Preventing rehospitalization in the chronic obstructive pulmonary disease (COPD) population has been the focus of many clinical studies and academic papers (Bahadori & FitzGerald, 2007; Garcia-Aymerich et al., 2003; Lau, Yam, & Poon, 2001; McGhan et al., 2007; Sharma, Kuo, Freeman, Zhang, & Goodwin, 2010; Wang & Bourbeau, 2005). However, it took the landmark study by Jencks, Williams, and Coleman (2009) along with what followed; the Medicare 30-day hospital readmissions initiative contained in H.R. 3590: the Patient Protections and Affordable Care Act (Public Law 111–148, Section 3025) for our collective attention to be drawn to this problem. Beginning on October 1, 2015 Medicare reimbursement will be reduced to acute care institutions whose rates for COPD readmission exceed a predetermined threshold (Stone & Hoffman, 2010). Threatened by the 

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Oxygen and Outcomes

Although many medications are used in the treatment of COPD, including agents targeting lung and cardiac function, only oxygen has been shown to reduce mortality in this population (Nocturnal Oxygen Therapy Trial Group, 1980; Report of the Medical Research Council Working Party, 1981). Furthermore, simple nasal oxygen therapy combined with regular ambulation reduces both morbidity and mortality. Petty and Bliss (2000) identify that clinically stable COPD patients who are moderately active and who use oxygen for at least 18 hours per day have a survival rate that is close to 3 times greater than matched patients that only use oxygen during sleep and are minimally active. Even more impressive was their finding that patients who combined oxygen with regular ambulation experienced fewer days of hospitalization per year compared to others who used less oxygen or had lower activity levels.

Ironically, despite the irrefutable benefits of oxygen therapy, compliance rates run dismally low. The average compliance with oxygen as prescribed is only 40%–50% (Peckham, McGibbon, Tonkinson, Plimbley, & Pantin, 1998; Pépin, Barjhoux, Deschaux, & Brambilla, 1996). Multiple factors may play a role in influencing such poor compliance. Unlike typical medications, receiving oxygen therapy is not as simple as swallowing a pill. Patients must contend with relatively large electronic devices that limit their range of mobility while at home. Because a large percentage of patients are on a fixed income and have multiple competing medical expenses, many ration their oxygen use on the basis of a desire to limit the cost of operation—even though newer technologies reduce electrical consumption. Outside home, patients must carry their oxygen source and often are self-conscious of the attention drawn by the equipment, cannula, or the intermittent noise that accompanies some forms of oxygen delivery. Additionally, older technologies may require the patient to limit their activities and the time they spend away from home on the basis of the amount of portable oxygen that has been provided to them. Ongoing training and repeated reinforcement are essential to overcoming these obstacles and to reducing the exacerbations associated with COPD.
These newer oxygen systems are much smaller, lighter, and less obtrusive than those that have traditionally been furnished and they possess the ability to provide patients with an unlimited supply of portable oxygen.

**Technology**

Within the past decade new technologies have emerged that improve how LTOT is provided and may promote more frequent oxygen supported ambulation. What these technologies have in common and what makes them superior to previous home oxygen systems are the design features that make them more compatible with patients’ lifestyles. These newer oxygen systems are much smaller, lighter, and less obtrusive than those that have traditionally been furnished and they possess the ability to provide patients with an unlimited supply of portable oxygen. Moreover, doing away with portable cylinder deliveries eliminates the need for the patient to remain at home waiting for those deliveries. These technologies, collectively referred to as oxygen-generating portable equipment (OGPE), include patient operated cylinder transfilling systems and both portable and transportable oxygen concentrators. Cylinder transfilling systems let patients fill their own portable oxygen cylinders from oxygen generated by an oxygen concentrator. Portable oxygen concentrators are smaller, lighter versions of the larger stationary models typically seen at home; however, they differ in that they administer oxygen on an intermittent, pulse-dose fashion, instead of providing a continuous flow of oxygen. Transportable oxygen concentrators are new hybrid devices that are slightly larger than their portable cousins, but they are capable of providing oxygen on a continuous flow basis and they offer a degree of portability that the larger traditional stationary concentrators cannot.

Given the clinical advantages afforded by these newer technologies, it would seem reasonable to assume that they are used by all DME providers. Unfortunately, that is not the case. The reasons why some DME providers are reluctant to transition to these technologies are often financially based. OGPE is more costly to purchase compared to traditional oxygen systems, yet Medicare reimbursement is only slightly higher than that for the traditional stationary oxygen concentrator and delivered portable cylinders. Also, many DME providers have made very significant investments in an inventory that supports the traditional model and they are reluctant to change. These issues are further compounded by the new Medicare cap on payments for home oxygen (payments limited to 36 of 60 months) and an anticipated 30%-40% payment reduction resulting from a Centers for Medicare and Medicaid Services program that requires DME providers to bid for the right to service Medicare beneficiaries (National Competitive Bidding). Despite the financial obstacles that caused some DME providers to shun OGPE technologies many others have embraced it out of recognition that their delivery costs can be reduced as well as an altruistic desire to benefit their patients.

**Challenges of Training COPD Patients**

COPD patients, particularly in the later stages of their disease, are often especially hard to train. The prolonged and persistent hypoxia they have experienced over the slow, steady deterioration of their lung function reduces cognitive performance, making even the simplest training a challenge. In a recent study matching both the age and education of 1,202 COPD patients with 302 control subjects, the risk of cognitive impairment was inversely related to oxygen saturation and risk was highest when the saturation was less than 88% (Thakur et. al., 2010). This confirms the findings of an older study that used pulmonary function results (instead of oxygen saturation) to classify the severity of disease (Grant et. al., 1987). That study found that deficits in memory were directly related to the severity of disease. In fact, the most severe patients, those with the most frequent rates of hospitalization, demonstrated neuropsychological performance deficits as high as 61% compared to the control group. Obviously, where chronic hypoxemia is present, supplemental oxygen should be utilized. Unfortunately, the initial administration of oxygen has no immediate impact on cognitive performance (Hung, Winsivsky, Siu, & Ross, 2009; Wilson, Kaplan, Timms, & Dawson, 1985). Although research on the subject is limited the data that exist suggests that in COPD patients a minimum of 6 months of oxygen therapy for at least 18 hours per day is necessary before they demonstrate improvement in neurocognitive performance (Heaton, Grant, McSweeney, Adams, & Petty, 1983).

**Patient Education and DME Providers**

Favorable readmission outcomes can be achieved through patient education and sustained reinforcement. Clearly, patient education and training needs to start in the hospital; however, training cannot
Favorable readmission outcomes can be achieved through patient education and sustained reinforcement. Clearly, patient education and training needs to start in the hospital; however, training cannot stop there. To be successful in reducing readmissions, training needs to be continued and reinforced at home. In fact, home may be the best location for training, because it presents with countless opportunities to address real-life scenarios.

stop there. To be successful in reducing readmissions, training needs to be continued and reinforced at home. In fact, home may be the best location for training, because it presents with countless opportunities to address real-life scenarios. It seems reasonable to assume that a patient who has been discharged from the hospital is clinically more stable and home may be better suited, both from a physical and emotional perspective, for effective training.

DME providers that offer clinical services employ licensed respiratory therapists or other licensed clinicians to provide patient education; however, not all DME providers do this. Under the Medicare benefit DME companies are not recognized or paid for providing any form of professional clinical services—including patient education. However, the costs of employing these more expensive personnel had historically been offset by the reimbursement provided for the oxygen equipment. Unfortunately, a growing number of providers are considering or already have either reduced or eliminated their clinical staff in response to the considerable cuts in Medicare reimbursement that have taken place. This may not bode well for hospitals looking to reduce COPD patient readmissions. For hospitals to be successful in this effort they need to communicate their expectations to their DME suppliers, including the need for continuing educational support. They also need to evaluate their DME providers to ensure that they are capable of providing the educational services and any other support needed to achieve favorable patient outcomes. As the front line troops in the effort to reduce readmission rates case managers need to vet the DME providers to ensure they have the resources and dedication to support those efforts.

Case managers are responsible for the majority of referrals that DME providers receive. These providers realize that current and future business is largely dependent on meeting the expectations and requirements that their referral sources set. By asking questions and focusing discussion on clinical services and expectations, case managers can send a powerful message to their DME providers: that clinical services and patient education must be preserved, or enhanced.

IDENTIFYING SUPPORTIVE DME PARTNERS

Pressure is mounting throughout the health care system to ensure quality patient outcomes while simultaneously reducing costs. To accommodate these unprecedented changes we must adapt the way oxygen patients are referred to DME providers. As a previous DME provider, it was my experience that the criteria for receiving referrals was often based more on the subjective referral experience and less on the products and services we provided to the patients. Patient referrals can no longer be based on such ambiguous, superficial criteria. In fact, given the recent draconian reductions in oxygen reimbursement one could argue that the only way that DME providers can afford to spend resources to curry favor with their referral sources is through reductions in service, support, or care to the patient. The current market requires true collaboration between case manager and DME provider, with the primary goal of providing quality patient care and service that is measured by improved outcomes and reductions in readmissions. Patient referrals must be predicated on what the DME provider can offer to the patient, not the referral source.

Successfully reducing COPD readmissions requires case managers to align themselves with DME providers that are committed to patient care. The challenge is in seeing past the smoke-and-mirrors to clearly identify the providers who are dedicated to patient care and quality outcomes. This will require a willingness to ask the tough questions, even of those sales reps that are considered a “friend.” You need to find out how potentially responsive the company can be to patient needs—how close is their nearest office, is it located within the local community or several states away? Distance not only is a factor in an emergency, but also plays a role in the understanding of local weather, geography, and other factors that influence not only patient activity but also the appropriate matching of a patient with the best ambulatory oxygen equipment. Does the company offer options for oxygen therapy that includes new technologies, do they offer standardized, comprehensive patient education, are they accredited?

A survey of 413 patients receiving ambulatory oxygen (McCoy, 2004) identified that 72% experienced periods during which their supply of portable
oxygen was not sufficient to meet their activity needs. Yet new technology that affords unlimited ambulatory oxygen is only initially provided 7.5% of the time (Mapel, Robinson, & Lydick, 2008). Clearly, new technology should be made available to the majority of patients for which portable oxygen is prescribed. Probing the DME provider to understand both the types of oxygen equipment they provide and the criteria they use when newer technology is dispensed will shed considerable light on their commitment to patient outcomes. Your DME provider must be your partner and, as such, they need to demonstrate their method for evaluating each patient and how that assessment is used to match the patient with the technology that will promote the best outcome. Who provides the patient training and education and what are their credentials? Does training include written materials? Ask for and review any written material the provider leaves with your patients. For materials to be effective, they must be written in simple lay language and in a font size large enough to be clearly legible to an elderly person. Discharged COPD patients do not always receive the support of a home health nurse or other formal care provider. So the DME provider will often be your eyes and ears in the patient’s home. They should assess the environment for electrical safety, working utilities, and safe clear passageways, and should determine the presence/proximity of a family member or other support system. They should also have an action plan when they encounter deficiencies. Table 1 offers some recommendations for questions that can help identify DME providers that are committed to promoting favorable patient outcomes.

**CONCLUSION**

Traditionally, case managers have been the gatekeepers overseeing, among other things, patient transitions from hospital to home. Successful transition now encompasses a broader definition, one that includes ensuring that patients have the postdischarge resources and support that will enable them to remain at home, free of exacerbation, for at least 30 days. Hospitalized patients are generally sedentary, passive, and dependant, but successfully discharged and supported COPD patients have the potential to transition back into active and independent people. Achieving this transition requires case managers to partner with progressive, patient-centric DME providers that share in that goal.

**REFERENCES**


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**TABLE 1**

Questions for DME Providers

<table>
<thead>
<tr>
<th>Question</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What is the location of the nearest office?</td>
<td></td>
</tr>
<tr>
<td>a. Is the phone answered locally?</td>
<td></td>
</tr>
<tr>
<td>b. Can I visit the office?</td>
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<tr>
<td>2. Is equipment distributed locally or by courier?</td>
<td></td>
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<tr>
<td>a. What happens if there is a malfunction?</td>
<td></td>
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<tr>
<td>b. How quickly can equipment be replaced?</td>
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<tr>
<td>3. Do they routinely provide oxygen-generating portable equipment (OGPE)?</td>
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<tr>
<td>a. What types?</td>
<td></td>
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<tr>
<td>b. What are the criteria for use?</td>
<td></td>
</tr>
<tr>
<td>c. Does it have to be specifically prescribed?</td>
<td></td>
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<tr>
<td>4. Do they have respiratory therapists (RTs) or nurses on staff?</td>
<td></td>
</tr>
<tr>
<td>If yes</td>
<td></td>
</tr>
<tr>
<td>a. How many clinicians work out of the local office?</td>
<td></td>
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<tr>
<td>b. Do they provide clinical services or marketing?</td>
<td></td>
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<tr>
<td>c. If they do not use RTs, who does patient education?</td>
<td></td>
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<tr>
<td>5. What is the process for patient education and who provides it?</td>
<td></td>
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<tr>
<td>6. Do you evaluate the home environment?</td>
<td></td>
</tr>
<tr>
<td>a. What is involved in that process?</td>
<td></td>
</tr>
<tr>
<td>b. What do you do when you find a problem? Give a specific example.</td>
<td></td>
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