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14. ABSTRACT

Falls among the elderly are common and result in personal injury, mortality, and increased healthcare costs. Employing the Elderly Falls Screening Test (EFST), Timed Up and Go (TUG) and Tinetti Scale, a multidisciplinary team at Johns Hopkins Hospital conducted an assessment of 104 neurology patients to identify fall risk factors within the ambulatory care setting. Results indicated a single question within the EFST, "Have you fallen or nearly fallen in the last year?" most accurately identified the majority of patients at high risk. Recommended was to formalize the asking of this question during patient appointing so that individualized fall prevention measures could be implemented effectively. Environmental hazards were also identified during the assessment and included potential threats to patient safety within the waiting area, hallways, bathrooms, and examination rooms. The result was a system-wide process to reduce or eliminate associated risks.

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Patient Falls Risk Assessment, Neurology Clinic, Johns Hopkins Hospital, Baltimore, MD

A Graduate Management Project Presented to:

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In partial fulfillment of requirements for the

Army-Baylor Graduate Program in

Health and Business Administration

2007-2009

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6 July 2009

Abstract

Falls among the elderly are common and result in personal injury, mortality, and increased healthcare costs. Employing the Elderly Falls Screening Test (EFST), Timed Up and Go (TUG) and Tinetti Scale, a multidisciplinary team at Johns Hopkins Hospital conducted an assessment of 104 neurology patients to identify fall risk factors within the ambulatory care setting. Results indicated a single question within the EFST, "Have you fallen or nearly fallen in the last year?" most accurately identified the majority of patients at high risk. Recommended was to formalize the asking of this question during patient appointing so that individualized fall prevention measures could be implemented effectively. Environmental hazards were also identified during the assessment and included potential threats to patient safety within the waiting area, hallways, bathrooms, and examination rooms. The result was a system-wide process to reduce or eliminate associated risks.

Acknowledgements

This graduate management project would not be possible without the hard work, mentorship, and education that comes by working with individuals that truly believe in the safe delivery of Healthcare. The Johns Hopkins Health System is an institution driven by innovation, education, and quality. It is with great pleasure to serve as a member on this Falls project by which I am able to participate in meaningful research and discussion.

The time committed to the development and refinement of this project does not come without meaningful forfeiture of valuable time with family and friends. The support of my family enabled me to deliver when the alternative was glaringly imminent and for that, I would like to extend a heartfelt thank you to my wife, Mandy, and son, Jaxon, for their patience and continued support. I am also thankful to have shared this time and effort with LT Suzanne J. Wood, Ph.D., M.S., MSC, USN, FACHE. I learned, throughout this year, that a tremendous amount of work was done on her part to provide constructive, positive and voluminous feedback. Without her guidance and motivation this project would not have reached its full potential.

I now look forward to additional opportunities for producing meaningful quality work that meets the standard of the United States Navy, Army-Baylor University, and Johns Hopkins Medicine.

Disclaimer

The opinions or assertions expressed in this paper are those of the author and are not to be construed as reflecting the official policy or position of Baylor University, Johns Hopkins University, U.S. Army Medical Command, Department of the Army, Department of the Navy, Department of Defense, or the U.S. Government.

Ethical Considerations

No personal identifying information was used during this study. The author declares no conflict of interest or financial interest in any product or service mentioned in this paper.

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Background

According to the Institute for Healthcare Improvement, patient falls are the most common adverse incidents reported within U. S. hospitals (IHI, 2008). Falls, in general, are defined as sudden unexpected events that result in a person's coming to rest on the ground or a lower level with or without loss of consciousness (Dellinger and Stevens, 2006). Many falls result in personal injury and even death. People who have fallen are more likely to be admitted to the hospital and the hospital stays are twice as long for those admitted after a fall (Sleet, Moffett, & Stevens, 2008) Data collected by the Centers for Disease Control (2008) confirm the most common injury a patient sustains due to a fall is traumatic brain injury (TBI), followed by injuries to the hips, legs, and feet. In the year 2000 alone, there were approximately 1.8 million emergency room visits secondary to falls, more than 10,000 of which resulted in death (ABT. Associates, Inc., 2004). The number of fatal falls rose to 15,800 by 2005 with emergency room visits remaining constant at 1.8 million (Centers for Disease Control and Prevention (CDC), 2008). During the same period, 473,000 patients were hospitalized for additional treatment (See Figure 1). As a result, every 18 seconds an older adult is treated in the emergency room for a fall, and every 35 minutes a patient dies from such injuries (CDC, 2008).

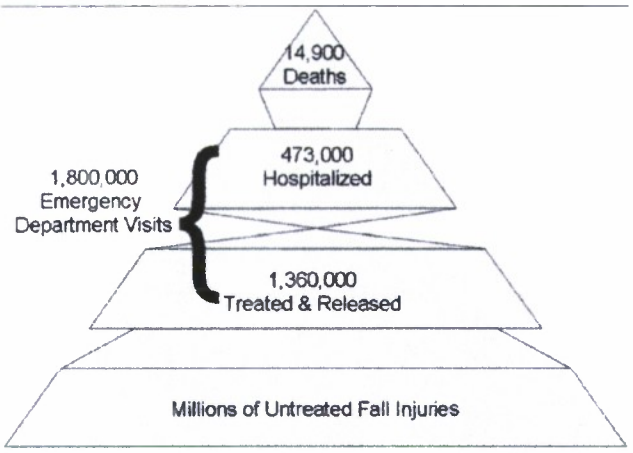

Figure 1. Unintentional Fall Injuries & Deaths

Note: Adapted from Sleet, D.A., Moffett, D.B., & Stevens, J. (2008). CDC's research portfolio in older adult fall prevention: a review of progress, 1985-2005, and future research directions. *Journal Safety Research*: pp. 261

The likelihood of falling increases with advancing age; therefore, falls are common in the elderly. Over one third of community dwelling elderly (> 65 years of age), 3% of those hospitalized, and up to 75% of patients in nursing homes sustain a fall every year (Mahoney, 1998). Elderly patients often experience head injuries, soft tissue injuries, fractures, and dislocations. It is estimated that 95% of hip fractures among the elderly result from falls, and more than 50% of those with hip fractures require nursing home placement (Mahoney, 1998). Patients who have fallen often fear a second episode and curtail their activities to protect themselves from injury. Unfortunately, a reduction in activities and movement may impact negatively the overall quality of life.

In addition to increasing morbidity, falls may also contribute to mortality, mainly from traumatic brain injury. The accompanying figures detail the exponential increase in age adjusted fatal and non-fatal injury from falls among men and women aged 65 years and older. Of the 2.9 non-fatal injuries, 63% are associated with falls. In the United States, Falls account for 70% of accidental deaths in ≥ 75 years of age (Paulozzi, Ballesteros, & Stevens, 2006).

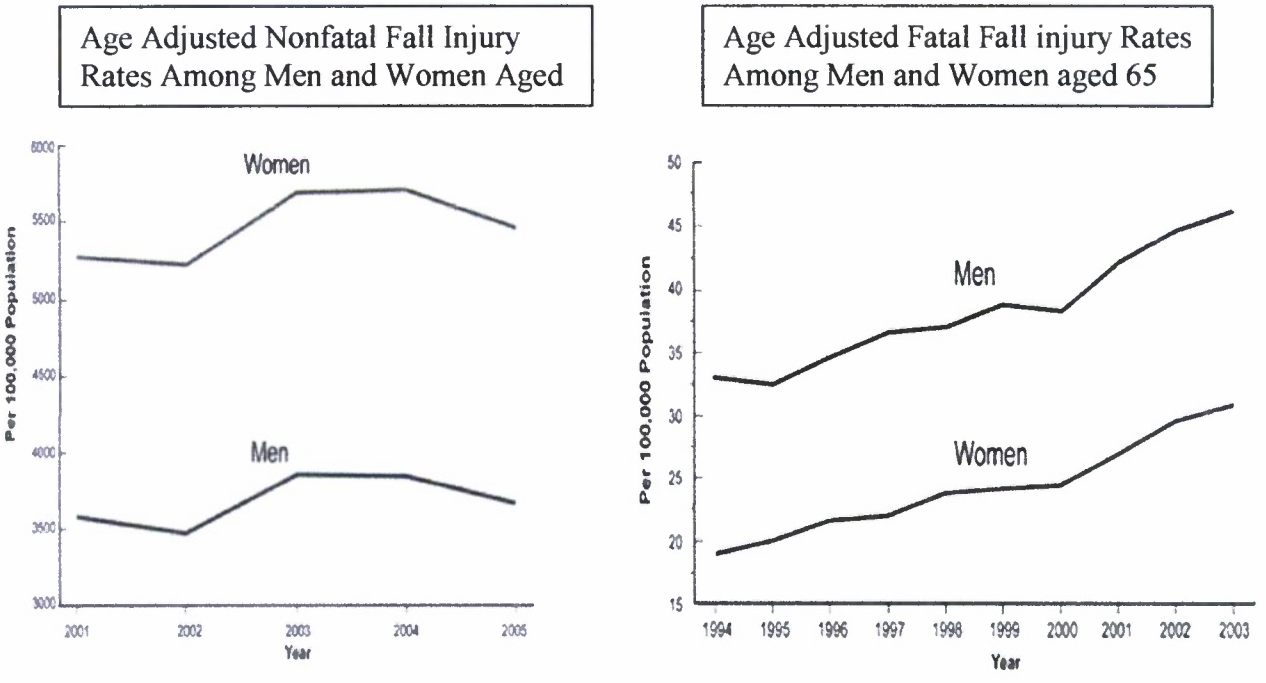

Figure 2. The Trends Associated with Increased Falls

Note: Adapted from Sleet, D.A., Moffett, D.B., & Stevens, J. (2008). CDC's research portfolio in older adult fall prevention: a review of progress, 1985-2005, and future research directions. *Journal Safety Research*: pp. 263.

Costs Associated with Falls

Patients who fall and sustain injury are reported to have hospital charges over $4,200 higher than patients who do not fall. Studies indicate that falls result in substantial economic costs for the community-dwelling elderly (Dellinger & Stevens, 2006). In a study done in 2000, there were 10,300 fatal and 2.6 million non-fatal fall related injuries. Estimated direct medical costs for these injuries totaled $179 million dollars for fatal and $19 billion dollars for non-fatal falls (Stevens, Corso, Finkelstein, & Miller, 2006). In another study by Englander that included the entire elderly population, both community-dwelling and institutionalized, the estimates were much higher: 17 billion in 1994 and that the cost per injured elderly faller was $6,215 (Englander, Hodson, & Terregrossa, 1996). By 2020, the total annual cost of these injuries is projected to reach $43.8 billion (Englander, et al, 1996). These costs do not include the non medical costs related to personal care and transportation due to disease or disability. Falls and fall-related injuries represent an enormous burden to individuals, society, and to the health care system. About 32% of older adults who sustain a fall-related injury required help with activities of daily living, and among them, 58.5% are expected to require help for at least six months (Schiller, Kramarow, & Dey, 2007). In addition, intangible costs in terms of pain and suffering are immeasurable. Furthermore, not measured are the indirect costs resulting from loss of

productivity for both the elderly and caregivers. Some are employed, others provide important services to society through volunteer work, childcare, and caring for friends and relatives. There is additional liability is a facility concern, as a patient may sustain a fall in the hospital environment. Between 2000-2007, over 174 events/claims/suits were reported by MCIC Vermont, Inc. A group that offers professional and liability coverage for eleven (11) hospitals, including Johns Hopkins. The total costs incurred were over $15 million. The Center for Medicare and Medicaid Services (CMS) no longer reimburses cases with certain hospital-acquired conditions, including falls with injury. By 2020, the annual direct and indirect costs of fall injuries is expected to reach $54.9 billion (2007 dollars).

In a study of people aged 72 and older, the average health care cost of a fall injury totaled $19,440, to include hospital, nursing home, emergency room, and home health care, but not doctors' services (Carroll, Slattum, & Cox, 2005). Fall-related injury among elderly in their local environment is one of the 20 most expensive medical conditions in the United States. In terms of aggregate spending, the $6.2 billion spent nationally on fall-related medical conditions is the same amount spent on chronic obstructive pulmonary disease (Carroll, et al, 2005). Figure 3 details the mean annual spending per individual, the $2,039 spent on treating fall-related medical conditions is comparable to the mean annual amount spent for diabetes ($1,978 per year) and

higher than the mean amounts spent for mental disorders ($1,475), osteoarthritis ($1,014), back problems ($982), and pulmonary conditions($699)(Carroll, et al, 2005).

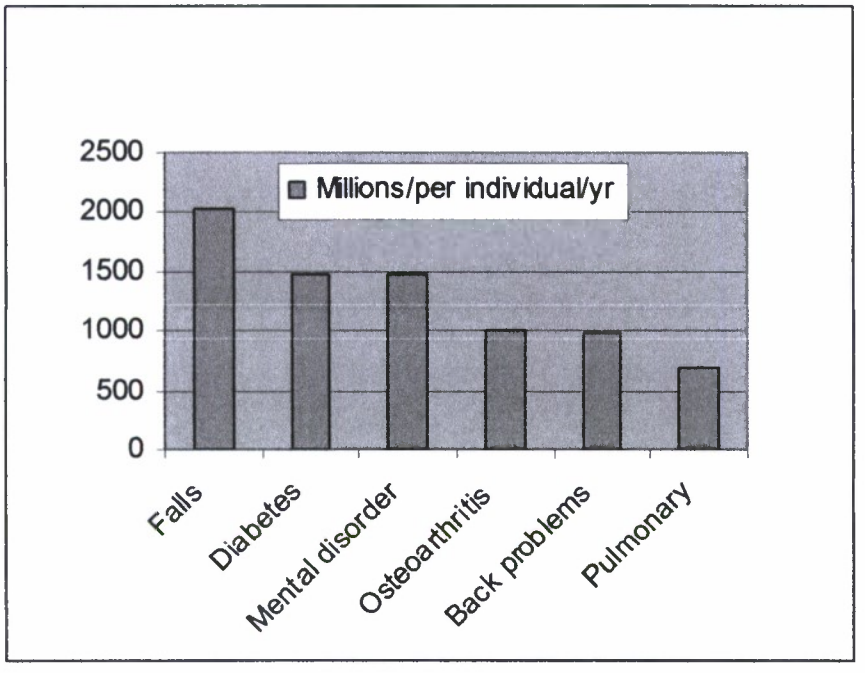

Figure 3. Mean amount spent per person by disease type

Note: Adapted from Carroll, N.V., Slattum, P.W., & Cox, F.M. (2005). The cost of falls among the community-dwelling elderly. *Journal of the Managed Care Pharmacy* 2005;11(4): PP. 313

The Joint Commission

Falls today amongst the adult population are quite prevalent within homes, hospitals, and long-term care (LTC) facilities. Each healthcare entity must devise a means by which to protect patients and reduce the number of falls within healthcare facilities. To aid in this effort the Joint Commission publishes an annual National Patient Safety Goals report centered on improving patient safety and preventing harm. These particular

goals are established annually and highlight problematic areas within different healthcare systems. The Joint Commission provides recommendations, evidence, and expert-based solutions as a means to mitigate risk. Goal number 9,"Reduce the risk of patient harm resulting from falls", is the focus for this study at Johns Hopkins Medical Center. The following is a checklist derived from the National Patient Safety Goal 2008, requirement 9B: (Joint Commission, 2008):

- Evaluate each patient's risk for falls and take appropriate action to reduce the risk for injury secondary to a fall should a fall occur.
- Conduct a complete evaluation to include a fall history, review of the patients medical and alcohol consumption, proper screening of gait and balance, and utilization of assistive devices.
- Establish a fall reduction program specific to patient population and services provided and include interventions to reduce patient fall risk factors.
- Healthcare staff should received proper education and training specific to the fall reduction program.
- Patients and their families should be properly educated on their individualized fall reduction techniques as set forth by the healthcare staff.
- The fall reduction program must be evaluated to determine its effectiveness.

In order to successfully reduce the risk of patient harm resulting from falls, implementation of a fall reduction program and evaluation of the effectiveness of such a program is required.

CDC Recommendations

The CDC in its report entitled "CDC's research portfolio in older adult fall prevention: A review of progress, 1985-2005, and future research directions," (Sleet et al, 2008) made the following recommendations:

- Research should be conducted to identify environmental, community, and individual variables that are related to fall risk factors and remediation among older adults.
- The current literature on risk factors by setting or sub-population should be reviewed in this effort to identify and fill gaps, and to tailor interventions to the specific setting or individual.
- Human factors of aging should be incorporated into research designs of studies on the environment as it relates to fall prevention.
- Strategies should be created to access existing data systems and to obtain more complete risk factor data on falls among older adults.
- Persons ≥65 years of age should be stratified in fall prevention research activities because this population is not homogenous. Separate interventions should be

developed for different age groups based on level of frailty, residence in an acute, residential, or community setting, and other factors.

- Innovative interventions for fall prevention should continue to be funded and tested (e.g., adding fall prevention education to routine health visits.
- Opportunities to conduct multi-site studies of well-developed and promising interventions should be explored.

The above CDC recommendations give insight into the major components of fall analysis. From this, it can be considered a major factor that focused this study around the intrinsic and extrinsic factors related to patient falls.

Recent Literature

Thurman et al (2008) conducted an assessment of neurology patient risk for falls. Results led to the identification of three categories useful in assessing a patient's risk for falls, grouped as Levels A, B and C. In relationship to fall risk, Level A patients are currently monitored and established in a preventive program. Level B patients as probable of falls, and Level C patients as possible. Patients within the Level A category are considered to be at the highest risk for falls secondary to such medical conditions as past history of stroke, dementia, or those who suffer from balance and gait disorders. Patients with a history of a fall within the last year are also labeled as level A because a previous fall is a prime indicator

of future falls. Level B patients primarily consist of patients diagnosed with: Parkinson's disease, known weakness of the lower extremities who may be utilizing an assistive device to increase mobility, sensory loss, vision loss, and/or peripheral neuropathy. Level C patients are those who upon examination and history pose a possible fall risk, so appropriate interventions should be made to reduce such risk. This category is considered to be the most responsive group with regard to interventions designed to avoid future mishaps (Thurman et al, 2008).

Patients with neurologic or general conditions associated with an increased risk of falling should be asked about recent falls and further examined for the presence of specific neurologic deficits known to predict falls. This includes gait and balance disorders; deficits of lower extremity strength, sensation, and coordination; and cognitive impairments (Thurman, Stevens and Rao, 2008). If substantial risks of falls are identified, appropriate interventions may be considered.

Various intrinsic factors that have been identified to pose high risk of falls include the presence of muscle weakness (relative risk of 4.4), history of previous falls (RR 3), gait deficits (RR 2.9), balance Issues (RR 2.9), use of assistive devices (RR 2.6), visual deficits RR 2.5), arthritis (RR 2.4), ADL Impairment (RR 2.3), depression (RR 2.2), cognitive Impairment (RR 1.8), Age >80 yrs (RR 1.7) (Rubenstein and Josephson, 2006).

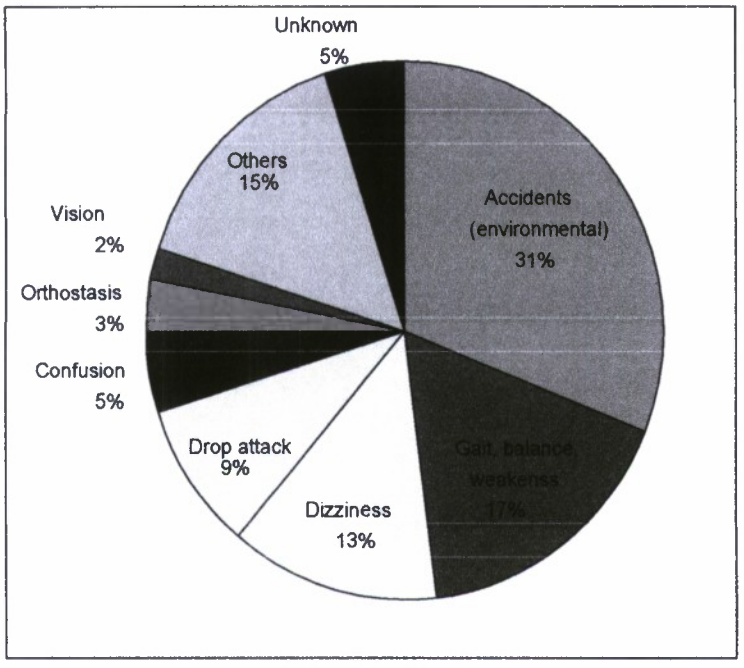

Figure 4. Chart depicting a variety of fall related factors

Rubenstein, L.Z., Josephson, K.R. (2006). Falls and their prevention in elderly people: what does the evidence show?. Medical Clinics of North America: pp. 809.

The extrinsic risk factors for falls are the environmental hazards: walking on slippery or rough surface, obstacles, inadequate light, loose carpets, height and stability of seating, bedrails, and obstacles created by mobility aids, and transfers. In general falls triggered by environmental hazards make up the largest cause category, accounting for 25% to 45% of falls (Rubenstein and Josephson, 2006).

In general, most falls result from an interaction of increased susceptibility from combination of intrinsic factors and a hazards or hazardous activities (extrinsic factors). In addition, certain behavioral aspects that affect a person's

ability to commute safely such as hurrying, being inattentive, difficulty or discomfort during a task, and moving beyond limits of stability play a part in the falls.

Various paradigms that have been used in the past have been assessed. It was evident that the inpatient falls assessment where acuity of the illness and medications require frequent observations and change in assessment, was different from outpatient falls assessment where functional mobility of chronic nature with stable medications is more of an issue. In the inpatient or in nursing homes, nurses are mainly responsible for making this assessment. Appendix D details various scales used in inpatient and outpatient settings. The inpatient fall risk include the following (Perell, et al, 2001). Morse Falls Scale, Stratify, Resident Assessment Instrument, Fall Risk Assessment Tool, Hendrich Fall Risk Model, High Risk of Falls Assessment form and Royal Melbourne Hospital Risk Assessment. In the outpatient setting physicians or physical therapists have traditionally done this assessment and used functional Mobility scales: Tinetti, Berg Balance Test, Functional Reach, Dynamic Gait Index, Elderly Fall Screening Test, Modified Gait Abnormality Rating Scale, and Timed up and Go are various functional outpatient measures used (Perell et al, 2001).

Conditions that Prompted the Study

Over the three-month period from April to June 2008, the Neurology Ambulatory Care Clinic, experienced three separate

patient falls. Prior to the occurrence of these falls, the entire Johns Hopkins Outpatient Center experienced falls at an average rate of one per six-month period. The series of falls this period is well above average and calls for an analysis into the intrinsic and extrinsic factors associated with the noted mishaps.

Statement of the Purpose

Given the economic burden of falls, increased mortality, and morbidity associated with falls, the ageing US population, the CDC and the Joint Commission mandate, it is critical that Johns Hopkins develop prevention programs that are practical, acceptable, and effective. Up to now, screening for high fall risk was done in the inpatient and nursing home settings but not in the ambulatory environment. For example, the Johns Hopkins Hospital currently has well established criteria for assessing and preventing falls for hospitalized patients. The Johns Hopkins Outpatient Center (JHOC) did not, however, systemically assess patients for risk of falls. In addition, systematic evaluation of the ambulatory patient's home environment to assess and prevent falls has not been given. Assessing the risk of falls and implementing effective intervention strategies will decrease the incidence of falls, improve health and quality of life of older adults, and reduce healthcare costs.

The Johns Hopkins Outpatient Center Neurology Falls Risk Assessment Team was chartered to assess the risk of patients who

received outpatient care at the nations' highest ranked hospital (U.S. News and World Reports, 2008). The focus of this study will reside within the Neurology Clinic in the Outpatient Center of Johns Hopkins Hospital, chosen due to its demographic patient mix and high-risk patient population.

Project Mission

The successful implementation of mechanisms to recognize patients at risk of falling and implementing a system to prevent these falls was expected to have an impact on the clinical practice, facility design, regulatory compliance, reduced morbidity to the patient and reduced liability for the institution. Reduction and prevention of falls mission was well aligned with The JHH Safety Mission Statement: "The JHH strives for safety in patient care, teaching, and research."

Current Practice

Johns Hopkins Neurology Outpatient Service was in a unique position to identify patients at risk of falling since most patients seeking neurological consultation were those identified at greatest risk. Neurology patients were considered to be at the highest risk for falls secondary to medical conditions such as: stroke, dementia, multiple sclerosis, balance and gait disorders, Parkinson's disease, neuromuscular conditions causing weakness of the lower extremities, sensory loss, vision loss, and peripheral neuropathy. Given this high-risk population, it was imperative that falls are prevented from occurring.

JHH Patient Safety Data

A preliminary analysis was requested of the patient safety office of Johns Hopkins Hospital to detail the gap between Optimum and Current Practice related to patient falls in the outpatient center.

The analysis revealed 10 recorded falls in the Neurology JHOC since 2004 (1 in 2004; 3 in 2005; 1 in 2006; 4 in 2007; and 1 in 2008). The age range was 2-69 year with 8 females and 2 males. Six falls could be attributed to weakness or gait disorders; six in patients using assisted devices; two falls related to syncope or seizures; and two miscellaneous (children) accidents (See Table 1).

Table 1.

Summary of Falls: Johns Hopkins Hospital 2004-2008

Age	Diagnosis	Dementia -Stroke	Parkinson	Gait - Balance	Assisted Device	Comment
64 - Fem	Polymyostis			Yes	?	Foot scuffed floor
56 - Fem	Seizures					Seizure at check-in
79 - Fem	Tremor		Yes	Yes	Yes	Wheelchair stability
45 - Fem	MS			Yes	Yes	Fell in Hallway
9 - Male	Tourette's					Running tripped
52 - Fem	MS			Yes	Yes	Walking misstep
69 - Fem	Parkinson		Yes	Yes	Yes	Fell during exam
65 - Male	ALS			Yes	Yes	Foot drop
42 - Fem	Syncope					Check-in
2 - Fem	Brain Tumor					Bathroom

	foot caught

Note. Table generated as a result of the patient safety falls data, Johns Hopkins Outpatient Center

On October 31, 2007, the American Disability Association (ADA) inspected several areas of the JHOC Neurology clinic and revealed the following:

1. Restrooms were not fully compliant with the ADA Standards
2. The registration desk needed to 37-1/2 inch high
3. An additional two inches of pull side clearance on exam room doors was needed
4. Identified a lack of visual fire alarms in examination rooms
5. Noted operational difficulties in weighing and examining patients who use wheelchairs
6. A need was determined for adjustable height examination tables

These findings were recorded by the facilities department and forwarded to Mr. Richard (Chip) Davis, Vice President for Innovation and Patient Safety, with recommendations listing the improvements would benefit both internal and external customers of Johns Hopkins Hospital.

Internal: Director of Neurology Clinic, Clinic Manager, Neurologists, Certified Medical Assistants (CMA), Physician Service Coordinators (PSCs), Department of Physical Therapy and Rehabilitation, and Staff of the Center for Innovation in Quality Patient Care.

External: Neurology Patients receiving care at the JHOC, patient's family, care givers, and The Joint Commission. The primary customer is the patient.

As a result, Mr. Davis, established the Johns Hopkins outpatient Falls committee, comprised of members of the Center for Innovation in Quality Patient Care, Director of Outpatient Nursing, Physical Therapist, Clinic Manager, and Neurology Staff, was formed (See Table 2).

Table 2.

Fall Team Members: Johns Hopkins Hospital 2008

Name	Title
Vinay Chaudhry	Director, Neurology JHOC
Anna Rice	Director, Ambulatory Nursing
Lori Paine	Director, Patient Safety
Judy Norris	Clinic Manager, Neurology and Neurosurgery
Mike Friedman	Director, Rehabilitative Services
Julie Kubiak	Assistant Director, Outpatient Nursing
John Gardner	Navy Lieutenant - Military Resident
Donna Beck	Home Care Services
Richard Davis	Vice President for Innovation and Patient Safety

Note. Fall Prevention was instituted to research strategies to improve safety through the hospital

Falls Team Description

Dr. Vinay Chaudhry, the Neurology Clinic Director, was appointed by Mr. Davis to serve as the team leader to manage the team responsibilities. His appointment resulted from vast

experience in the subject field. Other appointed team members of the diversified team included Lori Paine, Julie Kubiak, Judy Norris, Anna Rice, Michael Friedman, John Gardner, Donna Beck.

All the team members understood the project mission and recognized their respective tasks. The task assignments were arrived at by mutual agreement after identifying the respective strengths and weaknesses of the members. The team members were encouraged to communicate their opinions and help other team members to reduce redundancies. There was mutual trust and support and effective communication is achieved through frequent face-to-face meetings and electronic communications. All team members are strong leaders in their own spheres and bring a strong sense of ethics, integrity, trust, a spirit of team work, and conscientious work ethics. Resources were provided by administration led by Dr. Richard Davis.

Goal

The goal of this team was to identify high-risk patients and offer physical therapy, education, environmental modification, and support. The team's charge did not include investigating the underlying clinical condition (intrinsic factors for falls) thought to be the purview of the physician. The committee also extensively discussed who should be the assessing the fall risk in individual patients and what parameters should be assessed. In the setting of nursing homes or inpatient settings- comprehensive medical assessment was performed by nurses and was

set in a way that it can be repeated since the patient condition may change. In the outpatient settings however, functional mobility assessment was more important and was completed by physical therapists or treating physicians.

Objective

The objective of this study was to identify and pilot three test methodologies on one form to determine the most efficient and effective course of action in regarded to identifying patient fall risk.

Following criteria were used to identify three relevant tools for identifying high-risk patients:

1. be measurable/quantifiable
2. be workable in ambulatory environment
3. be repeatable and reproducible
4. not require excessive physician burden
5. not require excessive time on the patients
6. use limited resources
7. be universally applicable to all of JHOC
8. assess intrinsic risk factors.
9. have high sensitivity
10. have high specificity

After considerable discussion and review of the sensitivities and specificities detailed in Table 3, the committee decided to use various functional mobility scales such as the Elderly Falls Screening Test (EFST), Timed Up and Go

(TUG), and Tinetti scale. These test methods were used to identify high-risk neurology patients. These scales were given Level A and Level B recommendations by the American Academy of Neurology (Thurman et al, 2008).

Table 3.

Assessment Method: Sensitivity and Specificity

Tool	*Sensitivity%*	*Specificity%*	*Mins Taken*
Tinetti	80	74	20
Berg Balance	77	86	15
EFST	93	78	17
Dynamic Gait Index	85	38	15
Timed Up and Go	87	87	<1
ABC Scale	84	87	10-20

Note. Thurman, D.J., Stevens, J.A., & Rao, J.K. (2008). Practice parameter: Assessing patients in a neurology practice for risk of falls (an evidence-based review): report of the Quality Standards Subcommittee of the American Academy of Neurology. Neurology: pp. 473-479.

Methods

Falls were considered the result of an interaction between and individual and his or her environment. They invariably had multifaceted origin with multiple precipitating and predisposing factors, which made their diagnosis, treatment, and prevention a difficult clinical challenge. Falls occurring during an acute medical condition (infection, arrhythmia, stroke, seizure, change in medical condition) or during hospitalization (confusion, medications) needed to be differentiated from those resulting from chronic conditions seen in the ambulatory settings

(Parkinson's disease, dementia, diabetic neuropathy, change in vision, gait, sensation or weakness, ageing).

Confidentiality

All data was collected in compliance with HIPAA regulations and kept strictly confidential. With an active pilot number the clinical assessments of the TUG, EFST, and Tinetti was retained as a permanent part of the electronic medical record. A signed consent to participate in the survey was not deemed necessary, as it haf been noted by Institution Review Board that this was not human subject research. The goal of the team was to analyze cases of criterion based patients to identify trends, opportunities to improve and ultimately decrease the likelihood of falls within the institution. All participants were randomly assigned a unique personal identifier so that when data was coded and analyzed it was to be stripped of personally identifiable information.

Institutional Review Board

The Johns Hopkins Medicine Institutional Review Board granted this project an exemption given that this qualified as a Quality Improvement Project.

Data Collection:

The pilot study began on October 6, 2008 with four physicians' Neurology patients in the Neurology Clinic in the JHOC. Graphically depicted in (See Appendix A), a falls risk assessment form was administered to criterion eligible neurology outpatients. At check-in, the staff hand delivered the risk

assessment questionnaire (See Appendix B) to the patient. Patients completed Section 1 of the questionnaire. This portion of the assessment was the first half of the "Elderly Falls Screening Test". The questionnaire was then returned to the medical assistant to perform a "Time Up and Go" test on the patient. The medical assistant annotated the results on the form and delivered the form to the physician that would be administering the second half of the EFST and a full Tinetti Balance Assessment. Upon completion of the outpatient encounter, the physician staff returned the assessment form for scanning and entry into the electronic patient record. The original hard copy was then delivered to the falls committee for input and analysis.

Subjects

The participants in this study derived from routine outpatient Neurology Clinic visits at the Johns Hopkins Outpatient Center. Clinics of four volunteer physicians were chosen for this pilot study. All patients that visited the Neurology clinic within the period noted would be included due to the clinical nature of the neurology service. Patients were excluded if they were wheelchair bound. Based on a power calculation for comparison study, a goal of 100 patients was determined the minimum acceptable number to be recruited.

Definition of a Fall

For the purpose of this study a fall was identified as an event when you find yourself suddenly on the ground, without

intending to get there, after you were in either a lying, sitting or standing position (Cwikel, Fried, Biderman and Galinsky, 1998).

Apparatus

As identified in Appendix B, the falls assessment team developed an apparatus to document and collect both qualitative and quantitative values. The tool was approved by the Johns Hopkins compliance office and received a pilot number in accordance with hospital policy. With a pilot number attained, the staff began using the form as required for the study. The apparatus incorporated the methods of the Timed Up and Go, Elderly Falls Screening Tool, and the Tinetti Balanced Assessment Tool.

Timed Up and Go Test (Shumway-Cook, Brauer and Woollacott, 2000):

The test was created in 1986, and each took 10-15 minutes to complete. Patients were timed (in seconds) when performing the TUG in the following order. From sitting in a chair, stand up, walk 10 feet, turn around, walk back, and sit down. The time taken to complete the task was strongly correlated to level of functional mobility, (i.e. the more time taken, the more dependent in activities of daily living (Lundin-Olsson, Nyberg and Gustafson, 1998). The cutoff levels for TUG was 13.5 seconds or longer with an overall correct prediction rate of 90%; for TUG manual was 14.5 seconds or longer with a 90% correct prediction rate; and Tug cognitive was 15 seconds or longer with an overall

correct prediction rate of 87% with an Interrater reliability of r=.98 (Shumway-Cook et al, 2000). The TUG alone correctly classified 13/15 fallers (87% sensitivity) and 13/15 non-fallers (87% specificity), (Podsiadlo and Richardson, 1991). Older adults who took longer than 14 seconds to complete the TUG were considered high risk for falls.

Elderly Falls Screening Tool (Cwikel et al , 1998):

Cwikel et al evaluated the use of the elderly fall screening test in a community primary care clinic. This was a five item test; Part I consists of questions and part II was dependent on the observations of gait patterns. Subjects were divided into low and high risk, based on falls history and observations of walking speed and gait style. This simple tool was found to accurately predict falls, with 83% sensitivity and 59% specificity for a score of ≥2.

Tinetti Balance Assessment Tool (Tinetti, 1986):

Tinetti was created in 1986 and required 10 to 15 minutes to complete. Scoring of the Tinetti Assessment Tool was done on a three point ordinal scale with a range of 0 to 2. A score of 0 represented the most impairment, while a 2 would represent patient independence. The individual scores were then combined to form three measures; an overall gait assessment score, an overall balance assessment score, and a gait and balance score. The maximum score for the gait component was 12 points. The maximum

score for the balance component was 16 points. The maximum total score is 28 points. In general, patients who score below 19 were at a high risk for falls. Patients who score in the range of 19-24 indicated that a risk for falls. Interrater reliability was measured in a study of 15 patients by having a physician and a nurse test patients at the same time. Agreement was found on over 85% of the items and the items that differed never did so by more than 10%. These results indicated that the Tinetti Assessment Tool had good interrater reliability (Tinetti, 1986).

Identification of High Risk Patients

The Patient Service Coordinators were instructed to give the patient a sheet to fill out and answer the three questions. Certified medical assistants (CMAs) were trained by the physical therapist (MF) to perform the TUG analysis on each patient. The physicians participating in the study were instructed to perform the Part II of EFST and the entire Tinetti evaluation.

Limitations

The sole purpose of this study and associated internal and external analysis is to gain a depth in understanding of patient falls within the neurology clinic only. To this fact, it must be noted that any generalizations regarding the results of this analysis under dissimilar geographic and demographic factors are not supported. Time, latent medical conditions, facility changes and advances in neurological sciences may impact future study of

subsequent data, analysis and a re-evaluation of the findings, observations and conclusions expressed in the outcomes.

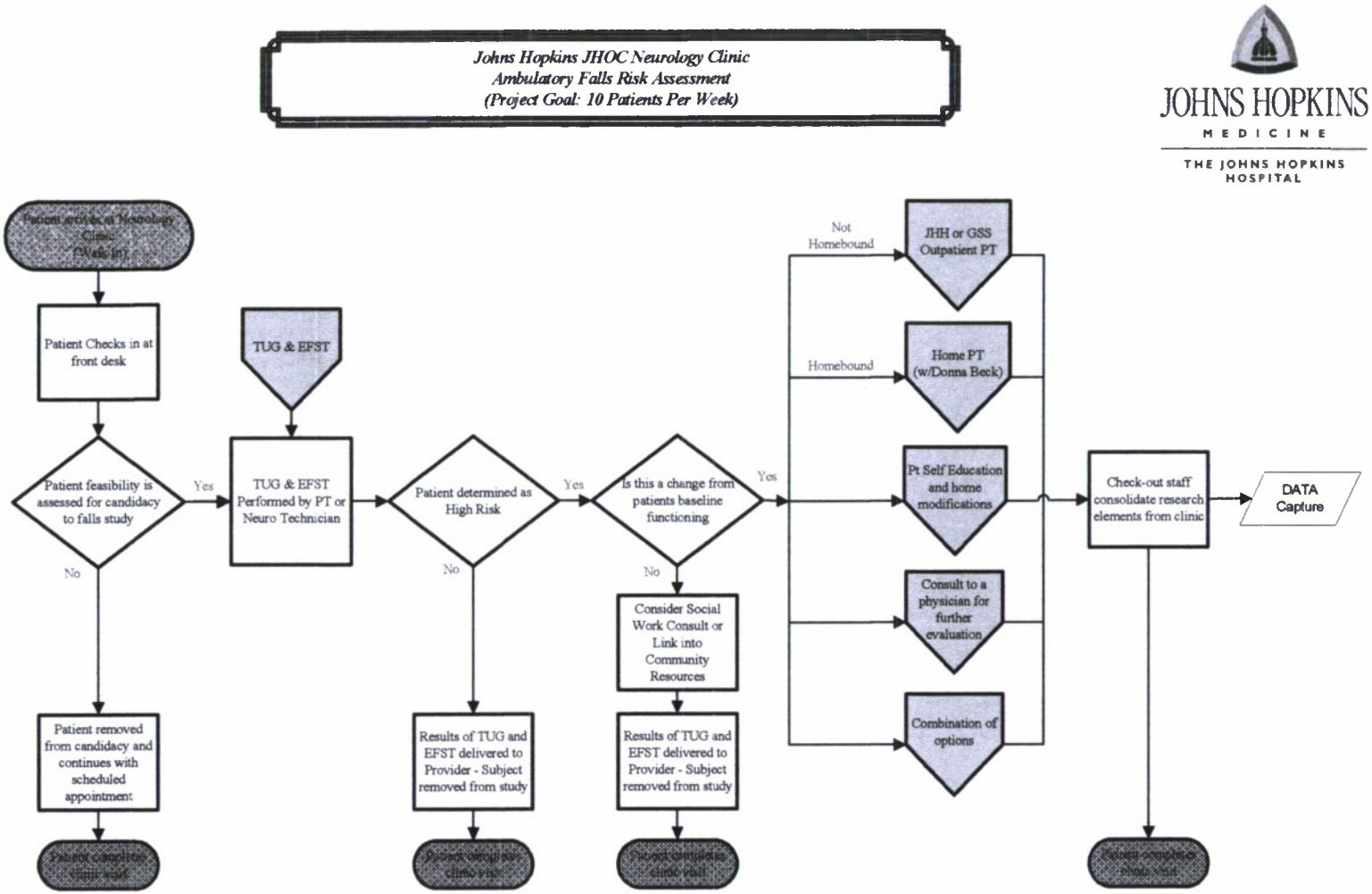

Figure 5. Falls Study Algorithm

Note: Process map constructed as the design of implementing the neurology falls pilot.

Results

Stratification of Medium-High Risk Patients

Patients were stratified as to the risk per the following criteria (See Table 4). The relative sensitivity and specificity of the three tests was determined.

Table 4.

Assessment Method: Stratification of Risk

Test	*Low Risk*	*Med Risk*	*High Risk*
EFST	0 or 1	2-3	4-5
TUG	< 14 sec	14-28 sec	≥28 sec
Tinetti	< 19	19-24	25-28
EFST	0 or 1	2-3	4-5
TUG	< 14 sec	14-28 sec	≥28 sec
Tinetti	< 19	19-24	25-28

Note. Table generated as a result of the analysis of testing methods, Tinetti, 1986); (Podsiadlo and Richardson, 1991); (Cwikel et al , 1998)

Patients identified at medium or high risk by CMA were given a yellow wrist band to wear.

The Neurology Staff were instructed to recognize those with the yellow high risk of fall wrist bands and advised to offer the do the following:

1. Offer to "Please let us know if you would like a staff member to accompany you to and from the bathroom, or to the exam room. We also have wheelchairs available if needed."

Remind them that some of the hallways to the exam rooms may be upto a "block of walking."

2. Preferably seat high risk patients in an area where they can be observed.
3. Please offer the educational pamphlets from the CDC on Fall Prevention (available at check in station).
4. If you see any obvious hazards/obstacles in the patient's path to the exam room/bathroom, try and clear them
5. Offer the use of assist device (seat lift cushion) to help patients who need help standing.
6. Offer the use of the assist device to weigh patients as appropriate.
7. Ask them to please let us know if there is anything else we can do to prevent any falls in our environment.
8. Please report any fall or near fall in PSN and to the Clinic Manager and/or Physician.

Since there was no gold standard test to diagnose those who will fall, fall outcome and previous falls or tendency to fall were used as gold standards and used as the reference against which the predictor variables and tests were compared.

Intrinsic Factor Analysis - Clinical Pilot

From 10/6/08 to 12/3/08, a total of 104 patients (51 males and 53 females) were evaluated by 4 physicians in the Neurology JHOC. The average age was 61±16; and the median age was 65 yrs (range 21-86). Of the Subjects, 72% were above the age of 50 and

49% were above the age of 75 (See Figure 6). Patients were seen in the subspecialty Clinics of Neuromuscular Disease, Hydrocephalus, Multiple Sclerosis, and Parkinson's Disease.

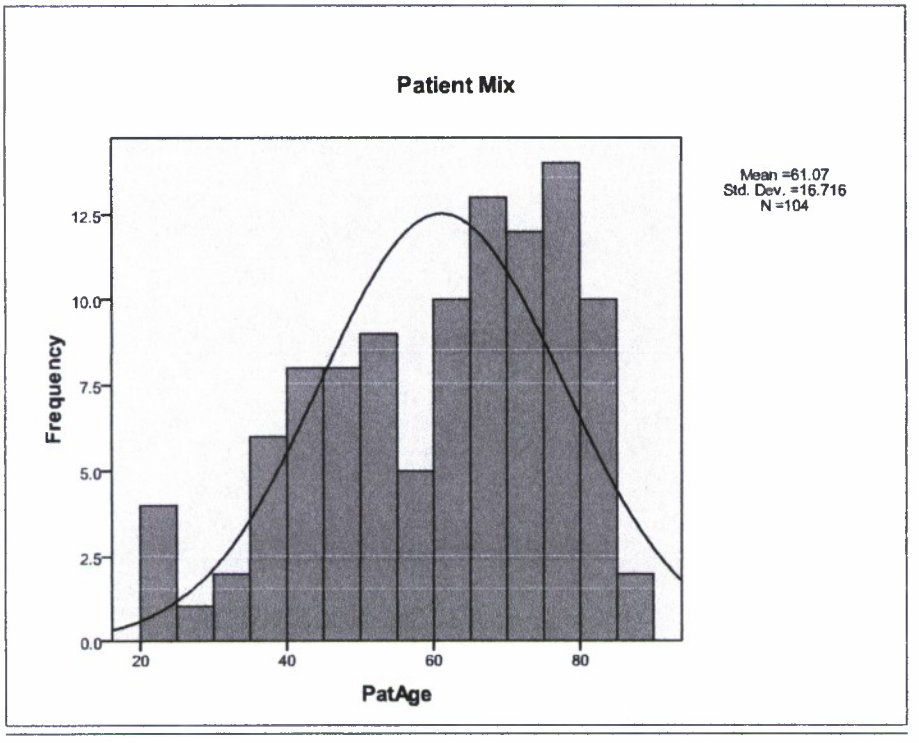

Figure 6. Age distribution of Neurology clinic patients

Note: Data gathered from JHOC falls study questionnaire

Overall, 41 (39%) patients stated that they had fallen more than once in the past; 22% stated that they had injured themselves in the fall; and 56% stated that they had near falls. Additionally, 60% stated that they had either fallen or had near falls (See figure 7).

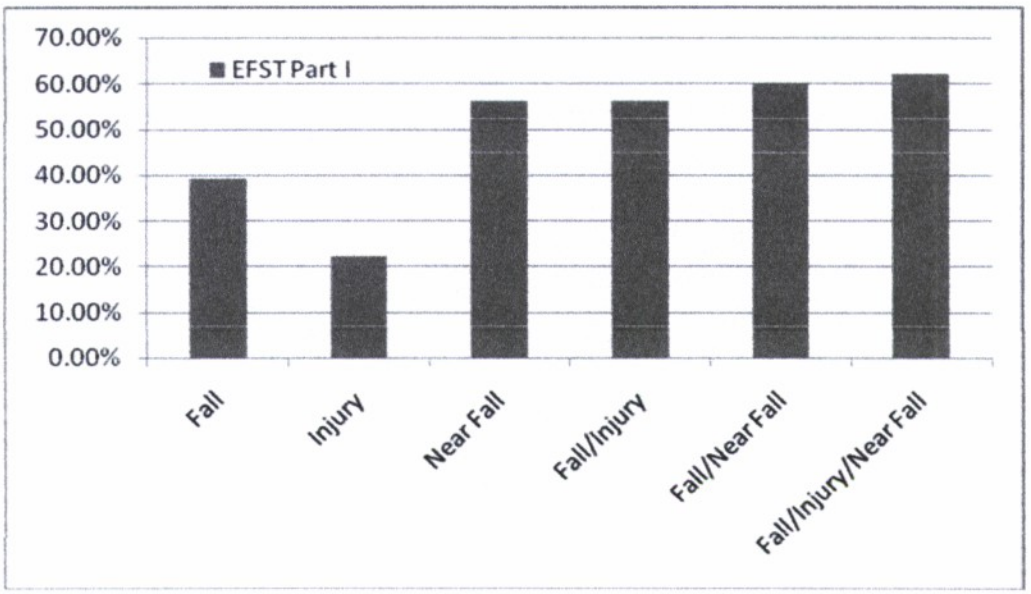

Figure 7. Percentage of patients within each question type

Note: Data gathered from JHOC falls study questionnaire

Of Study Subjects, 17% walked a distance of 15 feet, slower than 10 seconds in 24% the gait was observed to be uneven, shuffling or wide based. TUG and Tinetti- Overall the EFST was abnormal in 45% f cases (16% were high risk; rest medium risk); TUG was abnormal in 37% (8% were high risk); and Tinetti was abnormal in 30% of cases (15% were at higher risk) (See Figure 8).

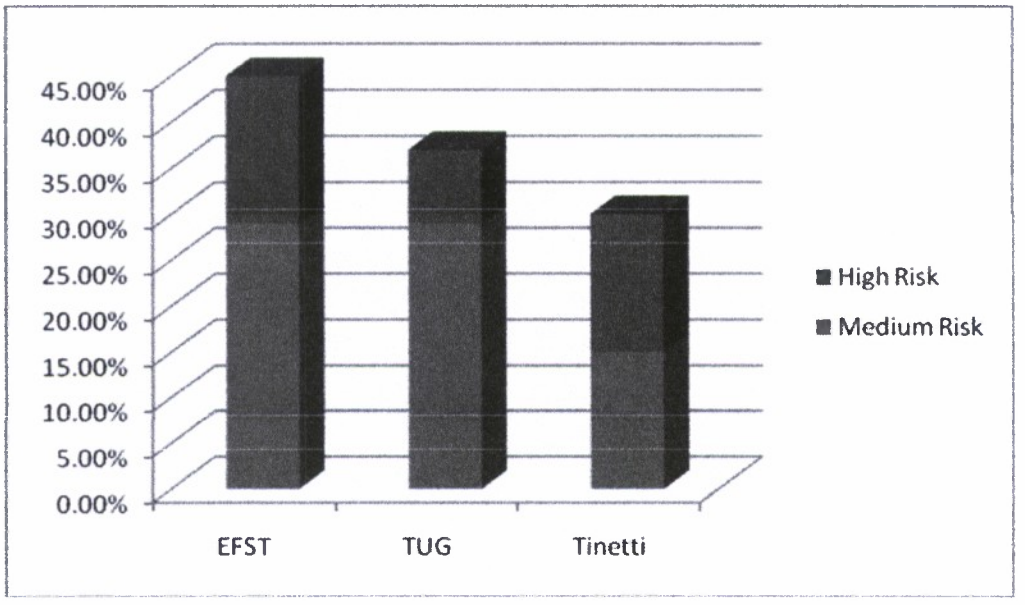

Figure 8. Percentage of medium to high risk observances

Note: Data gathered from JHOC falls study questionnaire

Overall, patients that stated they had fallen or had near falls correlated well with TUG and Tinetti testing. Falls and Near Falls appeared to capture most patients with abnormalities noted on TUG, Tinetti, or Part II of the EFST questionnaire (See Figure 9).

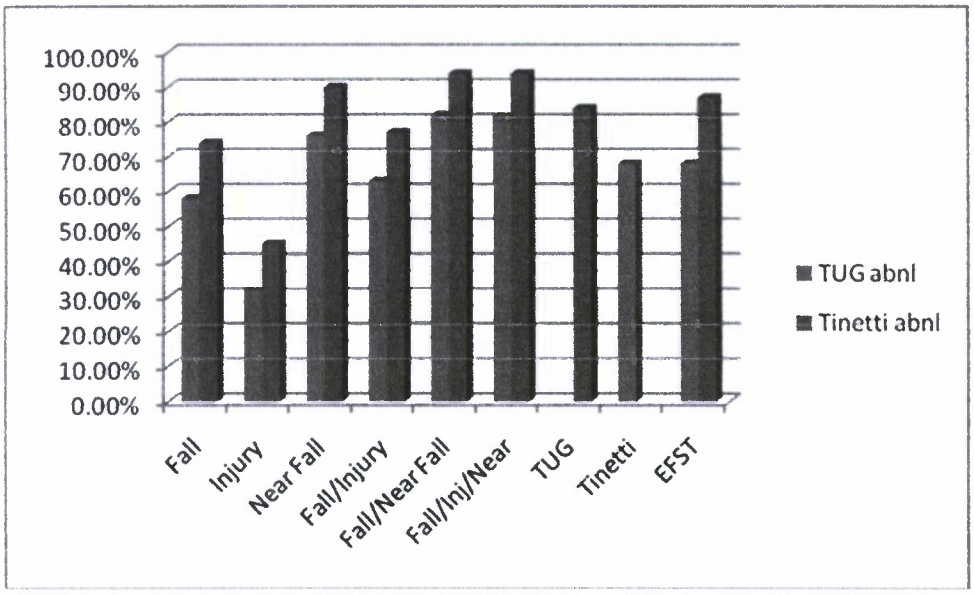

Figure 9. Percentage of patients with abnormal results

Note: Data gathered from JHOC falls study questionnaire

Extrinsic Factor Analysis - Root Cause and Facility Walkthrough

Fall Event Summary:

Two separate falls occured within the Neurology Clinic, Johns Hopkins Outpatient Center, over a span of three months. A group of multidisciplinary members from across the institution met to discuss these falls, determine issues that may be common to all instances, and to provide recommendations for fall prevention strategies. Figure 10 depicts the various intrinsic and extrinsic factors involved in the two neurology outpatient falls specifically.

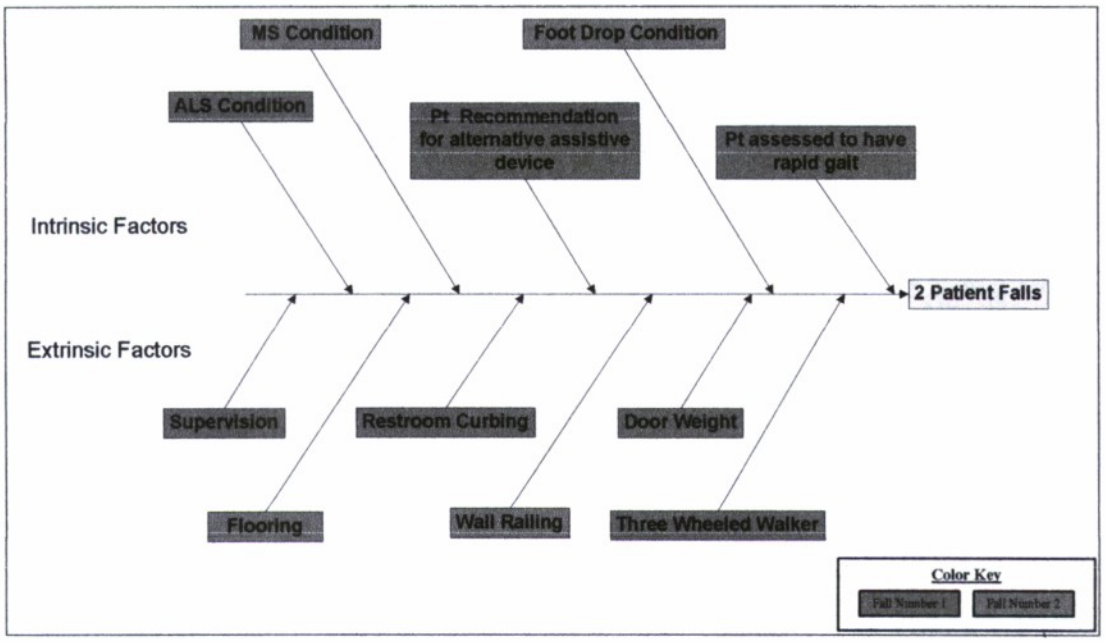

Figure 10. Cause and Effect Diagram - Root-Cause Analysis

Note: Data gathered from JHOC falls study questionnaire

Fall Event Synopsis:

Fall #1: An 89 year old patient was dropped off for her ALS Clinic visit at the front door of the outpatient center on July 29th 2008. After she was dropped off, she proceeded to the 5th floor of the outpatient center and asked where the bathroom was prior to checking in. The patient proceeded to the restroom, room number 5130A, using her three wheeled walker. The patient opened the door and while trying to enter the restroom fell and lacerated her left eye and had to go to the ED for treatment.

Fall #2: A 67 year old patient with MS was walking through the facility with her husband fell on the way to her appointment. The patient suffered from lower extremity weakness and had a "foot drop" associated with this condition. The patient expressed

previous issues with falls due to shiny floors that were in places such as airports and hospitals, and she also claimed that she knew prior to her fall that there was a high probability of falling because of the way the floor looked. The patient suffered a knee injury as a result of her fall.

Contributory Factors and Recommendations:

Functional and Cognitive Contributory or Causal Factors:

1. Need for assisted devices - the patient in fall #1 was using a three-wheeled walker, which is not the recommended device for this type of patient. This patient was subsequently advised that a walker with four legs would be more appropriate for stability. No recommendation on this action.
2. Related medical conditions - both patients described in these falls had conditions that have a higher risk for falls (ALS and MS). No recommendation on this action.

Environmental Factors:

1. Floor condition - the patient in fall # 2 described the floor as being "too shiny" and indicated to the medical provider that she knew prior to walking on it that she had a higher risk of a fall.

   Recommendation: Investigate alternative flooring in the neurology clinic hallway (outside of the exam rooms) to reduce the risk of falls for the higher risk population.
2. Restroom (5031A): There were two issues discussed concerning the restroom design that contributed to fall #1. First, the

granite lip that separates the restroom floor from the rest of the facility is a large obstacle for disabled patients to navigate as there is a large difference between the elevation levels of both sides of the lip. Second, the door leading into the restroom is heavy and shuts very fast.

Recommendation: Reduce and smooth the transition between the restroom floor and the floor of the outpatient center. Also, we recommend that the door speed be reduced to its slowest level to allow patients to navigate into the restroom in a safer fashion.

Other Recommendations

Environmental Factors:

1. Seating - the current layout of the patient waiting area is not very conducive to the complex patients that are being seen within neurology. Because of the nature of their conditions, many patients have difficulty sitting in the chairs provided. Also, there is no designated space for patients/visitors in wheelchairs.

Recommendation: Investigate the possibility of redesigning the patient waiting area to include a space for wheelchairs as well as seating that is either higher or adjustable for those patients who experience difficulty sitting in low chairs.

2. Railings - there was a discussion of patients who park in the patient parking lot outside JHOC and have to travel

through the facility to the Wilmer building. Although there is some support, there are no railings for patients to hold on to during the long walk, which creates a higher risk for falls.

Recommendation: Investigate the possibility of installing railings or other supportive devices/benches throughout the building for those patients who need assistance during their commute.

3. Signage - the signage in JHOC is hard to navigate. Many patients come in through the first floor doors of JHOC and do not know where they are going and not having adequate signage can add an additional amount of time for patients to travel to their appointments, which creates an additional risk for falling.

Recommendation: Investigate the possibility of installing new signage to make it easier for patients to navigate the outpatient center.

4. Exam tables - the exam tables in the outpatient rooms are stationary. This creates a risk, especially for inpatients that are being transferred from a stretcher.

Recommendation: Investigate the possibility of purchasing new exam tables that adjust for height.

5. Neurology JHOC acquired a loner versatile patient lift in Neurology to accommodate patients weighing up to 500 lbs and is able to provide a digital weight measurement while

the patient is suspended. Additionally, the lift may be used to easily, safely and comfortably transfer patients from their wheelchair to an exam table, allowing for more thorough examinations and avoiding the risk of falls.

Recommendation: It is recommended that lift to weigh patients be bought and kept on a permanent basis.

Service Recommendations:

1. Patient Risk Identification - there was a discussion about identifying patients as high risk or in need of assistance at the time of an appointment. This has potential of helping patients up front if they are at higher risk or in need of assistance during their visit.

   Recommendation: Investigate the possibility of including this factor when booking patients and develop a method to appropriately assist patients if assistance is requested. If assistance is requested, there was an idea to develop a concierge type service for patients, much like that seen for assistance required at the airport.

2. Patient room scheduling - there was a discussion about having patients with certain conditions go to certain treatment rooms, thus minimizing the distance from the waiting area to the appointment.

   Recommendation: Investigate feasibility in scheduling for Neurology clinic.

Falls Committee - Facility Walkthrough Findings

1. Bathroom lips either not present or shaved and rounded so that rolling walkers easily rollover them.
2. Self-closing doors on the slowest setting
3. The doors are too heavy for patients to manage
4. Varying chair heights in waiting areas (not all low chairs that may be difficult for the disabled to get out of)
5. Benches/ places to rest in hall outside metro entrance (from JHOC to elevators to the hospital)
6. Signage stating "If you need assistance getting to your appointment, please ask the front desk personnel" at JHOC entrance.
    - 6a. Volunteers to assist these individuals
    - 6b. Concierge for way-finding at JHOC entrance
7. Move the planters at JHOC entrance so does not "bottle-neck" there

Conclusion

Falls are common in the elderly population and result in mortality, morbidity, loss of independence, and higher healthcare costs. In addition to ageing population, patients seen in the Neurology Clinic, because of the nature of the medical conditions, (gait and balance problems, weakness, sensory loss, visual, hearing, and cognitive difficulties) are especially prone to falls. A systematic study was done to identify high fall risk factors in Neurology patients in the ambulatory setting. In addition, strategies to offering physical therapy and education,

an attempt was made to modify the environment and educate the staff to avoid any falls or injuries during the patient's visit to JHOC.

Risk of falls determined from an Injury of Falls:

The two questions, "Have you fallen more than once in the past year?" and "Do you occasionally or frequently have near falls?" identified majority of the patients found to have abnormalities of gait, balance, or walking. These questions can be incorporated into patient questionnaires and strategies taken to avoid falls. This strategy is consistent with the American Academy of Neurology's systematic review on this topic (Thurman et al, 2008). There are several Class I studies available that conclusively establish a previous fall predictor of future falls with RR of 2.5 and OR 3.7 (Thurman et al, 2008). Depending on the resources and the population, TUG and Tinetti are additional functional measures that are probably effective screening measures (Thurman et al, 2008). Since TUG takes less than a minute and can easily be performed by certified medical assistant, TUG should be incorporated in the assessment of patients if the population is considered high risk. One intervention strategy was to identifying these high risk patients with yellow wrist bands and educate the staff to gently and discreetly offer help in the bathroom and along hallways of the Neurology Clinic (This was appreciated and achieved high patient

satisfaction). In addition, educational resources from the CDC (See Figure 5) were handed to these patients to help them modify their home environments. Furthermore, home and outpatient physical therapy was arranged, if needed, by the attending physician.

In addition to identifying the high risk patients by intrinsic factors, we set out to eliminate any environmental hazards that made this patient population even at higher risk of falling. This was done through the Walk-through Safety Check and Root Cause Analysis of two falls. The recommendations were to modify the waiting area, the hallways, the bathrooms, and the examining rooms in ways that all environmental factors predisposing to falls were eliminated. The patient waiting area should be redesigned to include a space for wheelchairs as well as seating that is either higher or adjustable for patients who experience difficulty sitting in or standing up from low chairs. A separate visible sitting area for high risk patients should be available. The hallways should be free of obstacles, and JHOC should investigate alternate flooring and grab bars in the clinic hallway to reduce the risk of falls and prevent injuries if a fall does occur for the higher risk population. In addition, for high-risk patients, the distance traveled to the examining room should be minimized. The bathrooms should have handicapped high toilet seats with grab bars, level flooring, and door handles. The examining room tables and chairs should be of appropriate

height and be free of obstacles. Identifying high-risk patients at the time of scheduling an appointment by above questionnaire method and offering help requested.

Future Recommendations and Plans

The above method of identifying high-risk patients will be generalized to the entire in the entire Neurology Clinic as a part of MCIC Vermont, Inc. study. Implementing of environmental modification and elimination of extrinsic risks from arrival to departure from JHOC will need to be taken. Education of patients through brochures and Websites will need to be done. Patient appointment letters will need to address the high risk of falls and the JHM commitment to completely eliminate preventable falls and injuries. All falls should be recorded as adverse events needing root cause analysis. It is likely that different JHOC clinics will have different intrinsic and extrinsic risks and that there may not be a ubiquitous tool or intervention strategy applicable. An acute awareness of this problem at upper administration, physician, and staff level will lead to better recognition, prevention, and implementation strategies to solve this important problem.

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Appendix A

Neurology Falls Team members and their assigned duties:

Dr. Vinay Chaudhry:

Dr. Chaudhry served as the primary initiator of this improvement project. Dr. Chaudhry has been the Director of the Outpatient Neurology Center at Johns Hopkins for over ten years. He is board certified in Neurology and Electrodiagnostic Medicine. He maintains a very active Neurology Practice and serves as the Vice Chair of Clinical Affairs in the Department of Neurology. He currently oversees the smooth running of the clinic and has the requisite leadership and authority to implement changes. His role was to organize the JHOC falls team and respond appropriately to team frustrations so as to keep focus on the mission at hand. Being involved with day to day operation of the clinic, he is acutely aware of the minor details and steps involved in this process. He was be able to provide vital information and opinions on improvement strategies that have been tried in the past and will also seek any information and opinions the teams members can offer for improvement. in addition, he has been involved in Press Ganey surveys to assess patient satisfaction and can monitor for any changes to the program.

Julie Kubiak, RN, MSN:

Julie is the Assistant Director of Nursing for Ambulatory Care at Johns Hopkins Hospital, served as the facilitator for this project. Julie is skilled as initiating activity and serving as the team's gate-keeper. Julie fosters standard setting, unit cohesion, and pride. She understands the demands on the nursing staff and other support personnel including phlebotomist, physician assistants, and other nurses. Through her caring attitude she acted as an intermediary in patient communication and ensures patient safety and satisfaction. Julie was well suited to analyze any problem areas in the current clinic flow, help brainstorm for solutions, and unify the group to identify a root cause for falls.

Lori Paine, RN, BSN, MS:

Lori Paine is the Patient Safety Coordinator and Quality and Innovation Coach in the Johns Hopkins Center for Innovation in Quality Patient Care. She holds a Bachelor's Degree in Nursing from Nazareth College and a Master's degree in Applied Behavioral

Science and Change Management from the Johns Hopkins University. In addition to clinical and patient care management experience, she has held positions in hospital administration, product line development, and work process redesign. Lori's clinical and administrative experience, her special expertise in patient safety issues and access to Patient safety net (PSN), an online web-based reporting system of any safety lapses, were crucial to this project.

Judy Norris:

Judy is the Neurology clinic manager is central to the operation of the outpatient clinic. She supervises the patient service coordinators (PSCs) and ensures that the registration of the patients, the paper work for insurance, room availability, and the smooth flow of patients from waiting room to physician's room occurs. The clinic manager is the central part of patient check-in and check-out system. The clinic manager is also responsible for interacting with the physicians, physician assistants, and the nurses. The clinic environment has to be at par with the standards of The Joint Commission. She has been the clinic director for the last five years. She is an expert in organization and communication, as she must receive all requests for rooms the day before and ensure that each physician has a room assigned that is in good working condition. Any problems in obtaining laboratory reports or radiological tests also will fall in her realm of responsibilities. Ms. Norris has a structured and defined role and is a central link between physicians, support staff, and patients. Ms. Norris is a very committed person who is familiar with the needs of Neurology patients. It is essential to understand the dynamics of the Neurology patients which include patients with muscular dystrophy, multiple sclerosis, dementia, stroke, Parkinson's disease, and brain tumors. Most of these patients are quite handicapped and require assistance either with braces, canes, walkers, or wheelchairs. In addition, they often need help with transfers from chair to the examining tables to be examined. Cognition of some of these patients is an issue and communication with family members becomes crucial

Mary A. Rice, MBA, MSN:

Mary is Director of Nursing for Ambulatory Care, Johns Hopkins Hospital, Baltimore, MD. She has been in charge of this department at an operational and financial level for twenty years. She is very detail oriented and can provide vital information to the team in the development on this project. As a skilled evaluator, her role was to help coordinate and monitor the data collection process over time. She oversaw all data analysis and data presentation through appropriate chart, figure,

and graph selection. Her unique ability to present complex data in a simplified manner was well utilized by our team. Given her central role, she was able to ensure that deadlines are adhered to, as well as address and identify when conflicts arose and mediated team members through these situations. She had the talented to manage the support staff and physicians and was receptive and flexible to the needs of the patients, physicians, and staff.

Michael Friedman, PT, MBA:

Michael is the Director, Rehabilitation Therapy Services at the Johns Hopkins Hospital and is familiar with the falls in elderly as it relates to assessment, training, and rehabilitation. In addition, he has been involved with the inpatient falls safety issues and has worked closely with the hospital leadership in this capacity. He was responsible for keeping our team focused on the goal and the mission.

Donna Beck, PT:

Ms. Beck served to lead the home services physical therapy resource. Donna is a certified physical therapist who is well aware of the needs of the handicapped individuals when they are discharged home. She helped select the relevant educational materials and guide the team to different home therapy options available and their respective insurance coverage.

John M. Gardner, M.Ed:

John is a Lieutenant Medical Service Corps Officer serving on active duty in the United States Navy. He is also a Fellow with the American College of Healthcare Executives. He has served on active duty for the past thirteen years of which the last eight have been committed to Navy Medicine. John is now in his second year of the U.S. Army Baylor Program in Health Administration. He has been assigned as a Military Fellow, Department of Operations Integration, Johns Hopkins Hospital for a residency year in efforts to gain a better understanding of the civilian health system. With this knowledge, he will be able to carry-over lessons learned from this academic medical system to the military health system. His involvement has been to develop the clinical survey apparatus, chronicle the efforts as a case study and provide an in-depth quantitative analysis on the material.

Richard Davis, PhD:

Dr. Davis was responsible for providing the coach responsibilities to the team and providing all the necessary

resources to carry out this project. Chip has a PhD in Health Policy and Management from The Johns Hopkins University School of Public Health, a Master's degree from Harvard University's Graduate School of Education and a Bachelor's degree in psychology from the University of Michigan. He is Johns Hopkins Medicine's (JHM) Vice President for Innovation and Patient Safety, directing JHM's system-wide effort to improve the quality, efficiency and safety of patient care. Dr. Davis in his capacity as the Executive Director for the JHM Center for Innovation in Quality Patient Care oversees a multidisciplinary staff leading initiatives to facilitate innovative, patient-centered approaches to make Hopkins the safest place to receive patient care.

Appendix B

Neurology Falls Risk Assessment - Front Page

The Johns Hopkins Neurology Clinic is identifying patients who may be at risk of falling before they have a major injury. Will you please fill out the questions below and participate in the *Timed Up and Go* test?

EFST Section I: Questionnaire: Section to be completed by patient:

1. How many times in the past year did you fall? ☐ One or less times --- place a "0" in the box to the right ☐ More than once --- place a "1" in the box to the right	___
2. Did you injure yourself from any fall? ☐ No injury or no fall --- place a "0" in the box to the right ☐ Any Injury (soft tissue or fracture) --- place a "1" in the box to the right	___
3. How often does it happen to you that you think you are about to fall, but manage to grab something and then don't fall? ☐ Never or Rarely have near falls --- place a "0" in the box to the right ☐ Occasionally/ frequently have near falls -- place a "1" in the box to the right	___

- At any point during your visit to the Johns Hopkins Outpatient Center, did you feel that you were likely to fall? Yes / No (Please consider: parking lot, elevators, hallways, doors, escalators, etc...)

  If Yes, please describe: _____

- What can we do to make our environment safer?

(SECTION TO BE COMPLETED BY STAFF OR PROVIDER)

TIMED UP AND GO

1. Begin timing
2. Rise from standard arm chair (seat ht 18.4")
3. Walk 10 feet, turn and return to chair
4. Sit in chair again
5. End Timing

EFST Section II: Gait Observation

4. Respondent is asked to walk at normal pacing speed over 15 feet. Walking speed is recorded with a stopwatch ☐ walking speed - faster than 10 sec's = 0 ☐ walking speed - slower than 10 sec's = 1	___
5. Gait style is observed and recorded ☐ gait is even, straight and feet are raised with each step score =0 ☐ gait is uneven, shuffling, on a wide base, or unsteady score =1	___
EFST Total of question 1 - 5 (Circle risk level below)	___

High	Medium	Low
4-5	2-3	0-1

TUG Timed Results (Circle Risk level below)		___
High	**Medium**	**Low**
≥28 Sec	14-28 Sec	<14 Sec

Staff Signature

Provider Signature

Neurology Falls Risk Assessment – Back Page

Tinetti Balance Assessment Tool

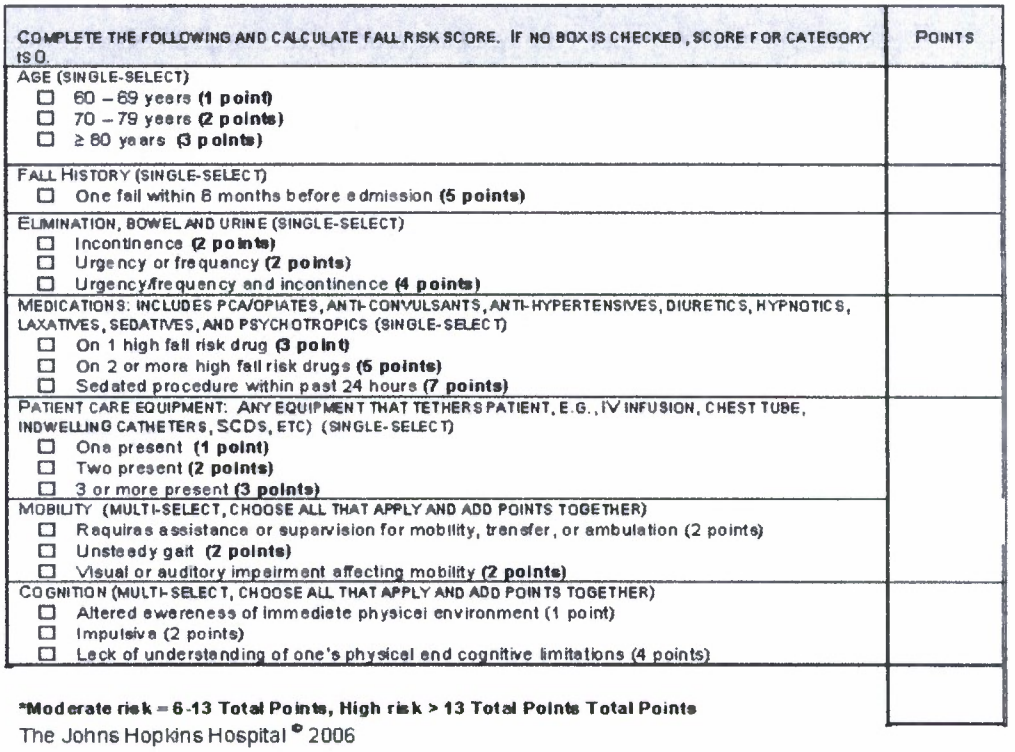
BALANCE TESTS: Subject is seated on hard, armless chair		
SITTING BALANCE	Leans or slides in chair = 0; Steady, safe =1	_____
ARISES	Unable without help = 0; Able, uses arms to help = 1; Able without using arms = 2	_____
ATTEMPTS TO ARISE	Unable without help = 0; Able, requires > 1 attempt = 1; Able on first attempt = 2	_____
IMMEDIATE STANDING BALANCE (first 5 seconds)	Unsteady (moves feet, sway, swaggers) = 0; Steady but uses walker or other support = 1; Steady without walker or other support = 2	_____
STANDING BALANCE	Unsteady = 0; Steady but wide stance (Medial heels > 4 inches apart) and uses cane or other support = 1; Narrow stance without support = 2	_____
STERNAL NUDGE (feet close together)	Begins to fall = 0; Staggers, grabs, catches self = 1; Steady = 2	_____
EYES CLOSED (feet close together)	Unsteady = 0; Steady = 1	_____
TURNING 360°	Discontinuous steps = 0; Continuous steps = 1	_____
TURNING 360°	Unsteady (grabs, staggers) = 0; Steady = 1	_____
SITTING DOWN	Unsafe (misjudges distance, falls) = 0; Uses arms or not a smooth motion = 1; Safe, smooth motion = 2	_____
BALANCE SCORE TOTAL		_____ **/16**
GAIT TESTS: Subject walks at normal pace		
GAIT INITIATION (immediate after told "go")	Any hesitancy, multiple attempts to start = 0; No hesitancy = 1	_____
STEP LENGTH	R swing foot passes L stance leg = 1; L swing foot passes R stance leg = 1	_____
FOOT CLEARANCE	R foot completely clears floor = 1; L foot completely clears floor = 1	_____
STEP SYMMETRY	Right and Left step length unequal = 0; Right and Left step length equal = 1	_____
STEP CONTINUITY	Stopping or discontinuity between steps = 0; Steps appear continuous = 1	_____
PATH (excursion)	Marked deviation = 0; Mild/moderate deviation or uses device = 1; Straight without assistive device = 2	_____
TRUNK	Marked sway or uses assistive device = 0; No sway, but knee or trunk flexion or spreads arms out while walking = 1; None of above deviations = 2	_____
BASE OF SUPPORT	Heels apart = 0; Heels almost touching with gait = 1	_____
GAIT SCORE TOTAL		_____ **/12**
COMBINED BALANCE AND GAIT SCORE		_____ **/28**
Diagnosis / Assistive Device:		

Tinetti Results (Circle Risk level below)		_____
High = <19	Increased = 19-24	Low = ≥25

Appendix C

Neurology Falls Methodology List

I. FALL RISK ASSESSMENT IN ACUTE CARE SETTINGS: Nursing Assessment Tool	
1. STRATIFY (St. Thomas 's Risk Assessment Tool in falling elderly inpatients) (Oliver, Britton, Seed, Martin, and Hopper, 1997).	1 Did the patient present to hospital with a fall or has he or she fallen on the ward since admission? (Yes=1, No=0) Do you think the patient is (questions 2-5) 2 Agitated? (Yes=1, No=0) 3 Visually impaired to the extent that everyday function is affected? (Yes=1, No=0) 4 In need of especially frequent toileting? (Yes=1, No=0) 5 Transfer and mobility score of 3 or 4? Transfer score: 0=unable, 1=major help needed (one or two people, physical aids), 2=minor help (verbal or physical), 3=independent. Mobility score: 0=immobile, 1=independent with aid of wheelchair, 2=walks with help of one person, 3=independent. (Yes=1, No=0) Total score ≥2 high risk
2. FRAT (Fall Risk Assessment Tool) (Schmid, 1990).	1 Is there a history of any fall in the previous year? (Yes=1, No=0) 2 Is the patient on four or more medications per day? (Yes=1, No=0) 3 Does the patient have a diagnosis of stroke or Parkinson's disease? (Yes=1, No=0) 4 Does the patient report any problems with his/her balance? (Yes=1, No=0) 5 Is the patient unable to rise from a chair of knee height?

	Total score ≥3 high risk
3. The Johns Hopkins Hospital Fall Assessment Tool	

COMPLETE THE FOLLOWING AND CALCULATE FALL RISK SCORE. IF NO BOX IS CHECKED, SCORE FOR CATEGORY IS 0.	POINTS
AGE (SINGLE-SELECT) ☐ 60 – 69 years **(1 point)** ☐ 70 – 79 years **(2 points)** ☐ ≥ 80 years **(3 points)**	
FALL HISTORY (SINGLE-SELECT) ☐ One fall within 6 months before admission **(5 points)**	
ELIMINATION, BOWEL AND URINE (SINGLE-SELECT) ☐ Incontinence **(2 points)** ☐ Urgency or frequency **(2 points)** ☐ Urgency/frequency and incontinence **(4 points)**	
MEDICATIONS: INCLUDES PCA/OPIATES, ANTI-CONVULSANTS, ANTI-HYPERTENSIVES, DIURETICS, HYPNOTICS, LAXATIVES, SEDATIVES, AND PSYCHOTROPICS (SINGLE-SELECT) ☐ On 1 high fall risk drug **(3 point)** ☐ On 2 or more high fall risk drugs **(5 points)** ☐ Sedated procedure within past 24 hours **(7 points)**	
PATIENT CARE EQUIPMENT: ANY EQUIPMENT THAT TETHERS PATIENT, E.G., IV INFUSION, CHEST TUBE, INDWELLING CATHETERS, SCDS, ETC) (SINGLE-SELECT) ☐ One present **(1 point)** ☐ Two present **(2 points)** ☐ 3 or more present **(3 points)**	
MOBILITY (MULTI-SELECT, CHOOSE ALL THAT APPLY AND ADD POINTS TOGETHER) ☐ Requires assistance or supervision for mobility, transfer, or ambulation (2 points) ☐ Unsteady gait **(2 points)** ☐ Visual or auditory impairment affecting mobility **(2 points)**	
COGNITION (MULTI-SELECT, CHOOSE ALL THAT APPLY AND ADD POINTS TOGETHER) ☐ Altered awareness of immediate physical environment (1 point) ☐ Impulsive (2 points) ☐ Lack of understanding of one's physical and cognitive limitations (4 points)	

***Moderate risk = 6-13 Total Points, High risk > 13 Total Points Total Points**

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4. MFS (Morse Fall Scale) (Morse, Morse and Tylko, 1989)	National Center for Patient Safety recommended risk assessment tool for inpatients. History of falling Yes (scored 25) if a previous fall is recorded during the present admission or if there is immediate history of physiological falls (i.e., from seizures, impaired gait) prior to admission. Secondary diagnosis Yes (15) if more than one medical diagnosis is listed on the patient chart. Ambulatory aids Scored 0 if patient walks without a walking aid even if assisted by a nurse or is on bedrest. Scored 15 if ambulatory with crutches, cane, or walker. Scored 20 if clutches for support. Intravenous therapy Scored 20 if has an IV apparatus or heparin lock. Gait Normal gait scored 0 if patient is able to walk with head erect, arms swinging freely at the side, & strides unhesitantly. Weak gait scored 10 if patient is stooped but able to lift head while walking. Furniture support may be sought but is of feather-weight touch, almost for reassurance. Steps are short, and the patient may shuffle. Impaired gait scored 20 if patient is stooped, may have difficulty rising from the chair, attempts to rise by pushing on the arms of the chair and/or by "bouncing". The patient's head is down, and because balance is poor the patient grasps the furniture, a person, or walking aid for support and cannot walk without assistance. Steps are short and patient shuffles. If patient is

	wheelchair-bound, the patient is scored according to the gait used when transferring from the wheelchair to the bed. Mental Status The patient is asked if s/he is able to go to the bathroom alone or if she/he is permitted up. If the patient's response is consistent with the ambulatory orders on the Kardex, the score is 0. If the response is not consistent with the orders or if the patient's assessment is unrealistic, score is 15. High risk is a score of 45 and above. The patient's actual score should be charted as well as ranking of risk (high medium and low).

5. HFRM (Hendrich Fall Risk Assessment Model) (Hendrich , Nyhuis, Kippenbrock and Soja, 1995)	Risk Factor	Risk Points	
	Confusion/Disorientation/Impulsivity	4	☐
	Symptomatic Depression	2	☐
	Altered Elimination	1	☐
	Dizziness/Vertigo	1	☐
	Gender (Male)	1	☐
	Any administered antiepileptics (anticonvulsants):	2	☐
	Any administered benzodiazepines:	1	☐

II. FALL RISK ASSESSMENT IN OUTPATIENT SETTINGS (Mobility and Balance are quite predictive of falls): Functional Assessment Tools

1. Timed up and Go test (TUG) (Shumway-Cook et al, 2000)	• Individuals are instructed to rise from a straight backed chair and walk 10 feet, turning, and returning to their chair. • This event is timed • Normal > 10 seconds. • Older adults with mobility difficulty or ADL dependence require > 30 seconds
2. Elderly Fall screening Test (EFST) (Cwikel et al , 1998).	Part One: Questionnaire 1. Q: How many times in the past year did you fall? 0 or one fall ... score 0; 2 or more falls ... score 1 Q: Did you injure yourself from any fall? No injury or no fall ... score 0 Any injury (soft tissue, fracture) ... score 1 2. Q: How often does it happen to you that you think you are about to fall, but manage to grab something and then don't fall? Never or rarely have 'nearfalls' ... score 0; Occasionally or frequently have 'nearfalls'... score 1 Part Two: Observations on gait patterns Respondent is asked to walk at normal pacing speed over a 5 M distance. 1. Walking speed is recorded with a stopwatch If walking speed is faster than 10 seconds over 15 ft... score 0 If walking speed is slower than 10 seconds over 15 ft ... score 1 SCORE: 2. Gait style is observed and recorded If gait is even, straight and feet are raised with each step ... score 0 If gait is uneven, shuffling, on a wide base, or unsteady ... score 1

	SCORE: TOTAL SCORE:
3. Berg Balance Scale (Berg and Norman, 1996)	Rates the ability of an individual to maintain balance while performing Activities of Daily Living related tasks. Components include balance, lower and upper extremity strength. 14-item scale designed to measure balance of an older adult in a clinical setting. Requires 15 to 20 minutes to administer. Training is required to administer this test.
4. Dynamic Gait Index (Whitney, Hudak and Marchetti, 2000).	Assesses the likelihood of falling in older adults. Used to rate the ability of an individual to modify gait in response to changing task demands. Designed to test eight facets of gait. Requires 15 minutes to administer. Training is required to administer this test.
5. Tinetti Performance Oriented Mobility Assessment (POMA) (Tinetti, 1986).	Tinetti Performance Oriented Mobility Assessment (POMA) Easily administered task-oriented test that measures an older adult's gait and balance abilities. Rates the ability of an individual to maintain balance while performing Activities of Daily Living related tasks. Components include balance, lower and upper extremity strength. Requires 10 to 15 minutes to administer. Training is required to administer this test.
6. Activities-specific Balance Confidence (ABC) Scale 23. (Powell and Myers, 1995)	The ABC is a 16-item scale. Older adults are asked to rate their confidence that they will lose their balance or become unsteady in the course of daily activities. The ABC can be self-administered or administered via personal or telephone interview. Regardless of method of administration, each respondent should be queried concerning their understanding of instructions, and probed regarding difficulty answering specific items.