

Issue: September 2004

The Financing and Economics of Oxygen Therapy

by Rick Carter, PhD, MBA, and Brian Tiep, MD

While figures may vary, costs to the nation of oxygen therapy are staggering, and this is after significant Medicare cost-cutting efforts over the past 8 years. Innovation holds one key for servicing patients with long-term oxygen therapy that is affordable yet supports an active lifestyle.

Chronic obstructive pulmonary disease (COPD) and other respiratory and cardiac conditions limit oxygen delivery to metabolically active cells. The challenge is not only to correct hypoxemia, but also to address other factors that lead to tissue hypoxia. Accordingly, lung function should be optimized, infection controlled, congestive heart failure treated, hemoglobin deficiencies corrected, cardiac output optimized, and other comorbid conditions addressed.

Long-term oxygen therapy (LTOT) improves survival, ability to function, and quality of life in hypoxemic chronic lung disease patients. The Nocturnal Oxygen Therapy Trial (NOTT) and the British Medical Research Council (MRC) trials together demonstrated greater survival directly relating to the number of daily hours of usage.^{1,2} Few other therapies have this level of scientific support, and there is no treatment alternative.

The majority of LTOT patients are diagnosed with COPD, a leading cause of death, illness, and disability. In 2000, 119,000 deaths, 726,000 hospitalizations, and 1.5 million hospital emergency department visits were attributed to COPD.³ In 2001, the diagnosis for chronic bronchitis accounted for 11.2 million individuals, emphysema added another 3 million, and asthma accounted for an additional 22.2 million individuals.⁴

The United States ranks first with respect to per capita LTOT at 241/100,000 people^{5,6}—nearly four times higher than Canada, the second-highest consumer, followed by France, England, and Japan.^{5,6}

Medicare Reimbursement

COPD costs the United States economy more than \$32.1 billion per year: \$18 billion a year in direct medical expenses, and \$14.1 billion attributed to indirect costs.⁷ In 2001, more than 397,000 patients were discharged from acute care hospitals with a diagnosis of COPD and an average length of stay of 5.1 days; it represents an average daily rate of nearly \$2,000 or \$10,200 per admission. Medicare payments to hospitals for routine COPD treatment exceeded \$1.5 billion. Admissions that included mechanical ventilation added another \$2.1 billion annually.

Approximately 1.2 million patients receive LTOT through Medicare, about 82% of them diagnosed with COPD. Using available Medicare allowables for stationary (E1390=\$228.80/month) and portable oxygen (E0431 = \$35.97) (Texas DMERC allowables), the calculated capital outlay for supplemental oxygen would be in the neighborhood of \$225 million per month for stationary units alone, with an additional \$3.54 million per month expended to cover portable oxygen, assuming that all patients receiving oxygen also receive portable systems of some kind for an entire year. These annualized figures account for \$2.74 billion per year for LTOT or \$2,784 per patient per year as a worst-case projection. These figures are more than two times those for 1997 and 1998 home oxygen equipment costs (\$1.7 billion, 36% Medicare budget, and \$1.3 billion, 28% Medicare budget) and are in line with the 2002 figure of \$2.24 billion.⁸

Medicare pays 80% of the allowable charge, or about \$2.2 billion per year (based on worst-case projection), with the other 20%—\$548 million—co-paid by insurance companies or patients—a staggering cost even assuming actual figure variables, and this is following significant Medicare cost-cutting efforts over the past 8 years. Yet, LTOT remains a bargain and has established efficacy even when one considers the costs for providing it. LTOT is the lowest-cost alternative and the most effective option for controlling rising health care costs among patients with COPD and those who are hypoxemic because of other medical conditions.

Medicare Cost-Reduction Strategies

Even though LTOT is the only option for addressing hypoxemia in these patients, the total capital outlay continues to attract attention from political forces.⁹ Across the board, mandated cuts during the late 1990s curtailed the outlay of funds for LTOT and placed an increased burden on the provider. Among additional

cost-reducing strategies being considered or under way are competitive-bidding projects in Florida and Texas.

Data suggest that at least part of the overall expenditure may be due to the fact that, at discharge, patients are prescribed oxygen therapy acutely and no periodic follow-up is given to reevaluate ongoing need, and that some prescriptions for oxygen are simply not needed.¹⁰ Thus, Medicare and other providers have increased their review of medical necessity for LTO to ensure that only hypoxemic patients will receive LTOT.

Alternatives

In response to the ever-increasing documentation burden, especially from Medicare, many physicians have elected to reject Medicare patients.

Physicians are also pressured by the hospital, insurers, and other forces to continue to reduce the patient's length of stay. The resulting accelerated discharge may be directed to another health care delivery entity or to the home and the durable medical equipment provider. Typically, the patient will continue treatment with antibiotics, corticosteroids, bronchial hygiene, airway management techniques, and oxygen. This cost shifting raises serious questions as to quality of care. Guidelines have been implemented to discourage readmission within a specified time period following discharge and to discourage premature discharges.

The supplier of LTOT is required to follow strict Medicare guidelines. Business costs are focused in the areas of prescription compliance, patient compliance, Medicare and other third-party compliance, precertification procurement, patient and family education, acquisition and delivery of oxygen and oxygen delivery devices, employee costs, regulatory costs, performance improvement activities, credentialing, capital asset management, repairs, and insurance. Suppliers are requested to service the indigent population. The documentation process is time-consuming and costly. Further, suppliers are facing decreasing revenues for services provided and are therefore seeking newer, more efficient means for delivering oxygen and remaining solvent. Because patients should remain active, efficient technologies have been developed to create lightweight portable oxygen systems.

Most patients are supplied with oxygen concentrators as the least expensive alternative, as Medicare reimburses at a fixed rate based on prescription and is "modality neutral." Concentrators deliver one to six liters per minute of >90% oxygen. These devices are more dependable and have improved filtration systems, hour meters, oxygen sensing, optimized warning systems for concentrator malfunction, and remote surveillance of the concentrator by telephone, reducing the necessity for frequent home visits—the most costly component of LTOT.

To address the need for ambulatory oxygen, innovation provided one solution through transfilling oxygen concentrators.¹¹ These systems can transfill small, lightweight cylinders while the patient is using the stationary system. The transfilling time varies depending on patient flow rate usage or size of the reservoir. These systems have demonstrated safety, efficacy, and reliability.

Liquid oxygen is another option for stationary and portable LTOT. The greatest advantages are the ability to store large oxygen volumes in small containers and the ability to transfill oxygen reservoirs to portable units. The most highly portable ambulatory units are liquid combined with an oxygen-conserving device. Major disadvantages are costs and the fact that deliveries to the home are still required.

Compressed gas oxygen finds its greatest use combined with other systems. It is common for patients to receive a concentrator for stationary oxygen with E cylinders for emergency backup and portable use. E cylinders are inexpensive, but heavy at 20 pounds. If the patient is very active, smaller 4.5-pound systems utilizing an oxygen-conserving device are excellent options. With the advent of concentrators that refill gas cylinders, the frequency of home visits by suppliers is drastically reduced.

Cost-Benefit Relationship

LTOT should be administered only to those who actually meet established criteria and who will use oxygen as prescribed. Compliance with LTOT is paramount if the true cost-benefit relationship is to be realized.

Further, patients prescribed oxygen during an exacerbation should be reevaluated in the next 30 to 90 days for continuing need.^{12,13}

The physician should periodically recheck arterial blood gas (ABG) results to assure appropriate settings. On the other hand, some are concerned that the increased monitoring of ABGs will impede the patient's ability to secure needed oxygen in a timely manner and that the documentation costs will offset any potential savings while further eroding marginal returns for suppliers.

Innovation holds one service key that is affordable yet supports an active living style. The number of home visits per month can be decreased using oxygen concentrators if the supplier uses newer monitoring features. However, most concentrators do not allow for ambulation beyond the 50-foot length of the supply tubing. Other portable devices can be used; however, if multiple deliveries of compressed or liquid oxygen are required, the cost accelerates.

Transfiling oxygen concentrators and oxygen-conserving technologies can address both stationary and ambulatory oxygen delivery.¹⁴ Efficient liquid oxygen systems have been engineered with less oxygen bleed-off and an oxygen-conserving device. This extends the time period between home visits by suppliers.

Portable oxygen concentrators have recently been introduced.¹⁴ However, their weight is still somewhat "heavy" and the initial cost remains high. It is likely that future innovations will improve efficiency of portable concentrators while allowing for further reductions in size and weight.

A challenge remains to find the best delivery method with a minimum of oxygen waste.¹⁵ Conserving cannulas and electronic devices pioneered the way.¹⁶⁻¹⁹ Oxygen-conserving devices that sense activity and adjust oxygen flow to the patient between rest and activity are now available. Future technologies will sense patient's blood oxygen levels and self-adjust oxygen delivery accordingly. Other devices will monitor patient compliance with oxygen to assure appropriate utilization.

Summary

LTOT is an important therapy for hypoxemic patients. Its efficacy is well established and irrefutable, and there is no substitute. Technology that not only improves therapeutic benefit but reduces the cost of this expensive therapy is becoming available. Manufacturers and suppliers must continue to seek improvements in oxygen delivery that promote access, enhance quality of care, and ensure high levels of compliance. Technology that reduces the frequency of home visits can significantly lower overall cost to the supplier and the payor. However, the initial cost must be taken into account. Further, reductions in overall cost may be realized through quality oxygen management and periodic reevaluations for supplemental oxygen need. Requirements for oxygen prescription should be continually reviewed in light of present knowledge, and physician/supplier documentation reevaluated to improve efficiency and justify need. Lastly, there exists a minimal reimbursement structure whereby survival of the supplier must be assured. Economies of scale will play a pivotal role with respect to purchasing and servicing patients within predefined geographies.

Rick Carter, PhD, MBA, is professor and chair of the Jiann-Ping Hsu School of Public Health, Georgia Southern University, Statesboro. Brian Tjep, MD, is director of the Respiratory Disease Management Institute, Pomona, Calif.