The Nicklaus Children's Hospital Humpty Dumpty Falls Prevention Program™: *Preventing Falls in Children Across the Globe*

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Nicklaus Children's Hospital, part of Miami Children's Health System, was founded in 1950 as South Florida's only licensed specialty hospital exclusively for children. Since its inception, Nicklaus Children's Hospital has upheld its mission to safeguard hospitalized children by keeping them safe from harm. The organization has gained international attention for its seminal work in preventing falls in the pediatric population. The nurses at Nicklaus Children's Hospital have long been empowered at the forefront of care. As a result, through integration of the American Nurses Credentialing Center (ANCC) Magnet® Model and exemplary professional practice, these nurses and interprofessional teams came together to build a program instrumental in promoting the safety and well-being of children.

The Humpty Dumpty Falls Prevention Program™ is an innovative, evidence-based tool that has become a standard of safe pediatric care, dramatically, decreasing pediatric patient falls while evolving into a standard of care around the globe. Nicklaus Children's Hospital, a third-time Magnet-designated facility, has demonstrated its commitment as a passionate advocate for pediatric patient safety for research, dissemination, and continuous program refinement with the aim of pediatric patient safety. The Magnet Model component of transformational leadership is at the very heart of the organization's culture and values in generating new knowledge such as the Humpty Dumpty Falls Prevention Program.

THE NEED TO PREVENT PEDIATRIC IN-PATIENT FALLS

Over the past decade, pediatric fall events have greatly demonstrated the need for patient safety precautions around the world. Safe Kids Worldwide,[1] a global organization dedicated to preventing childhood injuries, stipulates that preventing injuries includes the potential injury from falls. The World Health Organization[2] identifies falls as the leading cause of traumatic brain injury in young children. Both The Joint Commission[3] and the Institute of Medicine[4] have identified inpatient falls as a significant patient safety risk for pediatric patients as well as adults. The Joint Commission requires organizations to have a fall reduction program with interventions designed to reduce patient fall risk factors.

Leaders at Nicklaus Children's Hospital accepted the challenge to develop a unique and effective program to prevent children entrusted in their care from experiencing potentially life-threatening falls. They quickly discerned the only available tools and protocols were designed to prevent patient falls in the elderly and adult population, and not applicable to the distinctive needs of children in varying levels of development, an integral factor when assessing risk and analyzing fall data. The result of their landmark work is a comprehensive, scientifically developed and tested program that incorporates assessment, education, and prevention strategies that have become global standards in pediatric patient care.

A team of Nicklaus Children's Hospital nurses, synergistically, brought together interprofessional content experts to analyze the available evidence. These leaders were passionate in their quest to bring new solutions to this age-old problem. Ultimately, their work led to the development and implementation of a plan to finally meet this need-the Humpty Dumpty Falls Prevention Program. What began as a quest to solve a practice problem spread in 2006 among 16 hospitals; now, it has grown into the adoption of the pediatric falls program implemented in over 1100 facilities, internationally.

DESIGN, IMPLEMENTATION AND ENCULTURATION THROUGH NURSING LEADERSHIP

Under the leadership of Jackie Gonzalez, DNP, MBA, ARNP, NEA-BC, FAAN, senior vice president/chief nursing officer and patient safety officer, a transformational leader whose vision and advocacy fueled the organization's decision to develop this innovative program, an interprofessional team was formed. The team comprised direct care nurses, clinical specialists, nursing directors, nurse practitioners, risk managers. and rehabilitative services professionals. The team, under the ANCC Magnet Model, exemplified professional practice, developing evidence-based practices, implementing the new program, and continually monitoring effectiveness.

The team reviewed existing literature and pediatric fall rates, finding children at high risk for falls included preschoolers, children under 10 (twice at risk for falls compared with the total population), children with disabilities and minimal mobility, and children in wheelchairs. It was quickly discovered there was limited information in pediatrics related to fall events in hospitalized children. At this time, the only prevention scales implemented in hospitals focused on the adult patient population. Although the Morse[5] and Hendrich Scales[6,7] were widely used in the adult population, and some institutions adapted these to "fit" pediatric patients, their usefulness in pediatrics was not proven. Once the team evaluated this evidence, they collaborated with other institutions, leading to the development of a pediatric falls prevention program from the ground up. To inform this program, data were collected for 200 historical fall events from Nicklaus Children's Hospital, as well as, another freestanding pediatric hospital located in the Midwest.

Based on the review of this evidence, published and empirical, a comprehensive fall definition was developed that would impact the future identification of fall events. The team arrived at a new definition of a pediatric fall event to serve as the basis for collecting trended data for events and ensuring accurate benchmarking of this key indicator of nursing quality for hospitalized children. This definition describes a fall event as: a witnessed or reported unplanned descent to the floor or extension of the floor, where the child is at a lower level from where they started, with or without assistance, and resulting or not resulting, in injury by 2 classifications, developmental or nondevelopmental.

The next step was to develop an evidence-based assessment scale enabling nurses to identify pediatric patients at risk for falls. To that end, the team examined and trended previous fall event data to identify the most common risk elements. Drawing from those findings, the literature review and their extensive experience, the team designed the Humpty Dumpty Falls Assessment Inpatient Scale™. The interprofessional team developed a procedure for conducting an inpatient fall risk assessment at the following times: on admission to the hospital or entry to the emergency department, at the beginning of each shift, and for a major change in patient status.

The Humpty Dumpty Falls Assessment Inpatient Scale was validated comparing 153 pediatric patients who fell with a control group of 153 patients with matching ages and diagnoses who did not fall.[8] Findings indicated children under age 3 fell most often, followed by 12-year-olds and older patients with a neurological diagnosis. Team members and direct care nurses tested the new scale by scoring patients on the basis of the findings using a falls risk cutoff score. During this process, feedback led to further refinement of the scale. For example, the original scale did not include gender as a common element. After further evaluation by staff, gender was included in the criteria.

The result was an evidence-based assessment scale enabling nurses to readily identify pediatric patients at risk for falls. Today's scale includes 7 parameters with grading criteria based on fall risk. The parameters assess risk based on age, gender, diagnosis, cognitive impairments, environmental factors, response to surgery/sedation/anesthesia, and medication usage. Each parameter has a maximum grading score of 3 or 4 depending on the parameter, with a minimum grading score of 1 for all parameters. The overall minimum score for the scale is 7, and the maximum score is 23. Patients with scores of 12 or above are considered at high risk for falls. For

ease of use, the scale was embedded into the existing electronic medical record. The emergency department and outpatient centers also adopted and further adapted the scale to meet the unique needs of their areas.

Alongside the predictive scale was the development of a groundbreaking falls safety protocol for pediatric patients, based on low risk versus high risk evaluation for falling: the Humpty Dumpty Falls Prevention Program. The program consists of developed protocols for assessment with parameters, risk prevention protocols, parental education, and staff policies. One key component of the program is appropriate identification of children at high risk, ensuring all hospital personnel who come in contact with the child understand they play a key role in preventing a fall. The high risk assessment leads to a specific protocol, including: identification with a Humpty Dumpty bedside sign and identification band, and detailed education with the patient and family, which will be discussed further.

It has been over 10 years since the Humpty Dumpty Falls Prevention Program began. Committed to family-centered care, the Nicklaus Children's Hospital team continues to monitor the impact of this safety program. For example, the team discovered parents are present with hospitalized patients more than 80% of the time when a fall occurs. Thus, parent and patient education became a team priority, and the team expanded its educational efforts to include essential parental partnering and education. Working with industry leaders for pediatric parent education, the team designed and implemented an interactive educational module for the in-house television network, which is guided by the nurse.

THE HUMPTY DUMPTY FALLS PREVENTION PROGRAM: AN INNOVATION IN PRACTICE

The Humpty Dumpty Falls Prevention Program exemplifies the true definition of an innovation in practice. The program consists of several components.

1. The Humpty Dumpty Falls Assessment Inpatient Scale was established with 7 parameters (scale is available by contacting Deborah Hill-Rodriguez at Deborah.Hill-Rodriguez@mch.com). The Humpty Dumpty Falls Assessment Inpatient Scale has been validated as a psychometrically sound instrument.[8] The scale requires nursing judgment and individualization to each patient. Risk factors include specifics related to age, diagnosis, post-operative status, medications, nil per os status, as well as, equipment and environmental factors. Fall risk was identified as highest in the month of October. An assessment score of 12 or above triggers implementation of risk-based, age-appropriate fall prevention protocols.
2. Inpatient fall risk assessment procedures for conducting an inpatient fall risk assessment at the following times: upon admission to the hospital or entry to the emergency department, at the beginning of each shift, and for a major change in patient status.
3. A groundbreaking falls safety protocol for pediatric patients, based on low versus high risk evaluation for falling (*Table 1*).
4. innovative patient education for all pediatric patients using television and IPad technology. Nicklaus Children's Hospital nurses collaborated with the *Get Well Network*® (GWN), an industry leader in engaging patients and families in health care education and safety promotion, to develop age-appropriate fall prevention education at the point of care. GWN now offers this programming for its sites throughout the United States. In 2011, Nicklaus Children's Hospital won the "Innovations in Pediatrics" award at the annual GWN User Conference in Washington, DC, for its work in integrating Humpty Dumpty Fall Prevention Program for family education and patient safety.
5. A Package of Humpty Dumpty Falls Prevention Program resources, uniquely designed and branded staff educational materials, signage, identification bands, stickers, and badges that can be branded by any organization to identify children at risk. With the collaboration and partnership of Nicklaus Children's Hospital's legal department, the Humpty Dumpty Falls Prevention Program was uniquely trademarked, both nationally and internationally.
6. A 2-hour program training curriculum that is available onsite or via teleconference.
7. Opportunities to participate in pediatric fall prevention research studies.

The Humpty Dumpty Falls Prevention Program is based on an unprecedented approach to assessing fall risk among hospitalized pediatric patients to improve health outcomes. For the first time, pediatric nurses were able to differentiate developmental from preventable falls using the new Humpty Dumpty Falls Assessment Inpatient Scale. Integrating developmental concepts was a novel way to individualize fall risk assessment based on age range, prompting nurses to use the age-based Falls Safety Protocol to promote patient safety. Improving patient safety through decreasing falls benefits patients, parents, and nursing staff.

The Humpty Dumpty Falls Prevention Program is innovative in another way. Engaging families and industry health promotion leaders led to the innovative design of patient/family education materials that harness the potential of new technologies to enhance learning. Children and their parents learn about potential fall risks and how to prevent falls through interactive, user-friendly, bedside electronic devices or via television. The use of technology for patient education is a cost-effective, innovative strategy to maximize the attention span of children and to allow families to proceed at their own pace for learning readiness. Forging partnerships with industry leaders was another innovative strategy for sharing this new best practice with the pediatric health promotion community.

The Humpty Dumpty Falls Prevention Program has broken new ground in promoting pediatric patient safety. Today, the program has been globally and widely diffused, keeping thousands of children safer around the globe. The program was developed on the basis of a commitment to innovation and integration of evidence resulting in the elimination of risks and

Table 1. Humpty Dumpty Falls Prevention Program: Patient Falls Safety Protocol

Low risk standard protocol (score 7-11)	• Orientation to room
	• Bed in low position, brakes on
	• Side rails × 2 or 4 up, assess large gaps, such that a patient could get extremity or other body part entrapped, use additional safety procedures
	• Use of non-skid footwear for ambulating patients, use of appropriate-size clothing to prevent risk of tripping
	• Assess eliminations need, assist as needed
	• Call light is within reach, educate patient/family on its functionality
	• Environment clear of unused equipment, furniture's in place, clear of hazards
	• Assess for adequate lighting, leave nightlight on
	• Patient and family education available to parents and patient
	• Document fall prevention teaching and include in plan of care
High risk standard protocol (score 12 and above)	• Identify patient with an ID band on the patient and Humpty Dumpty signage on the bed and in patient chart
	• Educate patient/parents of falls protocol precautions
	• Check patient at minimum every 1 hour
	• Accompany patient with ambulation
	• Developmentally place patient in appropriate bed
	• Consider moving patient closer to nurses' station
	• Assess need for 1:1 supervision
	• Evaluate medication administration times
	• Remove all unused equipment out of room
	• Protective barriers to close off spaces, gaps in bed
	• Keep door open at all times unless specified isolation precautions are in use
	• Keep bed in the lowest position, unless patient is directly attended
	• Document in nursing narrative teaching and plan of care

reduction of pediatric falls. It is the mission of the Humpty Dumpty Falls Prevention Program team to extend this experience and utilize it to transform care in ways that make a real difference in the health and safety of the hospitalized child.

EMPIRICAL OUTCOMES AND IMPACT

The overall success of the Humpty Dumpty Falls Prevention Program is founded in the positive empirical outcomes that have resulted from integration of the program into routine practice. Standardization of falls risk assessment, interventions, and education has led to decreased patient falls within Nicklaus Children's Hospital. The program has offered its proven value to the community of nursing, having reached vast patient populations and health care industries, exceeding expectations of its original intent.

After implementing the Humpty Dumpty Falls Prevention Program, Nicklaus Children's Hospital has sustained a significant reduction in fall rates, including a decrease in severity and injuries while increasing knowledge about fall prevention among children and parents. Following full integration of the program, Nicklaus Children's Hospital experienced a sustained decline in fall rates from 1.03 per 1000 patient days in 2009 to 0.42 per 1000 patient days in 2015, a 41% drop. As a member of the Children's Hospital Solutions for Patient Safety National Children's Network, Nicklaus Children's Hospital partners with other pediatric hospitals to establish and share best practices.

Another outcome yielded from the innovation of the Humpty Dumpty Falls Prevention Program was the standardized pediatric falls definition, previously discussed. In addition

to the standardized definition, falls are further categorized into 2 classifications. The first classification is nondevelopmental falls, which includes falls related to accidents, and unanticipated and anticipated physiological characteristics. The second classification is developmental falls. These falls are related to the motor abilities associated with age or a stage of development. This fall definition classification has allowed further refinement of pediatric outcomes. It allows the team to continually identify trends and implement specific interventions to prevent falls. Some successful interventions include bathroom safety signage, fall safety bundles, post-fall event huddles, and the patient and family education strategies, mentioned earlier, detailing a lessons-learned educational series. Other educational components include gait belt utilization and footwear safety.

Time has brought forth change, growth, and improvement of the program; but most importantly, it has brought a passion for continued vigilance to the children and families we serve. Steady and sustainable reductions in inpatient fall rates demonstrate how a nurse-led innovation has become an international standard for improving safety outcomes in the care of children, everywhere.

GROUNDED IN RESEARCH

As a professional discipline, the ultimate goal of nursing research is to inform nursing practice and improve the health and quality of life of patients. As such, a deep understanding of the current needs and challenges facing patients and nursing practice is foundational. Whereas, 10 years ago, no tools existed for identifying hospitalized children at risk for falls, significant progress has been made. Several pediatric fall risk assessment tools currently exist, including the Humpty Dumpty Falls Assessment Scale, and others such as the GRAF-PIF,[9] I AM SAFE,[10] and CHAMPS scales.[11]

As with any innovation, it is critical that it is grounded in sound empirical evidence. Two internal research studies, evaluating over 500 falls events, were conducted to demonstrate the preliminary reliability and validity of the Humpty Dumpty Falls Assessment Scale. These studies consisted of retrospective chart reviews in which pediatric patients who fell were compared with a control group of patients who did not fall. These studies demonstrated the initial validity of the scale, showing patients who score as high risk are about twice as likely to fall compared with patients who score as low risk. The Falls Team at Nicklaus Children's Hospital meets weekly to evaluate pediatric fall events and to ensure and expand the program's effectiveness.

For example, findings also indicated children under the age of 3 fell most often, followed by 12-year-olds and older patients with a neurological diagnosis. Furthermore, Nicklaus Children's Hospital nurses have identified post-operative patients as being at risk for falling. Currently, they are translating their knowledge to improve plans of care in the pediatric surgical population.

The Nursing Research Department at Nicklaus Children's Hospital is now leading a 5-year multisite study that began in 2011 to continue measuring and quantifying the impact of the Humpty Dumpty Falls Assessment Scale, particularly with international populations. As of today, 14 national and international sites are participating in the study, with another 16 sites preparing to participate. The outcomes of this study will provide important information regarding the continued validity of the Humpty Dumpty Falls Assessment Scale, across multiple settings and identify areas for continuous quality improvement of the program.

GLOBAL IMPACT

Committed to improving the safety of children, Nicklaus Children's Hospital has provided the Humpty Dumpty Falls Prevention Program to organizations worldwide (*Figures 1 and 2*). Today, more than 1150 hospitals are actively utilizing the Humpty Dumpty Falls Prevention Program across the world, including more than 950 organizations throughout the 50 states, with more than 85 ANCC Magnet-recognized organizations. This program is now used in every branch of the U.S. Armed Services and is deployed in their hospitals around the globe. The Humpty Dumpty Falls Prevention Program has also been translated into 5 languages and is utilized in 18 countries on 6 continents. These organizations, committed to the care and safety of children, continue to experience improved and sustained patient outcomes with its use.

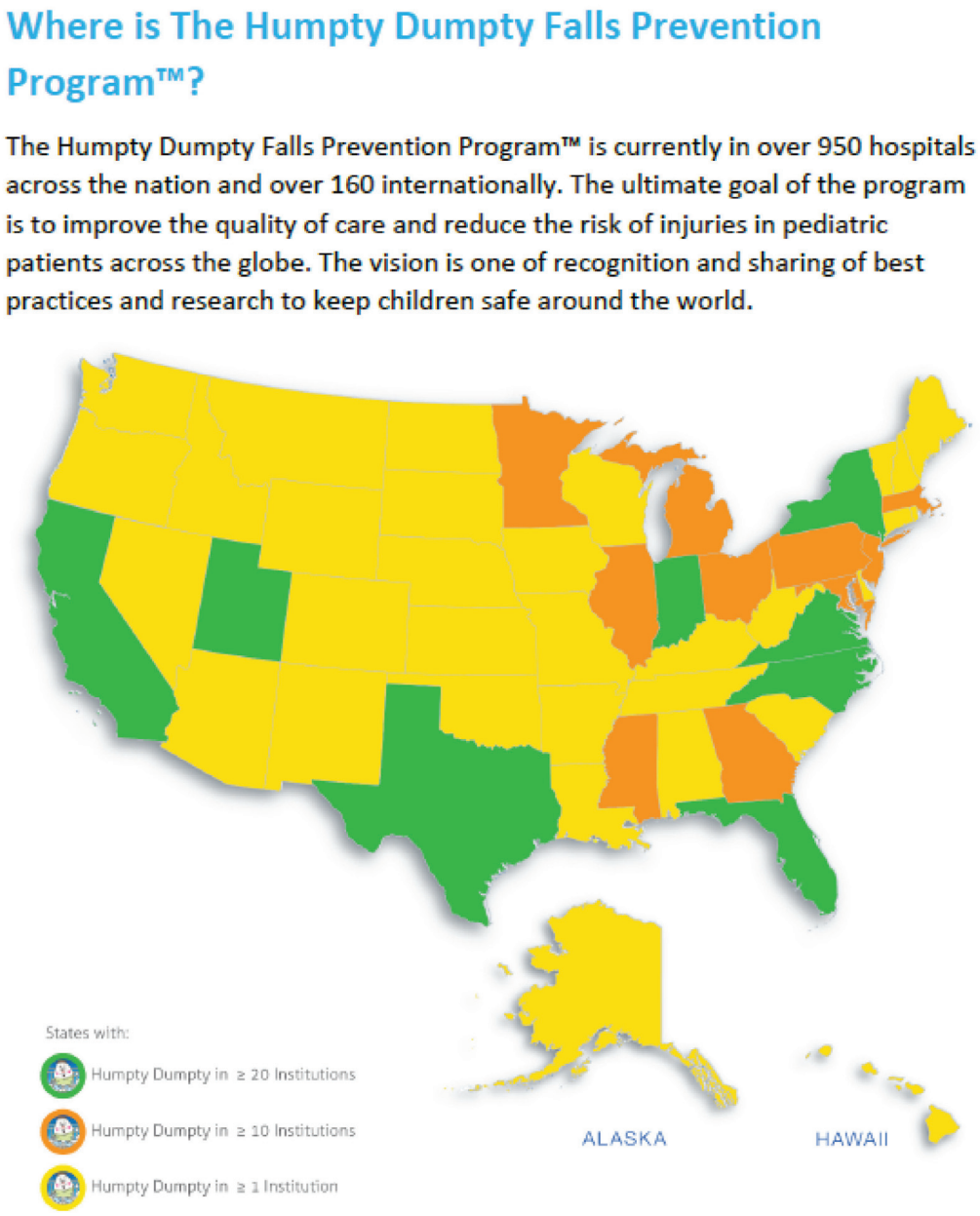
Australia utilizes the Humpty Dumpty Falls Prevention Program in more than 100 of its hospitals across the continent. Hospitals in Abu Dhabi offer the program throughout the entire Emirate, serving a population of 1.2 million people. The General Hospital of Itapecerica da Serra, Sao Paulo, Brazil has experienced a decline in pediatric patient falls after implementing the Humpty Dumpty Falls Preventions Program, from a rate of 1.16 per 1000 patient days in 2013 to 0.89 per 1000 patient days in 2014. Today, the Humpty Dumpty Falls Prevention Program is the most widely used pediatric falls risk identification tool for fall prevention on the planet. With an aim in mind that started simply with innovatively solving a practice problem to keep children safe from falling, Nicklaus Children's Hospital nursing has truly made the world safer for hospitalized children.

LESSONS LEARNED AND LOOKING TOWARD THE FUTURE

As nursing leadership from Nicklaus Children's Hospital plans for the future of the Humpty Dumpty Falls Prevention Program, it is important to reflect on the journey of innovation development and dissemination, while learning from the many lessons experienced during this process. Nine key lessons were identified:

1. The empowerment of staff in solving a practice concern is essential, powerful and can yield great results, achieved with coaching, support and barrier removal.
2. When staff presents a solution that may have broader applicability to patients and families in similar or like settings, it is up to the chief nursing officer and nursing leaders to explore practice potential and to support dissemination of evidence-based outcomes.

Figure 1. United States Locations of the Humpty Dumpty Falls Prevention Program



3. At every juncture, it is important to explore possibilities and ask how dissemination of the program could be achieved rather than dwelling on all of the reasons as to why this was not possible.
4. In order to achieve consistency and to standardize outcomes, it is important to fully commit and invest in innovation and ideas that make a difference which led to and finally culminated in trademarking its use.
5. It is essential to continue to ensure quality through research and to share results and best practices with colleagues.
6. Once you commit to the deployment of a program, it is forever a part of the fabric of your institution's shadow; therefore, continuous improvement and refinement must be a part of the equation.
7. It is important to understand the results achieved by organizations that implement the program at other institutions and not be content to just deploy a tool.
8. Always keep communication open to clarify, assist, or coach others who are implementing the program.
9. Embedding the risk assessment tool into the electronic health record is important, but optimal success was fully achieved with full program implementation along with associated alerts and interventions.

In keeping with the Magnet commitment of continually improving patient health and safety, the nursing staff at Nicklaus Children's Hospital has innovatively transformed the safe care of children by globally leading falls prevention, through its development and deployment of the Humpty Dumpty Falls Prevention Program. As the possibly most

Figure 2. Global Locations of the Humpty Dumpty Falls Prevention Program

recognized pediatric falls prevention program, the Humpty Dumpty Falls Prevention Program provides a safety net for children around the globe. NL

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References

1. Safe Kids Worldwide. Safety Tips: Falls. *Safe Kids Worldwide*. 2015. http://www.safekids.org/falls. Accessed November 9, 2015.
2. Peden M, Oyegbite K, Ozanne-Smith J, et al. *World Report on Child Injury Prevention*. Geneva, Switzerland: World Health Organization; 2008:101-123.
3. Examining inpatient pediatric falls: understanding the reasons and finding the solutions. *Jt Comm Perspect Patient Saf*. 2005;5:5-6.
4. Kohn LT, Corrigan J, Donaldson MS. *To Err Is Human: Building a Safer Health System*. Washington, DC: National Academy Press; 2000.
5. Morse JM, Morse RM, Tylko SJ. Development of a scale to identify the fall-prone patient. *Can J Aging*. 1989;8:366-367.
6. Hendrich A, Nyhuuis A, Kippenbrock T, Soga ME. Hospital falls: development of a predictive model for clinical practice. *Appl Nurs Res*. 1995;8:129-139.
7. Hendrich AL, Bender PS, Nyhuis A. Validation of the Hendrich II Fall Risk Model: a large concurrent case/control study of hospitalized patients. *Appl Nurs Res*. 2003;16:9-21.
8. Hill-Rodriguez D, Messmer PR, Williams PD, et al. The Humpty Dumpty Falls Scale: a case-control study. *J Spec Pediatr Nurs*. 2009;14:22-32.
9. Graf E. Pediatric hospital falls: development of a predictor model to guide pediatric clinical practice. Presented at: 38th Sigma Theta Tau International Biennial Convention; November 14, 2005; Indianapolis, IN.
10. Neiman J, Rannie M. I'm safe: development of a fall prevention program to enhance quality and patient safety. Presented at: 8th Annual Forum NICHQ Conference; March 11, 2009; Grapevine, TX.
11. Razmus I, Wilson D, Smith R, Newman E. Falls in hospitalized children. *Pediatr Nurs*. 2006;32:568-572.

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