

Rehabilitation

A publication from the Kessler Rehabilitation Corporation



Preventing pneumonia in rehabilitation patients

► *Douglas Green, M.D.*

Pneumonia is a potentially life-threatening infection for a rehabilitation patient—and a major setback to rehabilitation itself. The limited activity levels, general illness and neurological muscle weakness that affect many rehabilitation patients all work to compromise respiratory status. Preventing pneumonia in this population is therefore critical.

For rehabilitation patients, the main cause of pneumonia is aspiration of secretions. Many stroke patients, for example, lose or partially lose the ability to swallow, and may also lose sensation and awareness of body functions. These deficits decrease the ability to sense and clear secretions, in turn increasing the fre-

quency of aspiration to the lungs.

Patients with spinal cord injury also have a lessened ability to protect the airway. The problem may be due to swallowing issues or to mechanical weakness of the respiratory musculature, or both. This compromised ability to cough prevents secretions from being expelled from the lung. Individuals with muscular dystrophy are also at increased risk of pneumonia due to their muscle weakness.

Persons with scoliosis can experience respiratory weakness caused by structural abnormalities of the chest wall. These abnormalities can hinder breathing and coughing, heightening the odds of infection.

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Focus on

Rehabilitation

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Asking the right question

► *Bruce M. Gans, M.D.*

I was dumbstruck while reading an article on business decision making in the February 2003 *Harvard Business Review*. Before making any business decision, the author of the piece told readers, executives should first ask themselves, “Is this legal?”

That seemed a sad commentary on an age when every day brings some new revelation of corporate hubris or greed. Company after company—not only in the telecommunications and energy trading industries but in acute care and rehabilitation as well—has demonstrated catastrophic ethical lapses, with leaders enriching themselves at the expense of their businesses, shareholders and corporate reputations.

But from my perspective as a physician, I thought the *HBR* writer began with the wrong question. When we have a decision to make—choosing a therapy, prescribing a drug or partnering with another healthcare provider—the first question we need to ask is not “Is it legal?” but “Is it right?”

The standards we set
in our practices
create the ethical tone
for our entire industry.



Medicine is a unique art and science—and business. The decisions we make affect our patients’ survival, not just their savings. We are given unparalleled access to patients at the most vulnerable moments of their lives. That privilege sets us apart from other professions—and puts us under a profound obligation to the people who put their well-being in our hands. While all businesses should deserve their customers’ trust, those of us in medicine must meet an even higher standard.

We are also beset by a constant stream of ethical temptations, opportunities to shrug off what’s right for patients and line our own pockets or those of our organizations instead.

How many times is financial gain dangled in front of us to champion a new medication, endorse a new product or send business some new provider’s way? How often do even our patients want us to make an end run around ethics, asking us to authorize a medical leave for a work-related injury that evidence doesn’t support? Explosive growth in the number of new drugs, technologies and providers brings not only new possibilities to improve patient care but also more chances to either live up to our ethical obligations or fall down into opportunism and deceit.

As physicians, we are the point where the patient’s needs converge with the healthcare industry—and its staggering array of financial incentives. We are the ethical nexus where principles must either be upheld or ignored. Even if we don’t serve as executives or medical directors of our institutions, we are the ethical leaders of those organizations, charged with ensuring that economic interests—our own or someone else’s—do not become the criteria we use for medical decisions.

The standards we set in our practices create the ethical tone for our entire industry. Our obligation to “first, do no harm” means the decisions we make have as many ethical as clinical implications. Every choice we make must pass the “Is it right?” litmus test. Only by guaranteeing “no harm” in ethical principles can we serve our patients—and preserve the integrity of our profession.

—Bruce M. Gans, M.D., *Editor-in-Chief*

Advanced technology and prosthetics: a perfect fit

► Gus Eppinger, C.P.O., and Stephen T. Fasulo

New technologies in computer-assisted design (CAD) and computer-assisted manufacture (CAM) have opened the way to creating better prosthetic limbs faster and more cost-effectively. For the patient, this means improved comfort, better fit and fewer adjustments.

Until recently, all prostheses were custom-made by hand using plaster of Paris casts, a time-consuming and laborious task that almost always required taking several castings to get the proper fit. Today, prosthetists can use a CAD system to design the prosthesis, then send the digital information to a CAM system to create the finished product. The CAM system constructs the socket—the key component of the prosthesis that must be tailored to each patient’s specifications. The remainder of the device is attached to the socket, creating a prosthetic limb that not only is closer to a perfect fit the first time around, but may also be adjusted more easily if needed.

Taking measurements— with improved accuracy

The system creates below-knee and above-knee sockets in one of two ways. In the first method, the patient is measured by hand. The measurements are entered into the computer and—based on the patient’s size, age, weight and gender and on the size of the residual limb—are then utilized to select one of a dozen generic shapes provided by the

software. These data are then sent to the computerized milling machine, which manufactures the socket.

In the second method, a “T-ring” electronically measures the patient’s

training, which lasts 10 to 14 days. Here they are taught how to walk with the new prosthesis and how to manage its use.



Gus Eppinger uses a T-ring, which digitally records shape measurements used to fabricate a socket for a new limb.

limb. The ring is 20 to 22 inches in diameter and is placed around the patient’s residual limb. Lenses in the ring digitally record an image that can be visualized on the screen. From the digital image, the software then calculates the measurements, which are sent electronically to the milling machine. The T-ring system is faster and more accurate than manual measurement. It also eliminates the need to handle the limb, which can sometimes be painful for the patient.

Once individuals are fitted for the prostheses, they are admitted on an inpatient basis for post-prosthetic

Refittings made with technological ease

Prosthetic limbs can last four to five years, during which time patients should be seen twice a year for monitoring and for any necessary refitting. A general rule is that the limb will shrink somewhat over time. Before the CAD-CAM systems, this required going through the entire process again, including measuring the patient and constructing a new prosthesis. Now new measurements are simply substituted for the data already stored in the software for that patient or the patient is measured again using the T-ring. The data are then sent to the milling machine, and a new socket can be produced in as little as one day.

The new CAD-CAM technologies not only enable prosthetists to be more productive, they also bring a more scientific and accurate approach to the process. This greatly improves patient outcomes by providing a better-fitting prosthesis and patient convenience by reducing the number of refittings needed.

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Fitting a new chapter into a busy life

This clinician summarized the latest knowledge about spinal orthotics for a new textbook edition at a time when her baby daughter wasn't sleeping much—and neither was she.

It's a good thing Ferne R. Pomerantz, M.D., works well under pressure. For the six months she spent writing the chapter on spinal orthotics for the fourth edition of *Rehabilitation Medicine: Principles and Practice*, her life was not exactly leisurely. In addition to her duties as medical director of physical medicine and rehabilitation at Westchester Medical Center and staff physician at Kessler Institute for Rehabilitation, she had to study for her looming 10-year board recertification exam (she passed) and care for her two children, a boy now 8 and a girl now 2 who wasn't sleeping through the night. *Focus on Rehabilitation* wanted to know how she did it all.

FOCUS: What's your secret?

POMERANTZ: I had to grab any second I had free. At work I'd review a summary or write a paragraph, then later I'd cut and paste it all together. Luckily I had a good co-author, physical therapist Eva Durand.

FOCUS: How did you and she divide the work?

POMERANTZ: Over the phone we agreed on what sections we would include, and then who was going to cover which ones. We reviewed each other's literature sources, then each of us went over what the other had written and made suggestions.

FOCUS: This was the book's fourth edition. Wasn't there a previous chapter on spinal orthotics to revise?

POMERANTZ: There was one on



It's not mess; it's multitasking. That's a must, says Ferne R. Pomerantz, M.D., for a full-time physician and mom who is assigned to co-write a textbook chapter.

spinal and upper extremity orthotics combined. But we reviewed everything afresh to put it in the way *we* wanted to. And we chose to highlight practical problems, such as the need for exercise to combat the muscle atrophy that accompanies wearing braces, and hygiene issues associated with the devices. We defined a bit more succinctly what kinds of trauma or instability require the use of orthotics. It's not the most exciting stuff, so you have

to package it in a way that people will remember. Some past works have spent a lot of time on biomechanics of the spine, and the reader can get lost in that.

FOCUS: What has changed in spinal orthotics in recent years?

POMERANTZ: People are more aware of complications caused by the halo, so they're more willing to try simpler braces. And studies now suggest that collars may be removed earlier.

FOCUS: What advice would you give another full-time physician about taking on a textbook chapter?

POMERANTZ: Get all the help you can! My husband scanned diagrams into the computer. My secretary helped in a number of ways. And orthotists, cogent textbook summary of the latest in spinal orthotics literature. Even so I was basically sleep-deprived through this whole time.

► The fourth edition of *Rehabilitation Medicine: Principles and Practice* (ISBN 0-7817-4130-0) will be available in June 2004 from Lippincott Williams & Wilkins for \$179. Look online at lww.com or call 1-800-638-3030 for purchasing information. The book is edited by Joel A. DeLisa, M.D., M.S., president and CEO of the Kessler Medical Rehabilitation Research and Education Corporation; Bruce M. Gans, M.D., executive vice president and chief medical officer of Kessler Rehabilitation Corporation; and Nicolas E. Walsh, M.D., professor and chair of the department of rehabilitation medicine at the University of Texas, San Antonio.

Easing shoulder pain for individuals with spinal cord injury

► Trevor A. Dyson-Hudson, M.D.

One of the most common problems in people with spinal cord injury (SCI) is shoulder pain. It can be a serious complication for wheelchair-bound patients, who rely almost exclusively on their arms to perform all their daily mobility activities. However, effective intervention can help ease much of patients' pain—and perhaps even prevent it.

Overuse injuries related to the shoulder complex, especially the rotator cuff, are the most common cause of pain, because individuals with SCI constantly use their arms for manual wheelchair propulsion, transfers and other weight-bearing activities. Surgery is generally not recommended for shoulder pain in this population for fear that prolonged arm inactivity may lead to further functional decline. As a result, conservative treatments are preferred.

Determining treatments

Treatment goals are to restore and maintain the health of the rotator cuff by rest, to control pain and inflammation and to optimize function. Unfortunately, rest may not be practical for these individuals because of their great dependence on their arms. However, steps can be taken to limit overuse. They include using a sliding board to transfer, avoiding prolonged wheeling and switching temporarily to a power wheelchair. This last option may be unpopular because of self-image and the inconvenience of bulky power chairs. Push-rim-activated, power-assist wheels or manual-assist wheelchairs are relatively new technologies that provide an alternative to power wheelchairs, but these may not be covered by insurance.

Nonsteroidal anti-inflammatory drugs and steroid injections are commonly used to manage acute shoulder pain. However, they may be less effective in those with chronic shoulder pain, because studies suggest that inflammatory cells may be absent in chronic tendon injuries.



Shoulder pain can threaten mobility for wheelchair-bound SCI patients.

Alternative therapies such as acupuncture and Trager may also prove useful for managing shoulder pain. Trager is a form of manual therapy that uses gentle, rhythmic massage and “movement re-education” to correct movement patterns that can lead to pain. In a study at the Kessler Medical Rehabilitation Research and Education Corporation (KMRREC), 18 patients with SCI and chronic shoulder pain were given either 10 acupuncture treatments or 10 Trager treatments over a five-week period.¹ In both groups, patients reported reduced pain levels compared with pretreatment

baseline levels. Although these results appear promising, no placebo control groups were used. A follow-up, placebo-controlled trial funded by the New Jersey Commission for Spinal Cord Research is now being conducted and will compare acupuncture with placebo-acupuncture.

Setting goals

It is important to optimize function and prevent further injury through rehabilitation. This can be achieved with endurance training, stretching the anterior shoulder muscles and strengthening the posterior shoulder muscles to help stabilize the joint.

Finally, research on factors that contribute to upper limb injuries offers hope for prevention. For example, how do wheelchair fit, setup and seated posture affect a patient's pain? To learn more about some of these issues, a large, multi-center study involving KMRREC, the University of Pittsburgh and the University of Washington is currently under way. With this research, investigators hope to identify—and thus eliminate—movement patterns that cause musculoskeletal shoulder pain for individuals with spinal cord injury.

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It's time to redefine our terms

► *Bruce M. Gans, M.D.*

The rehabilitation community is embroiled in a major disagreement with the Centers for Medicare and Medicaid Services (CMS). The subject of the dispute? How to define an inpatient rehabilitation facility.

It seems an element of the existing definition—the so-called “75 percent rule” requiring that three-fourths of admissions fall within certain diagnostic categories—is no longer adequate. According to that outdated criterion, more than 80 percent of the rehabilitation hospitals and units in the country would have to leave Medicare’s rehabilitation prospective payment system (PPS) and revert to the acute hospital diagnosis-related group (DRG) payment system.

Clearly, the 75 percent rule no longer reflects our true mix of patients—and hospitals need the rehab PPS to support their rehabilitation mission. Destroying patients’ access to rehabilitation is unacceptable.

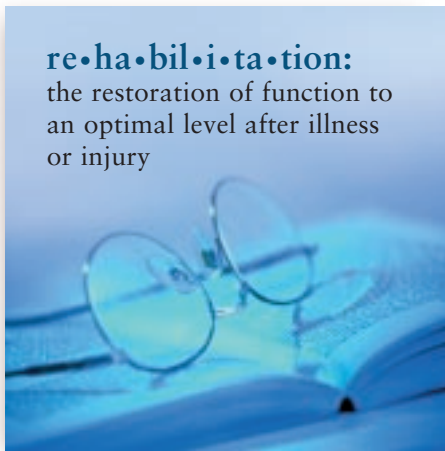
What a definition does

The impact of how rehabilitation facilities are defined, however, goes beyond economics. Without a clear definition, we won’t be able to designate which facilities can train new physiatrists or conduct research. We won’t be able to create benchmarks to measure quality of care. We won’t be able to differentiate our hospital-based facilities from other healthcare settings, which now include acute care hospitals, long-term acute care hospitals, skilled nursing facilities, day hospitals, comprehensive outpatient rehabilitation facilities, outpatient centers and home-based programs. If we cannot define what separates the rehabilitation hospital from the rest of the healthcare spectrum, we won’t be able to organize each setting to provide the best possible care.

The need for a sound definition is linked to other areas that desperately need authoritative criteria and objectivity. Who, for example, should define which type of facility is right for individual patients, especially when some can receive excellent care in a variety of settings? What objective, evidence-based tests can match patients to specific types of facilities?

re•ha•bil•i•ta•tion:

the restoration of function to an optimal level after illness or injury



Who gets to define “medical necessity” and appropriate utilization of services—a physician who knows the patient and medical history, or a claims agent or fiscal intermediary swayed by economic expediency?

And how do we define the ways different facilities should work together to render care during different stages of treatment and recovery? Risk contracting encouraged parsing patients to appropriate settings within integrated delivery systems, but that incentive has largely disappeared. In its wake, each facility now scrambles to hold onto its “core” business (and customers), with little regard for the continuum of care.

The search for a solution

How do we resolve these conflicts? Medicare could go the distance and define not only rehabilita-

tion facilities but each of the other types of facilities as well, using a common set of criteria and measures that deliberately promote an integrated view of the universe of provider facilities. That effort—and it would be a major one—might at least give us some basis for deciding which setting is right for each patient.

Or we could take a different approach: Instead of defining facilities, let’s define appropriate care for specific patient populations—such as joint replacement patients—and make it price-neutral from the payers’ point of view. If patients receive the right care, why should it matter to Medicare if that care is rendered in a rehabilitation hospital, a skilled nursing facility or even at home? Let Medicare pay one price for a carefully specified program, then the marketplace—the physicians and providers in a community—can decide which is right for each patient.

And, instead of trying to fit evolving care settings into rigid definitions, let us focus our efforts on creating an evidence-based methodology to define medical necessity and medically appropriate care—the real definitions we need. Let us do the research to define the most effective treatments and therapies and create measures to test those definitions. Then we will be able to identify the right care, which might cross the boundaries of different care settings.

While reimbursement is certainly at stake, this is not an economic issue. As a specialty, we need to make sure that patients get the care they need—the right care, no matter how you define the place where it’s delivered.

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Preventing pneumonia in rehabilitation patients continued from page 1

Guillain-Barré syndrome patients have varying degrees of risk, due to chest wall or pharyngeal muscle weakness.

For all rehabilitation patients, maintaining sufficient activity is a key to preventing pneumonia. Rehabilitation activities can help to stretch the lungs, increase tidal volume and surfactant levels in the lungs and decrease the amount of time the patient is supine.

Patients with more complex conditions—including respiratory failure, spinal cord injury or neuromuscular disease—may require artificial coughing machines to help clear secretions. These devices first apply positive pressure to give the patient a deep breath, then shift rapidly to negative pressure to create a high expiratory flow, simulating a normal cough.

Mechanical ventilation (both positive and negative pressure) may also help to keep the patient's lungs clear and increase lung volume. Some rehabilitation patients therefore may be placed on a ventilator overnight to reduce atelectasis and clear the lungs. Although there is a great deal of literature on the risk of infection for intensive care patients on mechanical ventilation, much of this risk is related to their profound general illness. Because rehabilitation patients are less ill than acute care patients and less prone to nosocomial infections, the benefits of mechanical ventilation often outweigh the risks of infection in this setting.

A shot for protection

Immunizations against influenza and the pneumococcus bacteria are also key tools in the prevention effort. Flu is highly contagious, and

secondary bacterial pneumonia is a potential complication that can be life-threatening, particularly in this population. In recent years, public health experts have called for broader employment of flu vaccinations, advising their use in those

Asthma and emphysema are even more obvious impediments and increase muscle weakness. Underlying symptoms need to be treated aggressively in these patients.

Take-home lessons

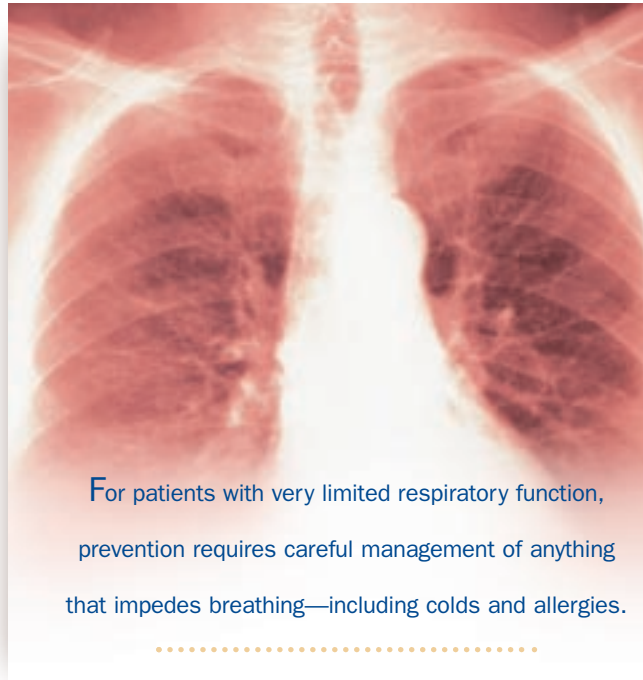
Educating family members, caregivers and patients about preventive measures is crucial. Clinicians should emphasize the importance of continuing to be active after returning home; the more patients do, the greater their level of protection. Caregivers, patients and family members are also strongly urged to wash their hands frequently to prevent the spread of infection.

When discharged patients are given an artificial coughing machine to use at home, education must also include the correct use of this device. The mechanics of the machine

are fairly straightforward, but each patient will be different in terms of when and how often to employ it. Training therefore requires familiarity with the particular patient's needs and experience. For patients who are unable to use the device themselves, the caregiver receives this training.

Preventing pneumonia in rehabilitation facilities is critical. Physicians who treat this population must maintain a high level of awareness for all at-risk patients. With vigilance and effective prevention techniques, however, we can significantly reduce the incidence of pneumonia in this vulnerable population.

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For patients with very limited respiratory function, prevention requires careful management of anything that impedes breathing—including colds and allergies.

who come into close contact with high-risk patients as well as in the patients themselves. Annual flu shots should be administered between October and February to all patients in institutions and to those outpatients at high risk for pneumonia.

Because the pneumococcus bacteria accounts for 20 percent to 30 percent of all pneumonia cases, pneumococcal immunizations are important for all at-risk patients. They should be administered twice per lifetime, once before age 65 and once after that age.

For patients with very limited respiratory function, prevention strategies require careful management of any condition that can impede breathing—including colds and allergies. Symptoms and underlying causes of these ailments should be treated to ease breathing.

Beyond rehabilitation: crucial care for medically complex patients

► *Craig N. Eichner, M.D.*

In these times of HMOs and DRGs, hospital patients are discharged “sicker and quicker.”

As a result, rehabilitation hospitals admit patients with increasingly complex medical conditions. Additionally, many rehabilitation patients are elderly and have multiple conditions, such as gastrointestinal bleeding or heart, kidney or liver failure. For this sicker patient population, the transition from acute care to inpatient rehabilitation is particularly beneficial. Rehabilitation inpatients not only receive the therapy they need to gain strength and function but also have access to a skilled nursing staff on hand around the clock to identify problems and a staff of physicians who can provide the necessary care.

Stumbling blocks after discharge from acute care

Hip-replacement patients, for example, are typically discharged from acute care in three days. Some will have neurogenic bladder or paralytic ileus, requiring treatment when they leave the hospital. Stroke patients frequently need further adjustment of their anticoagulant therapy, and the rehabilitation hospital laboratory can perform the

needed blood-level testing and other lab services.

Patients recovering from coronary artery bypass graft (CABG) and other post-surgery patients in rehabilitation also tend to have complex medical conditions. CABG patients may be admitted with pleural effusions. Although this is not terribly dangerous, it does require

Stroke, joint replacement and bypass surgery—
which account for many rehabilitation patients—
can all exacerbate existing medical problems.

X-ray examination and a course of diuretic or anti-inflammatory drug therapy. In addition, the CABG patient routinely presents with hypotension and syncope, which require treatment.

New medical developments such as arrhythmia are also not uncommon in CABG patients in the rehabilitation setting. In addition, post-surgery patients are at increased risk for acute kidney failure. Individuals with joint replacement and other post-op patients may also require treatment for poor nutritional status due to diminished appetite and vomiting.

When the need is more than medical

Aside from requiring medical care beyond their hospital stays, many rehabilitation patients are unable to return home immediately. Those with knee or hip replacements, spinal cord injury or stroke can use their rehab hospital time to work with family members, social services and others to arrange the care they will need at home or make any necessary changes at home such as adding access ramps or railings.

Medical care for individuals with these and other complex conditions continues after discharge and during outpatient treatment. Here the therapist serves as a point person who can report any medical problems to the attending physician.

Stroke, joint replacement and bypass surgery—which account for many rehabilitation patients—can all exacerbate existing medical problems. Rehabilitation care not only helps to restore function and strength to these patients; it also provides them with crucial care for complex medical conditions.

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