

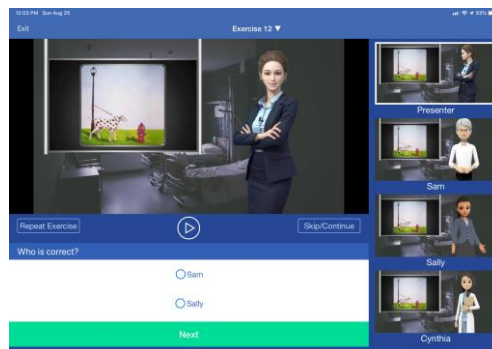
“White Paper”

PATIENT EDUCATION AND RISK MANAGEMENT VIA USE OF COGNITIVE GAME TECHNOLOGY

I: Prevention of facility-based falls with the “*Game of Falls*” approach

Overview:

- Learning is mediated by cognitive mechanisms involving instruction and practice. Using a “games” model enhances such learning.
- We are developing a variety of cognitive games delivered via mobile application (“app”) to address medical education, noncompliance and risk management issues.
- Falls is a major issue for hospitals and rehab centers and creates both clinical and financial risk.
- The “*Game of Falls*” approach is a mechanism that allows for reduction of risk and documentation of facility efforts to prevent falls with specific patients and their family members.
- As a self-administered tool, it is used with minimal/no staff time.
- As an intermediated tool, family members or volunteers can assist.
- As a health professional tool, it offers reimbursement opportunities in the context of a clinical procedure.



Patient nonadherence to medical regimen is a known problem that has significant clinical and financial consequences¹. Efforts to educate patients and their families have only been partially successful in reducing the risk facilities face as a result of patient noncompliance. Our approach to this problem is in development of patient games based on cognitive learning principles. These games are enjoyable, interactive activities that increases compliance and reduces risk for a variety of hospital and facility-based issues.

The “*Game of Falls*” approach improves compliance and reduces falls risk by teaching adaptive skills within a cognitive-behavioral-educational framework. As a “game,” it is an entertaining and effective and can be used both as a self-administered tool by the patient or as an intermediated tool used with the assistance of a family member or health care professional (e.g., NP, PA, etc.).

¹ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1661624/>

The system utilizes animated videos in an “app” (IOS and Android) which lead the patient through a series of scenarios (i.e. situation exercises), each depicting a particular aspect of falls risk. Patients use the structured game to learn and internalize principles that increase personal safety awareness and teach strategies to better deal with environmental hazards and challenges to personal wellbeing.

Although “Falls Prevention” remains a major goal for all health care settings, many patients do not respond to traditional prevention approaches that focus exclusively on environmental improvements such as providing safety bars or equipment, medical intervention, medication management or physical therapy intervention such as balance or weight training. They also do not reliably follow the directions that nursing staff provide. Despite all the traditional approaches, falls risk remains high and strategies for intervention remain limited.

Our approach in the “**Game of Falls**” focuses on behavioral and cognitive-psychological exercises to reduce risk. It is a delightful, eye-catching and interactive game that patients enjoy and tolerate. For patients who have problems with formal therapy approaches, the “**Game of Falls**” offers a non-pressured and enjoyable means to address falls risk. Studies conducted have found that patients rate the program's "enjoyability" factor as high.

Rationale and Medical basis

Falls are common in among hospital patients and represents a potentially devastating complications particularly for older patients. Falls have been reported to occur at a rate of 3–5 per 1000 bed-days, with the Agency for Healthcare Research and Quality estimating that 700,000 to 1 million hospitalized patients fall each year. The average hospital cost for a fall injury is over \$30,000².

Despite the clinical significance and frequency of the problem, nursing and rehabilitation professionals often struggle to provide effective interventions with hospital patients at risk for falls. Many patients are considered either to impaired or too frail to benefit from rehabilitation services. Others have limited physical tolerance for therapy and exhaust themselves easily. Many do not understand instructions provided to them verbally by nursing staff. The perception is that there is a limited repertoire of interventions possible with these residents. The “**Game of Falls**” offers a solution by providing a user-friendly tool that is easy to use, not focused on extended amounts of time, and enjoyable for the patient. Where cognitive issues are present, the assistance of a family member, volunteer or health professional allows the game to be played and benefits to be realized.

Cognitive-behavioral intervention: The “**Game of Falls**” approach focuses on behavioral factors related to falls. Although clinically significant, this is a much-ignored area of intervention. The WHO Global Report on Falls Prevention in Older Age (2007)³ lists behavioral factors such as risk taking behaviors, not asking for help, attitudes toward falling and coping with falls as major determinants to be considered in treating falls behavior. These factors are particularly acute in those who have “intercepted falls”, as, while they are “at risk”; they are typically more cognitively intact and less physically deteriorated than those are at greater risk. They tend to take more risk, be less attuned to their condition and more prone to the behavioral factors noted in the WHO report. Medicare cites patient education, instruction and provision of cues

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<https://www.cdc.gov/homeandrecreationalafety/falls/fallcost.html#targetText=Fall%20injuries%20are%20among%20the%20most%20expensive%20medical%20conditions.&targetText=The%20average%20hospital%20cost%20for%20a%20fall%20injury%20is%20over%20%2430%2C000.&targetText=The%20costs%20of%20treating%20fall%20injuries%20goes%20up%20with%20age.>

3 http://www.who.int/ageing/publications/Falls_prevention7March.pdf

and compensatory training for safety awareness as critical and reimbursable services. Treatment of these variables is at the core of our program.

The Behavioral/Cognitive aspects of FALLS...

For many residents, *attitude*, compliance and perception is critical in accounting for why they fall...changing *attitude* is the key to modifying *risk* and changing behavior...



Empirically-based treatment. The “*Game of Falls*” approach uses an application (iPad or Tablet) designed both as a risk management tool and a rehabilitation tool; one that can improve functioning and address risk factors. In a peer-reviewed study using the program, the system was found to reduce falls in the treated sample by 52%.⁴



Study published in JAMDA on the “*Game of Falls*” program

In development:

Our cognitive gaming team is planning additional games to address:

1. Preventing falls at home: community-based game approach
2. Preventing pressure ulcers in the hospital or rehab setting
3. Infection control: patient and family intervention
4. Staff education series for hospital issues (e.g., mass casualty, active shooter, etc.)

Versions in English, Spanish, Arabic and Chinese are being planned.

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⁴ Mansdorf, IJ, et.al. (2009) Falls Reduction in Long-Term Care Facilities: A Preliminary Report of a New Internet-Based Behavioral Technique. *Journal of the American Medical Directors Association*, 10, 630-633.