

RESEARCH PROGRAM: PREVENTING PATIENT FALLS (1981-present)

My background in nursing and physical anthropology has provided me with in-depth expertise and a multiple method toolkit for bridging clinical research and patient safety, in relation to falls. This, combined with a solid background in research methods, including mixed-method design, situates me well for developing this program. This safety and falls research began in the 1980s, when, with a joint appointment as Clinical Nurse Researcher at the University of Alberta Hospital, I was asked to “look at patient falls on Women’s Rheumatology unit. However, with the fall rate on one unit, it was clear that it would take 32 years to get a large enough sample—all falls in the entire hospital should be examined—as well as those occurring in the nearby nursing home and the rehabilitation hospital patient population a few miles away.

The following projects were conducted over 4 decades. Those conducted in Canada were funded by the Mackenzie Health Science Center, and those in the US, by AHRQ.

Project 1: How serious is the patient fall problem?

In 1982, we conducted a retrospective study of falls in an acute care hospital to determine the extent of the problem of falling in a hospitalized population.

Major findings: Analysis of 744 falls occurring in 12 months in a major health science center. Fall rate was 2.3/1000 pt bed days. 27.3% were falls from the bed; 18.2 from the commode, chair or wheelchair. 70% were without injury; 26.5% with minor injury; and 3.6% serious injury (concussion or fracture) This was the first

analysis of an acute care population.

Publication:

Morse, J. M., Prowse, M., Morrow, N., & Federspiel, G. (1985). A retrospective analysis of patient falls. *Canadian Journal of Public Health, 76*(2), 116-118.

From this study, the goal of my safety and falls research was identified. Initially, I intended to triage the fall-prone patient so that interventions could be targeted to those most at risk of falling.

Project 2

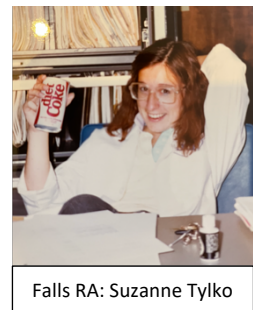
A prospective study is 100 patients who fell and 100 randomly selected control from 3 patient care settings. Using discriminant analysis of these data to determine if patient falls could be predicted.

Major findings: I developed the Morse Fall Scale (MFS); see attached information; http://en.wikipedia.org/wiki/Morse_Fall_Scale). The development and use of the *Morse Fall Scale*—to triage the fall prone patient six-item scale. (Also see the attached section.)

Morse, J. M., Morse, R. M., & Tylko, S. (1989). Development of a scale to identify the fall-prone patient. *Canadian Journal on Aging, 8*(4), 366-377. DOI: <http://dx.doi.org/10.1017/S0714980800008576>.

Additional Publications:

1. Identification of the types of falls: From these fall scale data, I identified 3 types of falls, changing the classification system from data from falls previously classified as Internal (intrinsic) and External (extrinsic) factors, to *Anticipated physiological falls* (82%); *Unanticipated physiological falls* (14%) and *Accidental falls* (6%). Each type of fall has a different approach to prevention.



Falls RA: Suzanne Tylko

Morse, J. M., Tylko, S., & Dixon, H. A. (1987). Characteristics of patients that fall. *The Gerontologist, 27*(4), 516-522. PMID: 3623149.

2. Computer modeling techniques were used to estimate the performance of the Morse Fall Scale at different criterion levels and using various estimated economic and social costs associated with selected decisions.

Morse, J. M. (1986). Computerized evaluation of a scale to identify the fall-prone patient. *Canadian Journal of Public Health*, 77 (suppl. 1), 21-25. PMID: 3742424

3. Examination of multiple fallers: For 11 of the 20 multiple “fallers”, the second fall occurred in same circumstances as the first fall. **Publication**

Morse, J. M., Tylko, S., & Dixon, H. A. (1985). The patient who falls ... and falls again. Defining the aged at risk. *Journal of Gerontological Nursing*, 11(11), 15-18.

4. Recognizing that the fall literature reported patient falls differently (for instance: By falls/100 patients; by 100 bed days), making comparisons difficult, we clarified reporting standards.

Morse, J. M., & Morse, R. M. (1988). Estimating fall rates: Methodological problems. *QRB Quality Review Bulletin*, 14(12), 369-371.

Project 3

Next, to ensure that the MFS was clinically feasible, we tested the MFS prospectively, in six units with different patient populations, for a period of 6 months.

Publication

Morse, J. M., Black, C., Oberle, K., & Donahue, P. (1989). A prospective study to identify the fall-prone patient. *Social Sciences & Medicine*, 28(1), 81-86. PMID: 2928815.

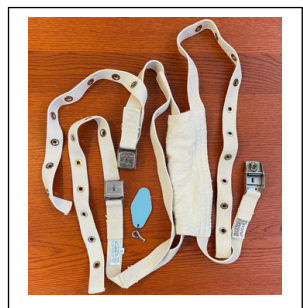
Project 4

Once we had constructed a valid and reliable tool to identify the fall-prone patients and the risk of falling, we were concerned that fall interventions were so limited that the use of the scale would actually increase the use of restraints. With co-investigators from Bioengineering, I conducted studies to explore the effects of restraints, and conducted 2 studies to determine the behavioral effects of restraining patients, and to determine if nursing care could be provided without restraints, and using fall interventions (a low bed and bed alarm). With J Steadman, I received patents for the development of a bed alarm, and a low bed with reduced length side rails.

Publications

McHutchion, E., & **Morse, J. M.** (1989). Releasing restraints: A nursing dilemma? *Journal of Gerontological Nursing*, 15(2), 16-21. PMID: 2915113.

Morse, J. M., & McHutchion, E. (1991). Releasing restraints: providing safe care for the elderly. *Research in nursing & health*, 14(3), 187-196. PMID: 1887099.



Restraints, used in 1985



Bed Alarm

Left: Placement on bed (under mattress, 1984).
Prototype 1: Nurses used bulb to pump up B/P cuff.
Right: Prototype 2-Flat plates (2), with spring to automatically inflate; Air pressure alarm (sits on pts locker); Remains of rubber B/P cuff (2022)



Left: Variable height bed. PCT Applications No: PCT/CA91/00236; International Publications No: 92/00712, Filing date July 11, 1991. Abandoned: April 6, 1992. Co-inventors, Heinz, D., & **Morse, J. M.**

Right: Bed alarm. British Provisional Patent No: 91 07 248.8. Filing date: April 6, 1991. Abandoned April 6, 1992. Co-Bed alarm inventors, Stedman, J. & **Morse, J. M.**

Project 5

By the mid 1990s, I became interested in knowledge translation, and published evaluation articles, books and a video “Preventing patient falls” on the implementation for fall intervention programs.

Publications

Morse, J. M. (1994). Strategies for preventing resident falls. *PADONA/LTC*, 7(1):15-22. Reprinted in *ASLTCN (American Society for Long Term Care) Journal*, 5(1), 15-22.

Morse, J. M. (1993). Nursing research on patient falls in health care institutions. *Annual Review of Nursing Research*, 11, 299-326.

Manual for the MFS:

Morse, J. M. (1997). *Preventing patient falls*. Newbury Park, CA: Sage.

Morse, J. M. (2009). *Preventing patient falls*. (2nd ed) NY:Springer.

Morse, J. M. (2001) Preventing patient falls in the elderly. *Reflections on Nursing Leadership*.

Morse, J.M. (2006). The safety of safety research: The case of patient falls. *Canadian Journal of Nursing Research*, 38(2), 72-86.

Morse, J.M. (2018). *Preventing patient falls institution-wide: The role of the administrator*. Henry Stewart Talks: London, UK.

Project 6

At the University of Alberta, early in 2000, I began researching bed ingress and egress and became interested in bed height as related for falls and fall injuries. Relocating to the University of Utah, in 2007, I collaborated with Drs. Andrew Merryweather and Don Bloswick, to evaluate patient biomechanics and fall risk during hospital bed ingress and egress, to determine optimal bed height. This research, exploring the relationship of patient disability and ability to move about the hospital room, is an extension of the research program exploring environmental hazards that result in patient falls.

Publications

Doig, A & **Morse, J. M.** (2010). The hazards of using floor mats as a fall protection device at the bedside. *Journal of Patient Safety*. 9(2), 68-75. PMID: 22130346. Abstracted in American Hospital Resource Center Blog: <http://aharesourcecenter.wordpress.com/2010/06/24/bedside-floor-mats-risky-for-patient-falls/> and *Current Awareness Literature Alert*, July (2) 2010, 14(7.2) article 6.

Doig, A., Merryweather, A., **Morse, J. M.**, Bloswick, D. (2013). Challenges of Biomechanical Data Capture in an Anthropometrically Diverse Geriatric Population at Risk for Falls. *Proceedings of the Human Factors and Ergonomics Society: 2013 Health Care Symposium*, 2(1), 143-146.

Morse, J. M., Gervais, P., Pooler, C., Merryweather, A., Doig, A., Bloswick, D. (2015). The safety of hospital beds: Ingress, egress and in-bed mobility. *Global Qualitative Nursing Research*, 2, doi:10.1177/2333393615575321

Merryweather, A. S., Morse, J. M., Doig, A. K., Godfrey, N. W., Gervais, P., & Bloswick, D. S. (2015). Effects of bed height on the biomechanics of hospital bed entry and egress. *Work: A Journal of Prevention, Assessment & Rehabilitation*. 52(3), 707-713.

Morse, J. M., Merryweather, A. & Bloswick, D. (2016) Research Approaches to the Prevention and Protection of Patient Falls. (Chapter 20, pg. 341-386), in *Fall Prevention and Protection: Principles, Guidelines, and Practices*. Ed by Hongwei Hsiao. Boca Raton, FL, Taylor & Francis. ISBN: 978-1-4822-1714-8; eBook ISBN: 978-1-4822-1715-5; DOI: 10.1201/9781315373744-21

Taylor, D., Merryweather, A., & **Morse, J.** (2018, June). Biomechanical characterization of the hand touch corrective behavior in the frail elderly during bed egress. In *Proceedings of the International Symposium on Human Factors and Ergonomics in Health Care* (Vol. 7, No. 1, pp. 237-239). Los Angeles, CA: SAGE Pub.

Hang, X., Xiaotong, L., Yuanyuan, S., Taylor, D., Christman, M., **Morse, J.**, & Merryweather, A. (2021). Hospital bed height influences biomechanics during bed egress: A comparative controlled study of patients with Parkinson's disease. *Journal of Biomechanics*. <https://doi.org/10.1016/j.jbiomech.2020.110116>

Taylor, Dorothy, **Janice Morse**, & Andrew Merryweather. (2021). Creating a Safer Patient Room Environment: The Contribution of Patient Bed Height. *Proceedings of the International Symposium on Human Factors and Ergonomics in Health Care*. 10. (1), 180-184. Sage CA: Los Angeles, CA.

NOW

Presently, with Dorothy Taylor, I am completing, a biomechanical analysis of the strategy of bouncing as a mode of egress, and the risks of falling at various bed heights.
