REHABILITATION
QUARTERLY
AN EDUCATIONAL JOURNAL OF
BAYLOR INSTITUTE FOR REHABILITATION

VOL. 3, NO. 4, WINTER 2017
BaylorHealth.edu/Rehab

NEONATAL THERAPY

Endoscopic Procedure Facilitates Assessment of Feeding Challenges in Infants in the NICU

Feeding disorders prevent infants from getting the nutrition they need to survive and grow, causing distress for babies and parents alike. Newborns may develop feeding disorders due to prematurity, feeding aversion or aspiration. Limitations with traditional assessment techniques such as modified barium swallow (MBS) can complicate the diagnostic process and create barriers to effective evaluation of feeding problems.

In 2014, the neonatal therapy team comprised of speech pathologists and occupational therapists at the Blanche Schwartz Lange Neonatal Intensive Care Unit (Lange Unit) at Baylor University Medical Center at Dallas completed its first research study of fiberoptic endoscopic evaluation of swallowing (FEES) in the NICU population. The study has been accepted for publication by the *Journal of Perinatology*, and the team's findings have garnered the interest of both national and international clinicians.

First Study to Analyze FEES in Infants in the NICU Exclusively

While numerous studies on FEES have been published, most were conducted in the otolaryngology and speech pathology literature and focused on the adult and older pediatric populations. The Lange Unit was the first institution to conduct a study exclusively following infants in the NICU receiving FEES. The neonatal therapy team created a comprehensive FEES program in the NICU with team members including a neonatal occupational therapist, speech

Fiberoptic endoscopic evaluation of swallowing (FEES) allows clinicians to evaluate a baby's feeding function during a 20- to 30-minute feeding.

BAYLOR Institute for Rehabilitation
Part of Baylor Scott & White Health

(*cover story continued*)

pathologist, neonatologist and registered nurse.

Investigators followed 25 infants who were 37 weeks gestational age and older identified by neonatologists and the neonatal therapy team as having signs and symptoms of aspiration. Infants were randomized to receive both FEES and the MBS exam, a radiological study where the infant swallows a barium-based solution and undergoes radiation to evaluate the swallow function.

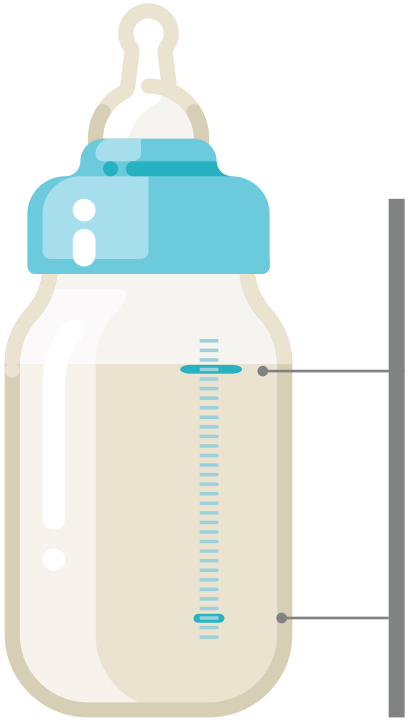
Investigators reported no adverse events or autonomic instability during the FEES study. Based on these findings, the Lange Unit neonatal therapy team believes the exam is a safe diagnostic tool to evaluate neonatal feeding and determine a plan for bottle feeding and breastfeeding.

FEES Offers Many Advantages to Current Gold Standard

Currently, the MBS remains the gold standard in evaluating a baby's ability to feed. MBS requires preparation of barium contrast to visualize swallowing function of the infant and determine whether the infant is aspirating into the lungs during swallowing. FEES involves placement of an endoscope into the nares just above the vocal cords, enabling clinicians to observe the infant's swallowing function.

FEES offers several major advantages to MBS, starting with a more natural feeding environment for the infant. Clinicians can conduct the study at bedside, which increases clinician-patient contact time and eliminates the need to transport an infant to radiology. The FEES examination is much less expensive than the MBS due to the elimination of a radiologist's fee and exam room hospital fees.

Unlike MBS, which allots a 3-minute maximum window to evaluate swallowing due to limitations with radiation exposure, clinicians can observe the entire duration of a 20- to 30-minute feeding with FEES. The FEES procedure also can assess both breastfeeding and bottle feeding, while MBS can only assess bottle feeding. The radiographic contrast utilized during MBS also complicates accurate elucidation of the infant feeding process. Clinicians must make assumptions or correct for the baby's swallowing ability due to the difference between the viscosity of breast milk and/or formula and the barium used in the study.



COMPARISON:
FEES VS. MBS

FEES: Clinicians can observe the entire duration of a 20- to 30-minute feeding.

MBS: Test offers a 3-minute maximum window to evaluate swallowing.

"Breast milk is closer to the viscosity of water, and barium is more viscous, so we know we're not comparing apples to apples, with FEES, you can assess the actual diet and bottle used at home to determine if it is safe to swallow—breast milk, formula or whatever the doctor has ordered for their diet."

—Jenny Reynolds, MS, CCC-SLP, CLC

"Breast milk is closer to the viscosity of water, and barium is more viscous, so we know we're not comparing apples to apples," says Jenny Reynolds, MS, CCC-SLP, CLC, Clinical Manager at the Infant Feeding Diagnostic Center at Baylor University Medical Center. "With FEES, you can assess the actual diet and bottle used at home to determine if it is safe to swallow—breast milk, formula or whatever the doctor has ordered for their diet."

Coordination of Sucking, Swallowing and Breathing Critical for Preterm Infant Survival

The ability to feed safely remains one of the most critical elements to ensuring the survival of infants in the NICU, and proper feeding is one of the final steps required before preterm infants become eligible for discharge. Because reflexes, motor skills and coordination that facilitate proper feeding in infants normally develop closer to term, around 36 to 38 weeks' gestation, infants born preterm

PHOTO CREDIT

face an increased risk for dysphagia, apnea and aspiration—all of which decrease their risk for survival. If an infant has poor coordination of swallowing and breathing, there can be autonomic instability in the infant, including decreased heart rate or decreased oxygen saturation levels.

"Learning to coordinate sucking, swallowing and breathing is one of the hardest things to do for an infant—especially because the process involves multiple muscles and coordination. For preterm infants, feeding can be like running a marathon," Reynolds says.

"This FEES study can help us identify feeding problems before the infant's discharge from the NICU and find the safest and most effective feeding plan for the infant and parent."

Looking Forward

The neonatal therapy team at Baylor University Medical Center will open a still-unnamed first-of-its-kind infant feeding diagnostic center in July 2017, funded by a grant from the Baylor Health Care System Foundation and the Baylor University Medical Center administration.

In addition to offering diagnostic studies, the center will provide an array of supportive services, including lactation services, a rapid referral program, parent education and support classes centered around feeding. It will also serve as a training ground for clinicians on FEES and feeding. The center will empower and mentor clinicians who are seeking to replicate similar services at their respective institutions.

In the end, the research serves one goal, Reynolds says.

"We want to promote a positive and safe experience, and we want the moms to be confident in feeding their baby." ■

PHOTO CREDIT

Jenny Reynolds, MS, CCC-SLP, CLC, is Clinical Manager at the Infant Feeding Diagnostic Center at Baylor University Medical Center. She can be reached at ▸ **Jenny.Reynolds@BSWHealth.org.**

A MESSAGE FROM

The Medical Director

Amy J. Wilson, MD
Medical Director, Baylor Institute for Rehabilitation
Chief, Department of Physical Medicine and Rehabilitation, Baylor University Medical Center

The Power of Philanthropy

Certain words come to mind when one thinks about philanthropy: generosity, humanitarianism, altruism, charity, benevolence. Philanthropy may be as small as a dollar bill tossed into the red kettle during the holidays, an hour serving the hungry in a soup kitchen or financial gifts in amounts unfathomable to most. Philanthropy is a crucial foundation for many areas, including healthcare.

I feel very fortunate to showcase important rehabilitation stories in this publication. We may highlight a patient's remarkable recovery from a terrible injury or a novel treatment that can change outcomes for the better. Often what does not come to the surface is that philanthropy has contributed in some way, "behind the scenes," to help our patients achieve goals and to bring new treatments forward.

In this edition of *Rehabilitation Quarterly*, we feature two stories in which philanthropy has played a vital role in turning ideas into action and treatments into reality. Our cover story is about the potential for using a well-known swallowing assessment tool (fiberoptic endoscopic evaluation of swallowing, or FEES) on some of the most fragile patients in the hospital setting—newborns. A small pilot study showing bright promise for the use of FEES in infants caught the attention of a local philanthropist looking for a way to give back in the neonatal intensive care unit. This generous gift resulted in the opening of a one-of-a-kind assessment center, the Infant Feeding Diagnostic Center at Baylor University Medical Center.

In a story on page 5, we talk about the promise of the bioimpedance diagnostic device to assess early limb changes associated with lymphedema after breast cancer surgery. This device is available thanks to the generous fundraising of Baylor Health Care System's Celebrating Women campaign, with funds going directly to advance breast cancer treatments and improve the lives of those living with breast cancer.

Donations of all sizes from grateful patients and families, as well as community visionaries and leaders, have helped us with transformational care. Their efforts to show gratitude, make an impact, find meaning or create a legacy enable our clinicians to reach even farther for our patients.

Amy J. Wilson MD

Dr. Wilson can be reached at:
▸ **Amy.Wilson@BSWHealth.org** ▸ **AMWilson@BIR-rehab.com**

Speech therapist Brad Smith, MS, CCC-SLP, CLT, sometimes sees a reduction in swelling in his lymphedema patients in a single session.

Internationally Renowned Speech Pathologist Joins BIR

Head and neck lymphedema (HNL) expert Brad Smith, MS, CCC-SLP, CLT, recently joined Baylor Institute for Rehabilitation as an Advanced Clinical Specialist, Speech Pathologist and Certified Lymphedema Therapist. The North Texas native has spent the last 12 and a half years of his nearly 30-year career at MD Anderson Cancer Center (MDACC), where he helped the world-renowned institution develop a program to rehabilitate head and neck cancer patients with lymphedema.

"Lymphedema treatment is one of the most exciting things I have ever done in my career, since the swollen tissues often reduce in size and firmness in a single session. This rapid response is very motivating for the patient and for me as the therapist," Smith says. "It also allows me to help make a tremendous difference in the lives of my patients, because head and neck lymphedema can adversely affect vision, speech, respiration and swallowing, and can cause facial disfigurement."

Brad Smith, MS, CCC-SLP, CLT

Although there are more than 180,000 speech pathologists in the U.S., only about 150 have received specialized training in the performance of manual lymph drainage treatment, and fewer than 30 have completed the full certification training to become a certified lymphedema therapist (CLT). In 2006, Smith was one of the first speech pathologists in the U.S. to become a CLT. Most lymphedema therapists are physical, occupational or massage therapists.

"Management of head and neck lymphedema was not a priority until recent years, but thankfully, more patients are now being referred for treatment," Smith says. In 2014, he co-authored the largest study exploring lymphedema outcomes in head and neck cancer to date. He found that HNL presents and responds to treatment differently than lymphedema elsewhere in the body.

Smith, who is a cancer survivor, has served on the faculty at the Norton School of Lymphatic Therapy since 2009, teaching an average of five classes per year in the U.S. He has also trained certified lymphedema therapists in South America, Asia and Europe.

Under Smith's tutelage, the program at MDACC distinguished itself by being the first to exclusively utilize speech pathologists who were certified lymphedema therapists to administer treatment for HNL.

At Baylor Institute for Rehabilitation, Smith is training clinicians on management of head and neck lymphedema, as well as tracheoesophageal voice restoration after total laryngectomy and the general rehabilitation of communication and swallowing disorders for patients who have had head and neck cancer.

He plans to help Baylor Institute for Rehabilitation expand current practices and offer a more complex suite of speech pathology services to head and neck cancer patients in North Texas, neighboring states and beyond.

"I see tremendous opportunities ahead and look forward to working with the teams here to achieve great things to benefit our patients," he says. ■

New Tool Detects Lymphedema Before It Presents in Breast Cancer Patients

Experts predicted about 250,000 new breast cancer diagnoses in 2016. Of these cases, some—the literature varies on how many—will develop lymphedema. This condition, marked by swelling, pain and even disfigurement, can happen soon after treatment or years later.

Lymphedema remains one of the most common comorbidities in breast cancer patients, and a prompt diagnosis is crucial to improving outcomes while containing costs. Baylor Charles A. Sammons Cancer Center has taken proactive measures to establish a program that significantly improves patients' quality of life by facilitating the ability to diagnose subclinical unilateral lymphedema.

For women who have had lymph nodes removed or radiation, the greatest risk for lymphedema is during the first three years after treatment begins.

By employing the use of a bioimpedance diagnostic device, the ImpediMed L-Dex U400, clinicians at Baylor Institute for Rehabilitation will now be able to detect lymphedema as early as six months before volume measurements present in patients with stage 0 and stage 1 lymphedema.

Diagnosing lymphedema earlier means it's much easier to treat and possibly reverse, says Bonnie Lucio, PT, GCS, CLT. The longer the patient waits, the more difficult it is to treat.

"Bioimpedance is the best method to screen breast cancer patients for lymphedema," Lucio says. "It measures extracellular fluid. When doing traditional tape measurements, the clinician is measuring only limb girth, which does not differentiate between muscle mass and subcutaneous fluid."

The ImpediMed L-Dex U400 is a handheld, portable medical device approved by the FDA for lymphedema screening. The device is highly specific and utilizes a technology that measures extracellular fluid directly by transmitting low-level currents through the bodily fluids.

Baylor Sammons Cancer Center has taken proactive measures to establish a program that significantly improves patients' quality of life by facilitating the ability to diagnose subclinical unilateral lymphedema.

"It is ideal to take pretreatment measurements and quarterly measurements the first three years. The cutoff point is an L-Dex score of more than 10 units above the preoperative baseline, which is considered a diagnosis of subclinical lymphedema. If you do not have a preoperative baseline, then we are looking for an L-Dex ratio of 7.1 percent," Lucio says.

The noninvasive procedure is safe, quick and easy to perform.

While the device can be helpful in diagnosing subclinical secondary lymphedema in earlier stages, it is only useful for diagnosis of unilateral lymphedema. "You need to have a healthy control on the other side of the body you can compare it to," Lucio says.

With this bioimpedance diagnostic device, lymphedema can be detected much earlier.

Despite that limitation, the device can make a major difference for patients with cancer, Lucio says.

"We need to be proactive to diagnose lymphedema early on so we can begin treatment and improve the quality of life for survivors."

Baylor Charles A. Sammons Cancer Center began using the new tool in November 2016. ■

Bonnie Lucio, PT, GCS, CLT, is Therapy Supervisor at Baylor Institute for Rehabilitation. She can be reached at ▸ **Bonnie.Lucio@BSWHealth.org.**

Rehab Staff on Track to Reduce Patient Falls and Improve Safety

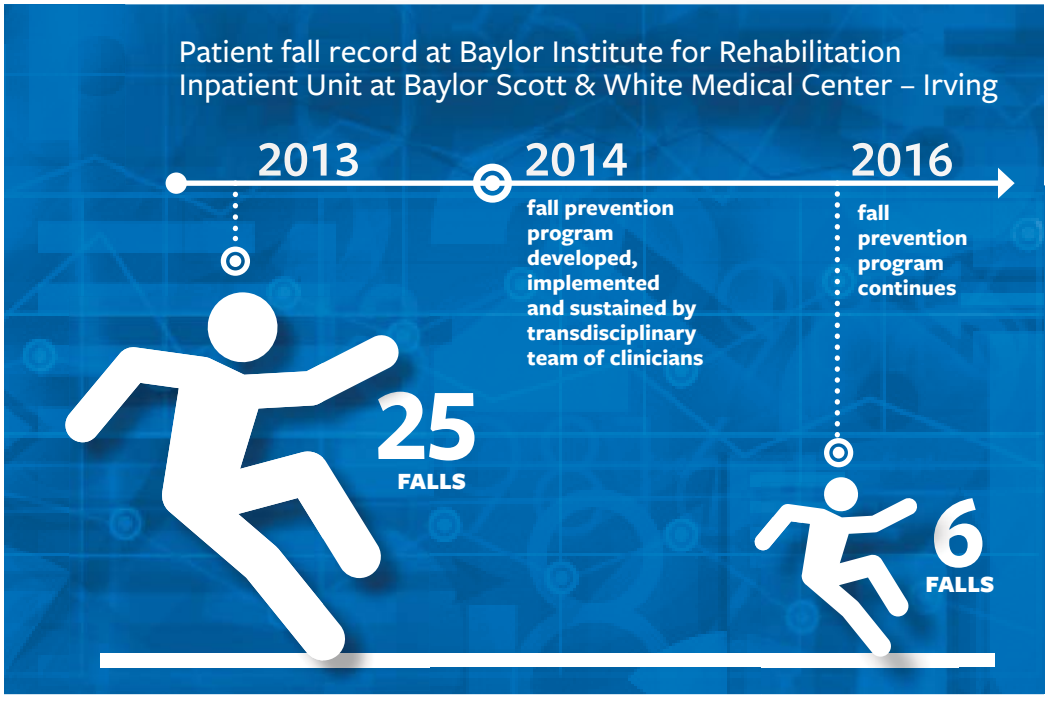
Every year in the U.S., hundreds of thousands of patients fall in hospitals, and 30 to 50 percent of these falls result in injury, according to The Joint Commission. Each one of those injuries costs an average of $14,000 and often increases the patient's length of stay.

Baylor Institute for Rehabilitation's inpatient unit at Baylor Scott & White Medical Center – Irving typically treats a large percentage of patients who are identified as having a high risk for falls, according to the Johns Hopkins Fall Risk Assessment. The majority of patients are geriatric with a variety of neurological and orthopedic diagnoses, including stroke, traumatic brain injury, joint replacements and debility.

In a rehabilitation setting, the goal is to mobilize patients in preparation for safely discharging back to the community. The boost in activity can increase opportunities for falls. "Potentially, rehabilitation patients are at higher risk for falls than any other patients in typical hospital settings," says Laurie Lutz, physical therapist. "The strongest indicator for fall risk is whether the patient has fallen within the last six months."

Risk factors include, but are not limited to, the following: impaired balance, cognitive impairment, polypharmacy, fluctuating blood pressure, incontinence and poor nutrition. Environmental conditions such as slippery surfaces, poor lighting and improper footwear further compound the risk. These factors are in addition to the inherent risk of a geriatric population being treated in an unfamiliar hospital environment.

In 2013, there were 25 patient falls in the inpatient rehab unit. This number was reduced by half in 2014 due to a fall prevention program developed, implemented and sustained by a transdisciplinary team of clinicians. In 2016, they were able to reduce the falls to six. "We had a streak of 152 days without a fall, which is a tremendous accomplishment for a team in a rehab setting," Lutz says.



Parameters for Success

Lutz and Renee Vickers, MS, CCC-SLP, Rehabilitation Therapy Manager, outline five steps they implemented that reduced the incidence of falls significantly among patients.

1) **Communication:** Lutz and Vickers emphasize that improving and maintaining an open line of verbal and written communication among clinical staff, patients and family members has proved perhaps the most important element to reducing falls.

As part of a hospitalwide fall prevention program, Baylor Scott & White Health – Irving placed large ceiling tiles above each patient bed that read, "Call, don't fall," as a reminder for patients to call for assistance before getting out of bed. In addition, the team holds biweekly huddles to devise

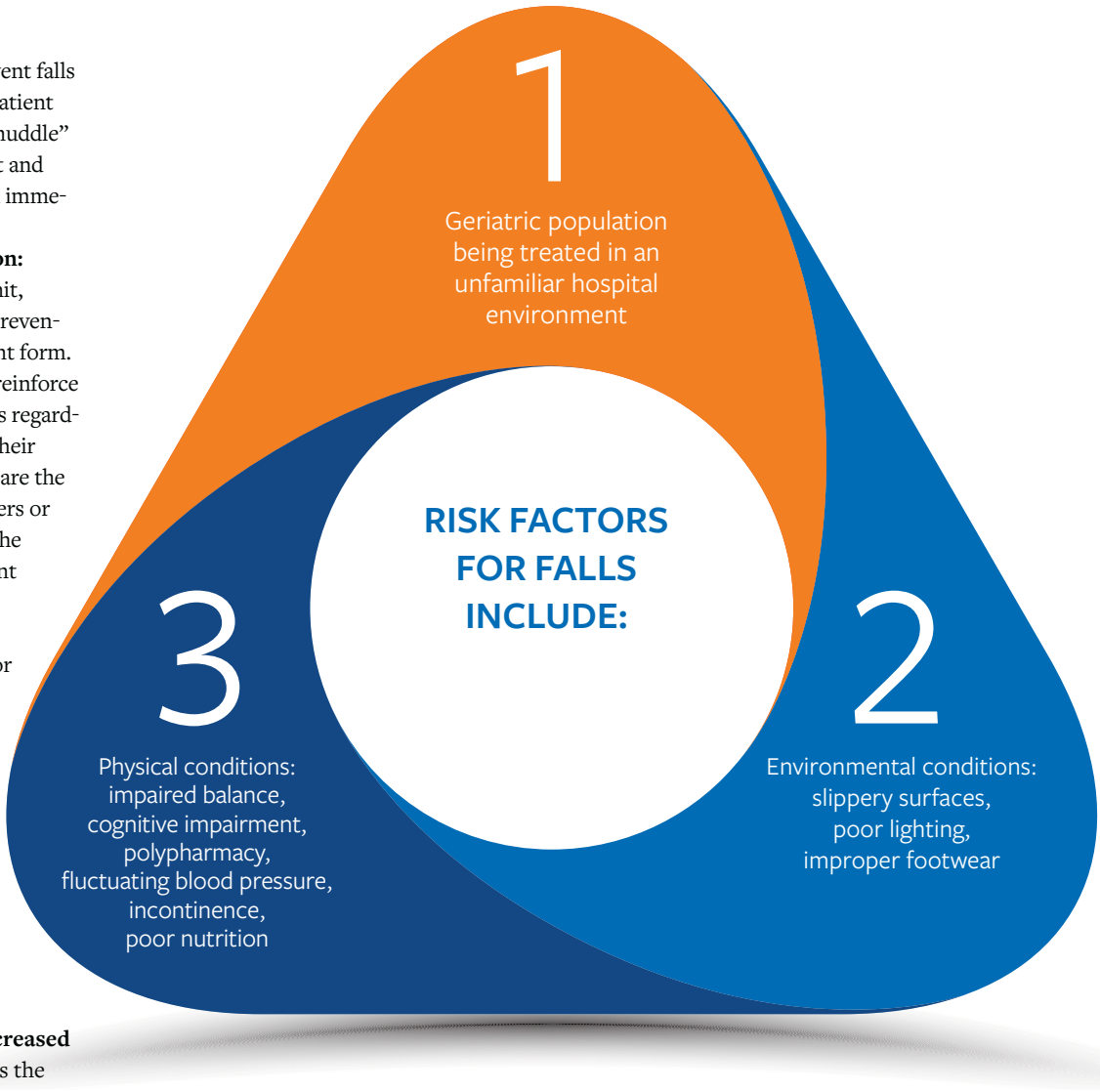
individualized strategies to prevent falls in high-risk patients. Should a patient fall, the team holds a "post-fall huddle" to evaluate patient management and pinpoint areas that can result in immediate behavior change.

2) Patient/Family Education: Upon admission to the rehab unit, patients receive and sign a fall prevention education acknowledgement form. All clinicians on the rehab unit reinforce educational concepts to patients regarding fall prevention throughout their stay. Clinicians proactively prepare the patients and their family members or caregivers in fall prevention in the home. All patients receive patient and family training by nursing, physical therapy, occupational therapy and speech therapy prior to discharge.

3) Device Use: While hospitalized, all high-risk patients wear a wheelchair belt and have a bed alarm that sounds an alert any time a patient is attempting to get up. When the alarm sounds, a staff member is alerted to check on the patient.

4) Identifying Areas of Increased Risk: "In the hospital, as well as the home, one of the biggest risk areas is the bathroom," Lutz says. "Surfaces are wet; folks have to remove clothing. Waterproof gait belts were obtained for use when the patient is moving from one surface to another in the shower. If it's a bathroom transfer, we're using the belt." Patients also use the belts while showering.

5) Staff Engagement: "We empower the whole team (nursing and therapy) to speak up and share information about fall risk. We work closely together so that it's very easy for staff to recognize early which patient is going to have a potential problem," Vickers says. This team effort among all disciplines has been critical to keeping patients safe.



Individualization Is Key to Prevention

"Fall prevention is individualized to the type of unit and patient population you work with, making it difficult to generalize," Lutz says. She advises clinicians to analyze each situation to identify where potential challenges may occur. "Every unit must look at its own situation and adapt its environment proactively."

Vickers believes patient engagement also has proved key to helping prevent falls. "I think there's been an increase in patient accountability as well," she says. "We are helping promote patients' involvement in managing their own health care." ■

For more information and resources about fall risk, visit **ahrq.gov** and search "preventing falls in hospitals" or **cdc.gov** and search "risk factors for falls."

Renee Vickers, MS, CCC-SLP, is Inpatient Rehab Therapy Manager at Baylor Scott & White Medical Center – Irving. She can be reached at ▸ **Renee.Vickers@BSWHealth.org.**

Laurie Lutz, PT, is a physical therapist at Baylor Scott & White Medical Center – Irving. She can be reached at ▸ **Loretta.Lutz@BSWHealth.org.**

Baylor Scott & White Health
Marketing Department
2001 Bryan Street, Suite 750
Dallas, TX 75201

RESEARCH UPDATES

The Latest News in Grants, Publications and Research

Grants

• Baylor Institute for Rehabilitation has started enrolling patients for a study comparing current sleep apnea identification tests in patients with traumatic brain injury. The goal of the project is to improve rehabilitation participation and outcomes; it is funded by the Patient Centered Outcomes Research Institute (PCORI). Neuropsychologist Marie Dahdah, PhD, is the principal investigator for the study at BIR, which is led by the James A. Haley Veterans' Hospital in Tampa and includes six other health care systems across the country.

• The Workout on Wheels Internet Intervention (WOWii), funded by the National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR), utilizes a novel, web-based platform to deliver a physical activity intervention to individuals who have experienced SCI. The study team is currently working closely with a web development company to revamp the website to address concerns and issues raised by focus group informants and will pilot the new website in January.

• The Group Lifestyle Balance project, funded by the Centers for Disease Control and Prevention, tests the effectiveness of adapting an evidence-based weight loss program for individuals with mobility impairment. The team, led by Katherine Froehlich-Grobe, PhD, enrolled and randomized 67 individuals into the experimental and waitlist control groups in summer 2015. As of August 2016, the team completed delivering the 12-month intervention with the initial experimental group and is analyzing data between the two groups over the initial six months. Study findings were presented at the annual meeting of the American Public Health Association in Denver, CO.

• The North Texas Traumatic Brain Injury Model System team continues to work on the project supported by NIDILRR. The team is wrapping up the final year of support, which is focused on comparative effectiveness research in TBI treatment. Currently, researchers are completing Delphi panels with experts in the field of traumatic brain injury to develop recommendations for evidence-based treatment approaches.

Select Publications and Presentations

• **Salisbury, D., Driver, S., Reynolds, M., Bennett, M., Petrey, L., Warren, A.** (2016). Hospital-based health care utilization after traumatic brain injury. Archives of Physical Medicine and Rehabilitation. doi: 10.1016/j.apmr.2016.09.117. [Epub ahead of print]

• **Lequerica, A.H., Vega, M., Belen, K., Salinas, C. M., Marquez de la Plata, C., Pappadis, M.R., Santos, O. A., Arango Lasprilla, J. C.** (2016). Estado actual de la rehabilitación cognitiva en personas de habla hispana en los Estados Unidos. Revista Neuropsicología, Neuropsiquiatría y Neurociencias.

• **Driver, S., Woolsey, A.** (October, 2016). Health literacy and activation to manage health: Initial findings from an inpatient rehabilitation sample. Health Literacy Research Conference, Bethesda, MD.

• **Driver, S., Reynolds, M.** (November, 2016). Achieving weight loss among individuals with TBI using a modified lifestyle-change program. American Congress of Rehabilitation Medicine 93rd Annual Conference, Chicago, IL.

• **Dijkers, M., Bayley, M., Driver, S., Dahdah, M., Gordon, W., et al.** (November, 2016). Creating guidelines for TBI rehabilitation. Part 1: Similarities and differences in evidence synthesis. American Congress of Rehabilitation Medicine 93rd Annual Conference, Chicago, IL.

• **Dijkers, M., Bayley, M., Driver, S., Dahdah, M., Gordon, W., et al.** (November, 2016). Creating guidelines for TBI rehabilitation. Part 2: Dissemination and knowledge translation to target audiences. American Congress of Rehabilitation Medicine 93rd Annual Conference, Chicago, IL.

Baylor Institute for Rehabilitation hospitals in Dallas and Frisco are certified for stroke rehabilitation by The Joint Commission.

Baylor Institute for Rehabilitation at Dallas is one of only 16 facilities nationwide designated as a model system of care for patients with traumatic brain injuries by the National Institute on Disability, Independent Living, and Rehabilitation Research.

Baylor Institute for Rehabilitation has been recognized by *U.S. News & World Report* in its 2016-2017 ratings as High Performing in Rehabilitation.