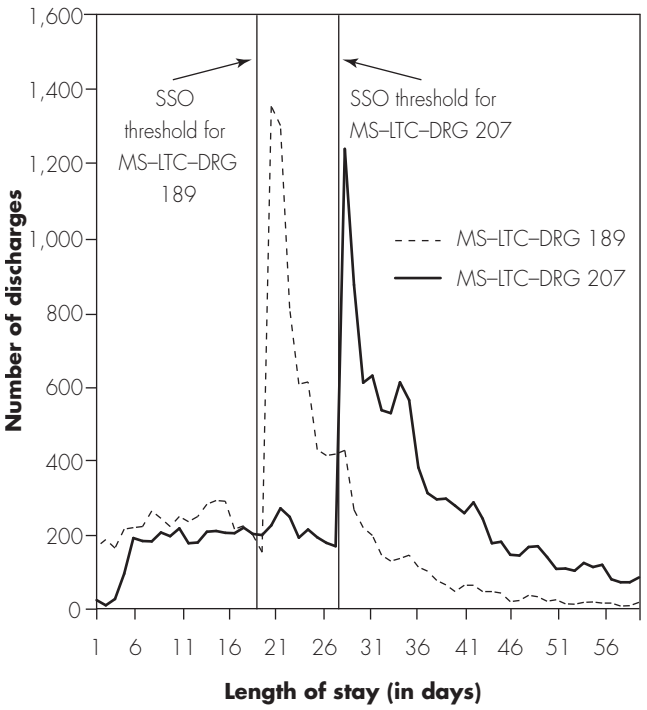
We have no direct measures of beneficiaries' access to LTCH services. The absence of LTCHs in many areas of the country makes it particularly difficult to assess the need for LTCH care and therefore the adequacy of supply. Instead, we consider the capacity and supply of LTCH providers and changes over time in the volume of services they furnish.

Capacity and supply of providers: Supply has grown between 2008 and 2011

The Medicare, Medicaid, and SCHIP Extension Act of 2007 and subsequent amendments imposed a limited moratorium on new LTCHs and new beds in existing LTCHs from December 29, 2007, to December 28,

Short-stay outlier cases in long-term care hospitals (cont.)

FIGURE 11–2 **Many LTCH cases in FY 2011 were discharged in the period immediately following the short-stay outlier threshold**



Note: LTCH (long-term care hospital), FY (fiscal year), SSO (short-stay outlier), MS–LTC–DRG (Medicare severity long-term care diagnosis related group). Cases in MS–LTC–DRG 207 are those with a respiratory system diagnosis and prolonged mechanical ventilation. Cases in MS–LTC–DRG 189 are those with pulmonary edema and respiratory failure. LTCHs usually receive reduced payments for cases with lengths of stay that are below the SSO threshold for the MS–LTC–DRG.

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

If the VSSO policy had been in place in 2011, the Commission estimates that 14 percent of all cases would have been classified as VSSOs.

We compared cases that would have been VSSOs in 2011 with cases that were not SSOs to get a better understanding of how very short stays differ from longer ones. Compared with cases that were not SSOs, VSSO cases were more likely to be of an extreme severity level (54 percent vs. 45 percent for longer stays). About 19 percent of VSSO cases were MS–LTC–DRG 207 (respiratory system diagnosis with prolonged mechanical ventilation), compared with 11 percent of cases that were not SSOs. Many VSSO cases had such short lengths of stay because the beneficiary was readmitted to an ACH or died. Twenty-seven percent of VSSO cases were discharged to an ACH, while only 5 percent of longer stay cases were readmitted. Similarly, 41 percent of VSSO cases died in the LTCH compared with 6 percent of longer stays. Even when VSSO cases were discharged alive, only 27 percent were still living one year after discharge, compared with more than half of non-SSO cases. Thus, as a group, VSSO cases appeared to be much more severely ill than non-SSO cases, even though the per discharge cost of caring for them tended to be lower.

This analysis highlights the importance of identifying medically complex patients who are appropriate for admission to an LTCH. Some of the most severely ill medically complex patients may not be appropriate for LTCH admission because they are too sick to benefit from specialized LTCH care or because their prognosis for improvement is so poor. ■

2012. We examined Medicare cost report data to assess the number of LTCHs and found that, in spite of the moratorium, the number of LTCHs filing Medicare cost reports increased 9.3 percent between 2008 and 2011 (Table 11-1, p. 244). New LTCHs were able to enter the Medicare program because they met specific exceptions to the moratorium. Most of the new LTCHs filing cost reports were for-profit facilities.

It is difficult to determine a precise number of LTCHs for 2011 because of discrepancies in Medicare's data sources on these facilities. However, our analysis of these sources indicates that the number of LTCHs increased between 2010 and 2011. Cost report data indicate that eight more LTCHs filed valid cost reports in 2011 than in 2010. However, analysis of Medicare's Provider of Services (POS) data suggests that the supply of LTCHs remained unchanged over the period, as we would expect in these later years of the moratorium. As we have found in previous years, Medicare's POS file includes a larger number of facilities than are found in the cost report file. The two data sources differ for a number of reasons.

TABLE 11–1

Growth in the number of LTCHs has slowed under the moratorium

Type of LTCH	2003	2004	2005	2006	2007	2008	2009	2010	2011	Average annual change 2003–2005	2005–2010	2010–2011
All	277	315	366	373	382	388	411	416	424	14.9%	2.6%	1.9%
Urban	264	299	342	348	358	362	388	389	397	13.8	2.6	2.1
Rural	13	16	24	25	24	26	23	27	27	35.9	2.4	0.0
Nonprofit	57	67	78	76	76	77	79	82	82	17.0	1.0	0.0
For profit	202	229	265	274	283	291	313	314	323	14.5	3.5	2.9
Government	18	19	23	23	23	20	19	20	19	13.0	–2.8	–5.0

Note: LTCH (long-term care hospital).

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

Some Medicare-certified LTCHs may not yet have filed a cost report for 2011 when we undertook our analysis. In addition, LTCHs with very low Medicare patient volume may be exempt from filing cost reports. At the same time, POS data may overstate the total number of LTCHs because facilities that close may not be immediately removed from the file. The cost report data, therefore, provide a more conservative estimate of total capacity and supply but may not accurately reflect the most recent changes in supply. A previous Commission analysis

TABLE 11–2

Medicare LTCH spending per FFS beneficiary continues to rise

	2004	2005	2006	2007	2008	2009	2010	2011	Average annual change 2004–2005	2005–2010	2010–2011
Cases	121,955	134,003	130,164	129,202	130,869	131,446	134,683	139,715	9.9%	0.1%	3.7%
Cases per 10,000 FFS beneficiaries	33.4	36.4	36.0	36.2	36.9	37.0	37.4	38.5	9.0	0.6	2.8
Users	108,814	119,282	115,598	114,299	115,328	115,834	118,322	122,838	9.6	–0.2	3.8
Spending (in billions)	$3.7	$4.5	$4.5	$4.5	$4.6	$4.9	$5.2	$5.4	21.6	2.9	4.0
Spending per FFS beneficiary	$101.3	$122.2	$124.5	$126.1	$129.8	$138.0	$144.4	$148.8	20.7	3.4	3.1
Payment per case	$30,059	$33,658	$34,859	$34,769	$35,200	$37,465	$38,582	$38,664	12.0	2.8	0.2
Average length of stay (in days)	28.5	28.2	27.9	26.9	26.7	26.4	26.6	26.3	–1.1	–1.2	–1.0

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

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

Chronically critically ill beneficiaries

Researchers and clinicians have noted the growing prevalence of chronically critically ill (CCI) patients, those who have survived acute critical illness in the hospital but face organ system failure requiring prolonged institutional care (Carson et al. 2008, Macintyre 2012, Nelson et al. 2010, Zilberberg et al. 2012, Zilberberg et al. 2008). Patients typically have long acute care hospital (ACH) stays with heavy use of intensive care services followed by stays in long-term care hospitals (LTCHs), skilled nursing facilities (SNFs), and inpatient rehabilitation facilities and may transition several times between these different venues of care (Macintyre 2012, Unroe et al. 2010).[13]

The CCI patient exhibits metabolic, endocrine, physiologic, and immunologic abnormalities that result in profound debilitation and often ongoing respiratory failure, abnormalities that have slowed or precluded recovery from a wide range of acute forms of medical, surgical, and neurologic critical illness (Nierman and Nelson 2002). Many require prolonged mechanical ventilation (PMV); as a result, many studies of the CCI population have used the need for PMV as a defining characteristic. Another way to define this patient population is by the extended use of intensive care services.

Mortality rates in this population are very high, especially for patients needing PMV. A cohort study of 300 intensive care unit patients (mean age = 56 years) requiring mechanical ventilation after acute illness for at least 21 days found that almost half had died within three months (Carson et al. 2008). A multicenter study in 2002 of 1,419 patients admitted to 23 LTCHs offering weaning from PMV found that 52 percent died within 12 months of the LTCH admission (Scheinhorn et al. 2007). Kahn and colleagues reported that in 2006, 69 percent of Medicare beneficiaries transferred to LTCHs needing mechanical ventilation after treatment for critical illness in the ACH died within a year (Kahn et al. 2010). Dematte D'Amico and colleagues observed that LTCH patients with more than two organ system failures (one of which may be respiratory failure) had very poor prognoses, with survival rates of less than 10 percent (Dematte D'Amico et al. 2003). Relatively few CCI survivors return to their previous level of health and function, and most end up with significant physical and cognitive limitations (Carson et al. 1999, Cox et al. 2007, Nelson et al. 2004, Scheinhorn et al. 2007, Unroe et al. 2010).

Some researchers and clinicians believe that gross misunderstanding of prognosis accounts for some of the growth in the number of CCI patients, especially those receiving PMV (Cox et al. 2009). Studies suggest that providers may fail to furnish families with key information needed to make decisions about prolonged life support (Cox et al. 2009, Nelson et al. 2010, Nelson et al. 2007). Participants in the Commission's October 2010 expert panel on LTCH quality reported that ACHs routinely discharge CCI patients to LTCHs without having had end-of-life and advanced care planning discussions with patients or their surrogates.

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revealed inaccuracies in ownership status in the POS data, so we have opted to rely on cost report data to determine the distribution of facilities across ownership and location categories (Table 11-1).

Volume of services: LTCH stays and cases rose in 2011

Beneficiaries' use of services suggests that access is adequate. From 2010 to 2011, the number of beneficiaries who had LTCH stays increased by 3.8 percent. Controlling for the number of FFS beneficiaries, we found that the number of LTCH cases rose 2.8 percent between 2010 and 2011, suggesting that access to care increased during this period (Table 11-2).

Compared with all Medicare beneficiaries, those admitted to LTCHs are disproportionately disabled (under age 65), over age 85, and 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 a greater incidence of critical illness in this population (Mayr et al. 2010). At the same time, African American beneficiaries may be more likely

Chronically critically ill beneficiaries (cont.)

Others have raised concerns that beneficiaries (or their surrogates) may not understand the differences between LTCHs and ACHs or SNFs and thus may not fully appreciate why transfer to an LTCH is recommended or what it signifies (de Lissovoy et al. 2013). CCI patients who are admitted to LTCHs (and their families) thus may have unrealistic expectations of LTCH care. Regardless of the health care setting, CCI is distressing and burdensome for patients and families. Experts therefore assert that treatment decisions for CCI patients must be driven by patients' values and preferences and bolstered by a thorough understanding of possible outcomes (Nelson and Hope 2012, Nelson et al. 2007, White 2012). Given the challenges of physician-patient communication about advanced illnesses, use of shared decision-making tools could improve the timeliness and clarity of information that patients receive about their condition and treatment options and empower patients to make choices based on their preferences.

CCI patients require specialized care from an interdisciplinary team including physicians, nurses, social workers, respiratory therapists, physical therapists, and nutritionists. Providers should have the capability to provide prolonged complex respiratory services, including the use of protocols for weaning from mechanical ventilation, and appropriate metabolic and nutritional support. They must be able to provide functional and cognitive support to patients with neurocognitive impairments and to minimize infections in a high-risk population (Macintyre 2012, Nelson et al. 2010). A growing number of researchers and clinicians insist that palliative care—including pain management and symptom relief; communication with patients and families about values, preferences, and care goals; transitional planning; and emotional support—is also an essential component of treatment for CCI patients, even when these patients are not at the end of life (Carson 2012, Macintyre 2012, Nelson et al. 2010, Nelson and Hope 2012, White 2012).

The Commission has posited that providers may need to reach a certain volume of medically complex patients to maintain treatment expertise and achieve high-quality care (Medicare Payment Advisory Commission 2008a, Medicare Payment Advisory Commission 2008b, Medicare Payment Advisory Commission 2010). Research has shown that higher patient volume is associated with better outcomes for certain procedures, such as surgery for cancers of the pancreas and esophagus (Birkmeyer et al. 2002, Institute of Medicine 2000). Studies have also found a positive relationship between volume and outcomes for patients admitted to intensive care units in ACHs, notably those receiving mechanical ventilation (Durairaj et al. 2005, Kahn et al. 2006, Kahn et al. 2009). Such a relationship may hold true in LTCHs as well. The Commission's analyses of LTCHs with high and low Medicare margins suggest that some volume of patients might also be needed to achieve economies of scale necessary to be profitable. ■

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). The concentration of LTCHs in urban areas and in areas of the country with larger African American populations may also be a contributing factor (Kahn et al. 2010). Further, as noted, a disproportionate number of Medicare beneficiaries who use LTCHs are disabled, a group that is itself more likely to be African American.

LTCH discharges are concentrated in a relatively small number of diagnosis groups. In fiscal year 2011, the top 25 LTCH diagnoses made up 62 percent of all LTCH discharges (Table 11-3). The most frequently occurring diagnosis was MS–LTC–DRG 207, respiratory diagnosis with ventilator support for 96 or more hours. Nine of the top 25 diagnoses, representing 34 percent of LTCH patients, were respiratory conditions.

Between 2008 and 2011, the number of LTCH cases with a principal diagnosis of skin ulcers with complications or comorbidities (CCs) and with major complications or comorbidities (MCCs) fell 38 percent and 15 percent, respectively, while the number of cases with the three most common aftercare diagnoses fell 20 percent, 7 percent, and

TABLE 11–3 **The top 25 MS–LTC–DRGs made up three-fifths of LTCH discharges in 2011**

MS–LTC–DRG	Description	Discharges	Percentage	Change 2008–2011
207	Respiratory system diagnosis with ventilator support 96+ hours	16,101	11.5%	7.4%
189	Pulmonary edema and respiratory failure	13,042	9.3	49.1
871	Septicemia or severe sepsis without ventilator support 96+ hours with MCC	8,453	6.0	30.4
177	Respiratory infections and inflammations with MCC	4,997	3.6	15.1
592	Skin ulcers with MCC	3,425	2.5	–14.5
208	Respiratory system diagnosis with ventilator support <96 hours	3,029	2.2	21.8
949	Aftercare with CC/MCC	3,004	2.1	–19.9
190	Chronic obstructive pulmonary disease with MCC	2,769	2.0	8.2
193	Simple pneumonia and pleurisy with MCC	2,573	1.8	–4.6
539	Osteomyelitis with MCC	2,541	1.8	33.5
573	Skin graft and/or debridement for skin ulcer or cellulitis with MCC	2,101	1.5	9.9
314	Other circulatory system diagnosis with MCC	2,039	1.5	37.2
919	Complications of treatment with MCC	2,033	1.5	22.5
862	Postoperative and post-traumatic infections with MCC	2,008	1.4	20.1
166	Other respiratory system OR procedures with MCC	1,988	1.4	17.4
682	Renal failure with MCC	1,987	1.4	14.3
4	Tracheostomy with ventilator support 96+ hours or primary diagnosis except face, mouth, and neck without major OR	1,887	1.4	33.5
559	Aftercare, musculoskeletal system and connective tissue with MCC	1,808	1.3	–7.0
870	Septicemia or severe sepsis with ventilator support 96+ hours	1,774	1.3	64.6
291	Heart failure and shock with MCC	1,713	1.2	1.5
593	Skin ulcers with CC	1,615	1.2	–37.6
178	Respiratory infections and inflammations with CC	1,591	1.1	–19.0
603	Cellulitis without MCC	1,539	1.1	9.9
602	Cellulitis with MCC	1,451	1.0	27.5
560	Aftercare, musculoskeletal system and connective tissue with CC	1,369	1.0	–17.3
	Top 25 MS–LTC–DRGs	86,837	62.0	12.8
	Total	139,741	100.0	6.8

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 LTCHs. Columns may not sum due to rounding.

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

17 percent, respectively (Table 11-3).[14] At the same time, cases with serious infections have grown significantly. The number of Medicare cases diagnosed with complicated septicemia without ventilator support grew 30 percent, while the number with septicemia and prolonged ventilator support climbed 65 percent. The number of cases with osteomyelitis with MCCs grew 34 percent over the period. In addition, the number of cases with postoperative or post-traumatic infections with MCCs increased 20 percent, while the number with cellulitis with and without MCCs increased 28 percent and 10 percent, respectively.

It is not clear whether the increase in cases with serious infections is due to changes in coding practices or to real growth in the number of beneficiaries admitted with infections. LTCH patients already face a high risk of hospital-acquired infection because they typically require invasive medical devices such as mechanical ventilators and catheters; they often suffer from conditions such as hyperglycemia and malnutrition; and they may have nonintact skin due to surgical wounds or pressure ulcers (Deutscher et al. 2011, Marchaim et al. 2012, Nelson et

Quality measures for long-term care hospitals

The Patient Protection and Affordable Care Act of 2010 requires CMS to collect data on quality in long-term care hospitals (LTCHs) and implement a pay-for-reporting program by 2014.[15] On October 1, 2013, CMS intends to begin pay for reporting for three measures—urinary catheter-associated urinary tract infections, central line catheter-associated bloodstream infections, and new or worsened pressure ulcers—and has begun collecting the necessary data from LTCHs. Data on urinary tract and central line infections are being collected through the National Healthcare Safety Network, an Internet-based surveillance system maintained by the Centers for Disease Control and Prevention. Because the data elements necessary to calculate the pressure ulcer measure are identical to those collected through the Minimum Data Set (MDS), the reporting instrument used in nursing homes, LTCHs are reporting these data elements using a subset of the MDS. On January 1, 2013, CMS will begin collecting data to support the development of two additional measures: the share of patients assessed for and appropriately given influenza vaccine and influenza vaccination coverage among health care personnel. Pay for reporting for these two measures will begin on October 1, 2015. The measures that CMS has chosen to date are already in use in acute care hospitals and post-acute care. Additional measures are needed that align with the conditions commonly treated in LTCHs. CMS has stated that future measures could include rates of other health care–acquired infections, such as ventilator-associated pneumonia and surgical-site infections; avoidable adverse events, such as rehospitalizations, injuries secondary to polypharmacy, and air embolisms; and nursing care measures, such as rate of restraint use, rate of falls with injury, and skill mix. ■

al. 2010). Therefore, growth in admissions to LTCHs of patients already infected with drug-resistant pathogens could pose a major challenge to infection control, not just within the LTCH but—because chronically critically ill patients often transition several times between different care venues—also for providers across the health care continuum (Gould et al. 2006, Macintyre 2012, Marchaim et al. 2012, Munoz-Price and Stemer 2010, Unroe et al. 2010).

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

Unlike most other health care facilities, LTCHs only recently began submitting quality data to CMS (see text box); those data are not yet available for analysis. Until the data are available, the Commission uses aggregate trends in rates of in-facility mortality, mortality within 30 days of discharge, and readmissions from LTCHs to ACHs. Although we use risk-adjusted measures to assess changes in quality in other health care settings, we do not risk adjust measures of LTCH quality because the available data are not adequate for this purpose. Medicare does not collect assessment data for LTCH patients. Claims data, which are used to risk adjust ACH measures of quality, do not provide the level of detail needed to adequately adjust for differences in risk across LTCH patients because the variation in patient severity and complexity in LTCHs is small compared with that in other health care settings. LTCH cases are highly concentrated in a few MS–DRGs; in addition, the vast majority of LTCH patients have multiple diagnoses and comorbidities. Clinicians and researchers participating in a Commission panel on LTCH quality measures agreed that risk adjustment was unnecessary for some proposed LTCH quality measures (Medicare Payment Advisory Commission 2011).

In 2011, 10 percent of LTCH cases were readmitted to an ACH. Thirteen percent of LTCH cases died in the facility, and another 12 percent died within 30 days of discharge from the LTCH. Mortality rates varied markedly by diagnosis group. Thirty-nine percent of patients with a principal diagnosis of septicemia with prolonged ventilator support died in the LTCH, and an additional 14 percent died within 30 days of discharge. By comparison, 5 percent of patients with a principal diagnosis of aftercare with major complications or comorbidities died in the LTCH, with an additional 8 percent dying within 30 days of discharge.

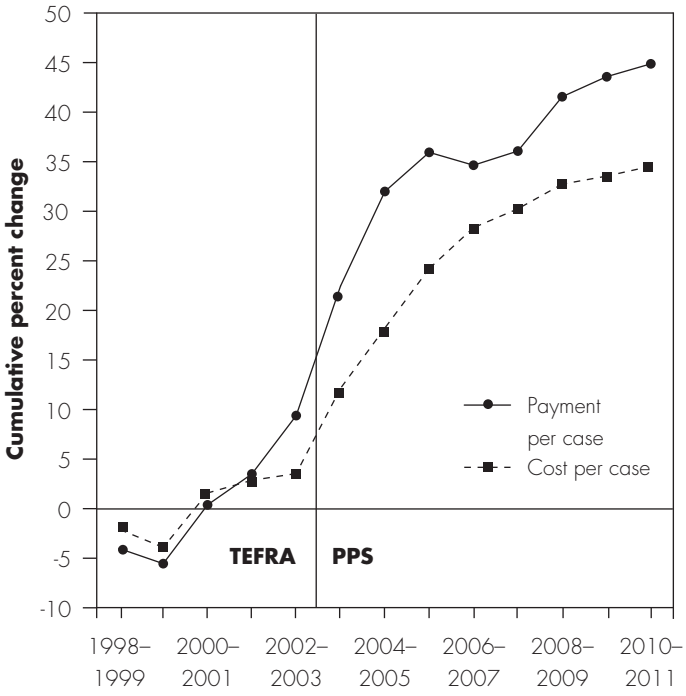
We considered readmission and mortality trends for the top 25 LTCH diagnoses over the period from 2008 to 2011. Although rates of readmission and death can vary

from year to year, over time we found stable or declining rates of death in LTCHs and death within 30 days of discharge for almost all of these diagnoses. The exception was cellulitis without MCCs, for which the share of cases that died in LTCHs increased an average of 1.4 percent annually between 2008 and 2011. Readmissions for the top 25 diagnoses also were generally stable or declining, except for cases with heart failure and shock with MCCs, some types of aftercare with CCs/MCCs, and other respiratory operating room procedures with MCCs.[16] In 2011, patients with a diagnosis of complications of treatment with MCC (MS–LTC–DRG 919) had the highest readmission rate (19.3 percent).[17]

Providers' access to capital: Moratorium has reduced need for new capital

Access to capital allows LTCHs to maintain and modernize 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 few years, the availability of capital says more about uncertainty regarding changes to regulations and legislation governing LTCHs than it does about current reimbursement rates. Payment reductions implemented by CMS and a congressional moratorium on new LTCH beds and facilities from July 2007 until December 2012 appear to have altered industry behavior. Although the number of LTCHs continued to rise during the moratorium, the rate of increase modified, while mergers and acquisitions of existing LTCHs—which were not prevented by the moratorium—dropped off considerably, with no such activity observed in the past year. With the expiration of the moratorium at the end of 2012, it is unclear whether LTCH companies will act quickly to open new facilities or proceed cautiously, given the continued scrutiny of Medicare spending on LTCH care. Companies may opt to focus on relatively low-risk capital investment, such as bed expansions. Kindred Healthcare, which owned 117 LTCHs as of September 2012, has continued to pursue its "cluster market" strategy, whereby the company operates SNFs, home health agencies, and LTCHs within a single market in order to position itself as an integrated provider of post-acute care. This strategy is intended to improve the chain's ability to control costs and limit the impact of payment policy changes in any one industry. In August 2012, the company acquired IntegraCare, which provides home health and hospice care in 47 locations in Texas.

FIGURE 11–3 **LTCHs' per case payments continue to increase more than costs**



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

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

Medicare's payments and providers' costs: Growth in payments continues to outpace growth in costs

Between 2010 and 2011, Medicare payments increased faster than costs, resulting in an aggregate 2011 Medicare margin of 6.9 percent. Medicare margins increased for almost every type of LTCH.

Reduction in the LTCH base rate slowed spending growth between 2010 and 2011

In the first three years of the LTCH PPS, Medicare spending for LTCH services grew rapidly, climbing an average of 29 percent per year. Subsequent changes in payment policies and growth in the number of beneficiaries enrolling in Medicare Advantage plans slowed growth in FFS spending between 2005 and 2008 to less than 1 percent per year (Figure 11-3). Between 2008 and 2010, however, spending jumped about 6 percent per year. A reduction in Medicare's payment rate for LTCH services helped to slow growth in spending between 2010 and 2011.[18]

TABLE 11–4 **Aggregate average LTCH Medicare margin rose in 2011**

Type of LTCH	Share of discharges	2004	2005	2006	2007	2008	2009	2010	2011
All	100%	9.1%	11.9%	9.7%	4.6%	3.5%	5.6%	6.6%	6.9%
Urban	95	9.3	12.0	9.9	4.9	3.8	5.9	6.9	7.1
Rural	4	2.6	10.2	4.7	–0.4	–3.3	–3.0	–0.3	1.1
Nonprofit	14	6.9	9.1	6.5	1.4	–2.5	–0.9	–0.2	–0.1
For profit	84	10.0	13.1	10.9	5.6	5.1	7.3	8.2	8.5
Government	1	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). Share of discharges column groupings may not sum to 100 percent due to rounding or missing data. Margins for government-owned providers are not shown. They operate in a different context from other providers, so their margins are not necessarily comparable.

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

Per case payments continued to exceed costs in 2012

In the first years of the PPS, LTCHs appeared to be responsive to changes in payment, adjusting their costs per case when payments per case changed. Payment per case increased rapidly after the PPS was implemented, climbing an average 16.6 percent per year between 2003 and 2005. Cost per case also increased rapidly during this period, albeit at a somewhat slower pace (Figure 11-3, p. 249). Between 2005 and 2008, however, growth in cost per case outpaced that for payments as regulatory changes to Medicare's payment policies for LTCHs slowed growth in payment per case to an average of 1.5 percent per year.

Between 2008 and 2009, growth in payments per case accelerated to 5.5 percent, more than twice as much as the growth in costs. This surge was due in part to congressional actions that halted or rolled back the implementation of CMS regulations designed to address issues of overpayments to LTCHs. 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 part 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.[19] Between 2009 and 2011, growth in payments slowed to an average of 1.6 percent per year, while growth in costs increased less than 1 percent per year.

High margins reflect economies of scale

After the LTCH PPS was implemented in 2003, margins rose rapidly for all LTCH provider types, climbing to 11.9 percent in 2005 (Table 11-4). At that point, margins began to fall as growth in payments per case leveled off. However, in 2009, LTCH margins began to climb again, consistent with the growth in payments described above. In 2011, the aggregate LTCH margin was 6.9 percent.

Although financial performance in 2011 varied across LTCHs, margins increased for all types of facilities. At 8.5 percent, margins were highest for for-profit LTCHs, which account for three-quarters of all LTCHs. The aggregate margin for rural LTCHs—which constitute about 6 percent of all LTCHs—was 1.1 percent, compared with 7.1 percent for their urban counterparts. Rural LTCHs tend to be much smaller than urban LTCHs, caring for a smaller

volume of patients on average and benefiting less from economies of scale.

We looked closely at the characteristics of established LTCHs with the highest and lowest margins.[20] As with SNFs and home health agencies, lower unit costs—rather than higher payments—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). Low-margin LTCHs had standardized costs per discharge that were 36 percent higher than high-margin LTCHs ($36,849 vs. $27,160). The average Medicare length of stay was one day longer in low-margin than in high-margin facilities. After controlling for the number of short-stay outliers, high-margin LTCHs had a higher average CMI, indicating a sicker patient population.

High-cost outlier payments per discharge for low-margin LTCHs were almost four times those of high-margin LTCHs ($4,434 vs. $1,134) (Table 11-5).[21] At the same time, short-stay outliers made up a larger share of low-margin LTCHs' cases (32 percent vs. 27 percent). Low-margin LTCHs thus cared for disproportionate shares both of patients who were high-cost outliers and patients who had shorter stays.

Compared with their low-margin counterparts, high-margin LTCHs were much more likely to be for profit, and they had more cases overall (an average of 553 compared with 428 for low-margin LTCHs). Low-margin LTCHs therefore benefited less from economies of scale.

TABLE 11–5 **LTCHs in the top quartile of Medicare margins in 2011 had lower costs**

Characteristics	High-margin quartile	Low-margin quartile
Mean margin	20.6%	–9.2%
Mean total discharges (all payers)	553	428
Medicare patient share	61%	63%
Average length of stay (in days)	26	27
Mean adjusted CMI	1.0057	0.9454
Mean per discharge:		
Standardized costs	$27,160	$36,849
Standard Medicare payment*	38,960	35,027
High-cost outlier payments	1,134	4,434
Share of:		
Cases that are SSOs	27%	32%
Medicare cases from primary-referring ACH	39	44
LTCHs that are for profit	92	62

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 2008 and 2009. Top margin quartile LTCHs were in the top 25 percent of the distribution of Medicare margins. Bottom 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. CMIs 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 patients. Government providers were excluded.
*Excludes outlier payments.

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

How should Medicare payments change in 2014?

To estimate 2013 payments, costs, and margins with 2011 data, the Commission considered policy changes effective in 2012 and 2013. Those that affect our estimate of the 2013 Medicare margin include:

- a market basket increase of 2.9 percent for 2012, offset by a 1.1 percent reduction required by the Patient Protection and Affordable Care Act of 2010 (PPACA), for a net update of 1.8 percent;
- a market basket increase of 2.6 percent for 2013, offset by required PPACA reductions totaling 0.8 percent, for a net update of 1.8 percent;
- a budget-neutrality adjustment in 2013 to account for CMS's underestimate of LTCH spending in the first year of the PPS. This adjustment, intended to bring total spending more in line with what would have been spent under the previous payment method, will decrease payments by about 3.75 percent over three years; and
- changes to the short-stay outlier policy in 2013, which will decrease payments.

We estimate that LTCHs' aggregate Medicare margin will be 5.9 percent in 2013. The Secretary has the discretion to update payments for LTCHs; there is no congressionally mandated update. In anticipation of the expiration of

temporary legislative relief from some of CMS's payment regulations, LTCHs are likely to continue to constrain their cost growth. We expect growth in costs to be modest, albeit somewhat greater than the current pace—roughly similar to the latest forecast of the market basket for 2013 of 2.6 percent.

Update recommendation

On the basis of our review of payment adequacy for LTCHs, the Commission recommends that the Secretary eliminate the update to the LTCH payment rate.

RECOMMENDATION 11

The Secretary should eliminate the update to the payment rates for long-term care hospitals for fiscal year 2014.

RATIONALE 11

The supply of facilities and beds grew between 2008 and 2011 and the number of LTCH cases rose, suggesting that access to care has increased. The limited quality trends we measure appear stable. The moratorium limited the need for capital. Medicare margins for 2011 were positive, and we expect they will remain so. These trends suggest that LTCHs are able to operate within current payment rates.

IMPLICATIONS 11

Spending

- Because CMS typically uses the market basket as a starting point for establishing updates to LTCH payments, this recommendation would decrease federal program spending by between $50 million and $250 million in one year 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' ability to provide care. ■

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.

2 More information on the prospective payment system for LTCHs is available at http://medpac.gov/documents/MedPAC_Payment_Basics_12_LTCH.pdf.

3 About 13 percent of LTCH cases received high-cost outlier payments in fiscal year 2011. Some case types were far more likely to be high-cost outliers than others. For example, 23 percent of cases assigned to MS–LTC–DRG 4 (tracheostomy with prolonged mechanical ventilation) were high-cost outliers, compared with 9 percent of cases assigned to MS–LTC–DRG 193 (simple pneumonia and pleurisy with major comorbidities/complications). High-cost outlier cases also differed by LTCH ownership. About 12 percent of cases in for-profit LTCHs were high-cost outliers, compared with 18 percent of cases in nonprofit LTCHs and 25 percent of cases in government-owned LTCHs.

4 Some beneficiaries who were not discharged to institutional post-acute care providers may have been discharged to their homes with home health care.

5 Nationwide, CCI patients requiring PMV in the ACH were by far the most likely to be discharged to LTCHs.

6 Kahn and colleagues found that the share of Medicare critical acute care hospitalizations ending in transfer to skilled nursing facilities (SNFs) and inpatient rehabilitation facilities (IRFs) has also increased, while the percentage of critical acute care hospitalizations ending in discharge to the home has decreased. Among critical acute care patients receiving intensive ventilator support, discharges to SNFs and IRFs have remained relatively constant, while discharges to LTCHs have increased (Kahn et al. 2010).

7 Kahn and colleagues found that among all Medicare ICU patients receiving mechanical ventilation in 2006, only 16 percent of patients discharged alive were discharged to LTCHs, while 46 percent were discharged to SNFs or IRFs (Kahn et al. 2010).

8 This analysis looked at non-short-stay outlier cases by core-based statistical areas (CBSAs). CBSAs with no LTCH claims were eliminated from the analysis.

9 One important limitation in this study is that it excluded payments for SNF and other post-acute care services used during the episode of care. As the authors point out, if LTCH stays were substituting, even in part, for high-level SNF care, then the model would overstate the episode payment differential attributable to LTCH use. To explore the effects of this limitation, the researchers looked at episodes that included SNF days and found that, on the basis of days of care, there was little evidence of a substitution effect between SNFs and LTCHs. Overall, 41.2 percent of episodes that used LTCHs and 42.7 percent of matched non-LTCH episodes had a SNF stay within the episode.

10 A geometric mean is derived by multiplying all numbers in a set and raising the product to the exponent of one divided by the number of cases in the set. This statistic is useful for analyzing data that are skewed. SSO cases that are very costly may qualify for high-cost outlier payments.

11 For the blended alternative, the LTCH per diem payment amount makes up more of the total payment amount as the patient's length of stay approaches the geometric mean length of stay for the MS–LTC–DRG.

12 CMS initially implemented the VSSO policy in July 2007. However, the Medicare, Medicaid, and SCHIP Extension Act of 2007 and subsequent amendments halted the application of the standard and prohibited the Secretary from applying it for five years.

13 A cohort study of 103 survivors of mechanical ventilation in the ACH ICU found that the patients experienced 457 separate transitions in postdischarge care settings. Sixty-seven percent were readmitted at least once (Unroe et al. 2010).

14 A principal diagnosis of aftercare with complications or comorbidities (MS–LTC–DRG 949) is assigned to patients who need hospital-level services (but not prolonged ventilator support) following a stroke or traumatic brain injury. A principal diagnosis of aftercare, musculoskeletal system and connective tissue (MS–LTC–DRGs 559 and 560) is assigned to patients who need hospital-level services for conditions such as a fracture with delayed healing.

15 Such a policy has been in place for hospitals since 2003. Under Medicare's Hospital Inpatient Quality Reporting Program, CMS requires hospitals to report a specified list of quality measures each year in order to receive a full update to Medicare payment rates in the ensuing year. This program creates incentives for providers not only to report the quality of their care but also to take steps to improve it and raise their quality scores. CMS makes some of the quality data available to consumers on Medicare's Hospital Compare website. More than 95 percent of hospitals opt to participate in the program.

16 We observed growth over time in the readmission rate for both MS–LTC–DRG 949 (aftercare with CC/MCC) and MS–LTC–DRG 560 (aftercare, musculoskeletal system and connective tissue, with CC).

17 We observed a higher readmission rate (23.4 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 since it is defined in part by the length of time a service (mechanical ventilation) is received. Any patient with a principal diagnosis of "respiratory diagnosis with mechanical ventilation" who is readmitted to a short-term ACH within four days will be assigned to MS–LTC–DRG 208, while a similar patient who stays in the LTCH for a longer period likely will be assigned to MS–LTC–DRG 207 (respiratory diagnosis with mechanical ventilation lasting more than 96 hours). When we combined cases assigned to MS–LTC–DRGs 207 and 208 and recalculated the rate of readmission, we found that 14.3 percent of these cases were readmitted in 2011.

18 The Patient Protection and Affordable Care Act of 2010 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.

19 CMS reduced the update to the LTCH base payment rate in fiscal year 2010 and fiscal year 2011 to partly offset payment increases due to documentation and coding improvements between 2007 and 2009.

20 Many new LTCHs operate at a loss for a period of time after opening. For this analysis of high- and low-margin LTCHs, we examined only LTCHs that submitted valid cost reports in both 2010 and 2011. We excluded government-owned LTCHs.

21 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 ($15,408 in 2013). Medicare pays 80 percent of the LTCH's costs above the threshold.

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