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>> Bill: Thank you for joining us today for United Spinal Associations Webinar, Preventing Falls in Adults with Disabilities and Chronic Health Conditions: What Works. Today's distinguished presenter is Barbara Kornblau . Archived at [www.spinalcord.org](http://www.spinalcord.org). Please use the chat questions window on your control panel, to pose your question and we will be, do our best to get can to the questions at the end of today's presentation. For any questions remaining unanswered please e-mail directly to the presenters, whose address is displayed on the last slide. Closed captioning instructions also appear in the chat window of your control panel, just above, yeah in the chat window and as well there is a handout section on your control panel that holds the PDF version of Mrs. Kornblau, an attorney and Professor of Occupational Therapy at Florida A&M University. She has written books, book chapters and journal articles on the Americans with disability act, the rehabilitation Act and return to work issues. And now I'd like to hand it off to Barbara Kornblau for a detailed presentation. Barbara?

>>Barbara: Thank you Bill and welcome everybody. Today we're going to talk about falls and preventing falls in people with disabilities and chronic conditions and what works and what doesn't work. So the funding for part of this activity was made possible by the Health and Human Services office of woman's health and the views expressed, you can read this, basically it doesn't reflect the government. When we did this originally a few years ago, we updated it. The goals and objectives for this presentation. We're going to look at the factors that put people at risk for falling, we're going to explain proven facts based on research studies or the evidence that people can take to prevent their own falls or falls of family members or falls for whom they provide care. We're going to facilitate and empower your own self-management and self-management of others and explain to other specific successful fall prevention techniques that apply to people with disabilities and chronic conditions. Now I want to say a word

about what evidence means. In research there are levels of evidence. So this slide kind of shows the levels from the lowest level at the top to the highest level at the bottom. So anecdotal reporting or expert opinion, that's when someone says this is what I saw. Case studies and case reports, this is what I saw in one person or a couple of people. Moving up to more significant studies that are better evidence, such as randomized clinical trials where you take some people and put them in one group and other people and put them in another group and compare intervention from those two different groups and then finally at the bottom, which is the highest, is systematic reviews, which is a study of studies. Sometimes you hear something called a meta-analysis, which is similar and you gather all the studies that you can find on a subject with certain criteria and you look at what, what those, the study of the studies concludes. And that's considered very good evidence of something, whatever it's trying to prove. So what are the public health implications of the problem of falls? Over 700 thousand patients a year are hospitalized because of a fall injury, most often because of either broken hip or head injury. And falls among older adults, in particular older women, with chronic conditions are a public health problem. Falls cause fractures, traumatic brain injury, decrease quality of life, increase mortality, morbidity, cause early death, create unnecessary pain, trauma and costs to individuals and society as a whole. And most are preventable. And one in three adults, over the age of 65, fall every year, two-thirds of them will fall within six months. 95% of hip fractures are caused by falls and one in five people with hip fractures die within a year, this is how my dad died, he fell and within a year he passed away. Fractures are twice as high in women than men. Falls are leading cause of death among people 65 and older, most common cause of hospital admissions in this age group, most common interference with independent living and more likely to end up in long-term care facilities if you fall. More than 75% of emergency room visits among people 65 and older in 2010 were related to falls, which equals millions of people. Medicare pays 7% of the cost of falls. Now injuries with the highest costs for patients treated in the ER and then admitted to the hospital, number one is falls, 9.2 billion dollars. Number two is motor vehicle accidents at 5.1 and poisoning is 1.8. Now 34 billion dollars is the cost in 2013 for direct medical costs for falls, it is expected to be close to 55 billion by the year 2020. Now what about falls and spinal cord injuries? According to the National Spinal Cord Injury statistical center, while vehicle accidents, including cars, motor cycles, are the number one cause of spinal cord injuries, accounting for 39% of all spinal cord injuries, falls are number two. So it's the second highest cause of spinal cord injuries, accounting for almost 30% of all spinal cord injuries. That's one of the reasons United Spinal is very concerned about this issue. Who is at risk for falls? We know that women are higher risk of falls, people who live alone, people who have fallen before, people with disabilities, gait and balance problems and ambulatory, walking device or wheelchair users, people with cognitive impairments, neurological impairments, dementia, intellectual disabilities. We're going to be exploring all of these, intellectual disabilities, that was a new one to me. Depression, people who have had a stroke, people with Parkinson disease, dizziness, vertigo, urinary incontinence and other chronic conditions and people who take multiple medications, including anti-diabetes medications. In general falls in people with disabilities is systematic review was done, remember the highest level of evidence so a study of studies, to measure the influence of preexisting disability, having a disability on the risk of sustaining an injury, including falls. What this study found was that people with disabilities experience a higher risk of sustaining an injury in comparison to people without disabilities and that there's a high need for large epidemiological studies of injuries among people with disabilities, to better address the unique risk profiles in order to prevent additional disability or secondary conditions. This slide is like a summary of this whole talk. Because every disability group, we know that people with that particular group

experience a higher risk of falls. And every study says that we need more research to address the issue, to look at how can we prevent falls and additional disability or secondary conditions in people with disabilities. Now this was interesting, from Johns Hopkins, these medications caused blurry vision, if you have blurry vision it increases chance of falls. So anti-arrhythmia drugs may cause blurred vision, yellow vision or blue-green halos to appear around objects, a lot of older adults are on these drugs. Antimalarial drugs, you may say malarial, who takes those, treats Lupus and rheumatoid arthritis, can cause blurred vision, long-term use can cause irreversible retinal damage, Plaquenil is an example of that. Erect till dysfunction drugs can cause temporary problems like blurred vision, light sensitivity or blue-tinged site. Phenothiazine, used to treat schizophrenia, nausea and pain can cause blurred vision, changes in color vision and difficulty seeing at night, Compazine, Thorazine and Mellaril. When you consider there is a big push to get people off of opioids you may see more people using this classification for pain, this may increase. Tamoxifen, used for avoiding breast cancer, can lead to blurred vision, cataracts and changes to the retina and cornea, but it is rare, it happens, but it is rare. Who is at risk? We know older adults are at risk and people with chronic disabilities are at risk. We will look into all of these. Now let's look at people with disabilities versus people without disabilities. Using data from the 2004, 2005 National Health Interview Survey, something done by the government to monitor the public's health, so people are contacted to take this interview. Brophy took the data and compared medically treated injuries among people with and without disabilities. What they found is falls were leading mechanism of injury, regardless of disability status. Falls injure everybody. Falls were more common in severely or moderately disabled adults compared with those without disabilities. So 68% of 47% among severely and moderate compared to 28 among those without disabilities. For the severely disabled, 57% of injury episodes occurred at home compared with only 32% for the moderately disabled and 23% for adults with no disability. So that's more than half of the people with severe disabilities who are going to experience an injury episode are going to experience it in-the-home. So the home is a dangerous place. Now how about falls with people with intellectual disabilities, I mention that when I started this research that this was an interesting news to me. So study the prevalence of falls and risk factors of falls, this study looked at 1515 adults over the, 18 years and older. And this was from the longitudinal health and intellectual disability study. Nearly 25% of adults with intellectual disability reported to have had one or more falls during the past month. So nearly a quarter of them. And the prevalence of falls increase with advancing age. The following risk factors were found in the population of people with intellectual disabilities. Being female, having arthritis, having a seizure disorder, taking more than four medications, using walking aids and having difficulty lifting or carrying greater than ten pounds. Going to see these risk factors repeated in other groups as well. Another study in Australia 34% of 114 participants reported a fall in the previous twelve months. Similar for formal care, institutional system of former care, and community dwellers. Falls among people with intellectual disabilities occurs at a younger age and significant cause of injury and hospitalization. A Scottish, 511 community dwellers looked at over twelve month period higher rate of injuries and falls, incident fall injury was predicted by urinary incontinence, if you have urinary incontinence what happens, you are running to the bathroom. That tends to predict fall risk in other populations as well. Now interestingly having Down Syndrome reduced the risk, we don't know why but in this population study that's what they found, if you have Down Syndrome risk was less than if you have intellectual disability and didn't have Down Syndrome. Other factors common to the general population not relevant, increasing age on didn't matter, taking multiple meds didn't matter and fear of falling didn't matter in this particular study. In systematic review, again a study of studies found seven articles that met criteria. Up to 57% of

people with ID experienced a fall, caused 50 to 62% of recorded injuries. Risk factors may include age, impaired mobility, epilepsy and behavioral problems. Also found there was paucity of evidence for intervention strategies, no evidence on how to prevent, don't know what works. Lack of evidence for falls management. Reducing injuries by addressing the environment may help, exercise for gait, balance and strength may help and medical management may also help. So like many other studies we're going to see, there is very little evidence on how to manage falls and how to intervene to prevent them. Hearing loss, this was another one that was kind of surprising to me. There were 2017 adults between 40 and 69 years of age underwent a hearing test and falls history as part of National Health and Nutritional Examination Survey, another federal survey that's done to monitor the public's health. People with a 25-decibel hearing loss, classified as mild, were nearly three times more likely to have fallen. Every additional 10 decibels of hearing loss that increase chances of falling increase by 1.4 times. Even when researchers accounted for other factors linked with falls, age, sex, race, cardiovascular disease and vestibular function, mild hearing loss was the factor that increased the risk for falls. How about wheelchair users and falls? A 1949 study of non-institutionalized users of manually propelled wheelchairs was conducted in Nova Scotia, mailed over 2000 surveys, 500 people responded, looking at tipping incidents, where it tips and you fall. Found 57% reported completely tipping over or falling from wheelchairs at least once. 66% reported having partially tipped. So two thirds of people who are using wheelchairs are falling or almost falling and most people think that oh if you use a wheelchair, that takes away risk of falls, not true. Of the tips, 46.3% were in a forward direction, 29.5% were backward, that scare me because you can't put your hand out to protect yourself. And 24.2% were sideways tips. Many of the accidents occurred outdoors or on ramps. Now interestingly this was in 1994, it was in Canada, I would like to think that perhaps ramps now are better designed or more ADA compliant, although 1 to 12 doesn't really work for everybody, maybe that has changed a little bit since this study, it is old. Love to see it done again. 292 of the injuries were reported by 272 respondents so 47.1% fell a lot. Most, 84.3% were minor, abrasions, contusions, lacerations, sprains. But of the 15.8% serious, percent of serious injuries most common were fractures and concussions. Now factors that are associated with an increase risk of accidents and injuries in this study were being younger, age. Male gender, having paraplegic I can't or Spina Bifida as the reason for wheelchair use. Having had wheelchair prescribed to them. Some wheelchair features, this is really important for those of you who are wheelchair users. Having a lightweight chair, I don't know what a camber is, but that was in the study, adjustable rather-axis compel position or a nap sac or backpack. Adding stuff to wheelchair can be dangerous, wheelchair is designed to have balance in a certain place, if you add things it throws things off and it makes more likely to fall. Daily use of a wheelchair in propelling the Chair with both hands increase risk of accidents. Use of the wheelchair for recreation. Obviously if you're doing some serious recreation, playing wheelchair basketball or some other things you will increase risk of tipping. Use of a sideways transfer without a transfer board and my favorite one is doing repairs yourself or having them done by the dealer. So maybe someone who is not really familiar with doing the repairs that need to be done. The factors associated with a decrease risk of accidents and injuries included having multiple sclerosis, stroke or arthritis as the reason for wheelchair use. Having your chair propelled by an attendant or the use of a one-person assist for transfers. But the bottom line is that tips and falls are very common, serious injuries are not unusual and there is a pattern of risk factors for people who are wheelchair users. And some of those risk factors are similar to people who are not wheelchair users. In 1995 Kirby & Ackroyd-Stolarz analyzed 18 years of FDA data. Based on reported adverse wheelchair events. You know, when you use a device or a medication and you have an adverse event, something that goes

wrong, someone is supposed to report it to the FDA, so that's where this information came from. So 52.8 of the incidents were from executes E, 4.6 from powered wheelchairs, 22.6 were from manual wheelchairs. And the most common injury from falls were fractures. There were contributing factors, some of them in combination, so this adds up to different numbers. Engineering problems were 60.5%, environmental issues were 25.4, issues on behalf of the occupant, which could mean a lot of different things. Somebody fooling around, somebody have a chair that maybe is not the right chair, 9.6% and system errors were 4.6. The forward tip in this study was the most common in incidents with manual and powered wheelchairs and the sideway tip was the most common in scooters. And I'm a scooter user myself and I can certainly see why. I like to think things have changed since then, but I'm not convinced. Now what about home modifications and falls? An analysis of the 1994, 95 National Health Interview Survey, there was a disability supplement and again this is the, one of the many federal surveys that's done to monitor the public's health and they did a follow-up in six to 18 months looked at 525 community dwelling wheelchair users and found that 37.9% fell at least once in the past twelve months. And 17.7% had a fall related injury, so that's 46.7% of fallers. The presence of any indoor home modification was associated with a lower prevalence of injury from falls. So this study kind of showed that if you made home modifications to improve access, that was associated with lowering your risk of falls or the prevalence, the occurrence of falls. Factors associated with an increase odds of a fall-related injury included the use of other mobility aids, the reliance on multiple helpers or getting outside on a daily basis. Now why would that increase fall related injuries, people who get outside on a daily basis theoretically are more mobile and have better functions, they do more things and probably take more, do more risky things um as well. Not necessarily intentionally risky but more risky to go outside and do something fun than sit in the house and do nothing. How about aging with a spinal cord injury? If 759 people with a spinal cord injury responded to a question about subsequent injuries in the past twelve months. This was part of a longitudinal study that started in 1973. So the average age in this population was 54.3 and 27 years post-spinal cord injury. 19.2% reported one or more injuries in the past twelve months and 10.4% reported a fall that resulted in an injury. And an equal, the amount was equal um whether your mode of locomotion was walking, or, I'm sorry there was an equal number of people who walked and an equal number of people who used wheelchairs. But the higher odds of falling was produced by people who only use wheelchairs. This study was people with spinal cord injuries who walk as method of locomotion and people who use wheelchairs, but the wheelchair users had higher odds of falling, if you were a wheelchair user only. They also found prescription drug use resulted in higher odds of falling, especially in three oldest age groups, they had people above 65, they had people above that. The average age is 54 but they divided people in age groups. As people aged, if they used prescription drugs they had a higher odd of falling. If you think about it the people in three oldest age groups probably more prescription drugs, the aging process, cardiac, Type 2 Diabetes, et cetera. Non-white race was also significantly associated with falls in the twelve months, especially in the younger and oldest age group, don't know why but that was a significant finding. Among participants who had at least one or more injuries in the last year, 22.8% were hospitalized at least once for an injury in the last twelve months and 47.6% were limited in their normal daily activities for a week or more due to the injury that they sustained. No significant difference in falls, in injury or falls or the number of them by age group. So across the board the number of falls and injuries was the same. There were differences by age group, however, in the days that they had more limited normal activity. Time out of bed and the ability to get out of the house following the fall. Participants in the middle age groups were the most likely to be limited in their activities. which is interesting, it is not the oldest group, it is the middle age

group. And then the younger group, those who reported binge drinking in last 30 days more likely to report an injury. I think we can all probably figure out some little correlation there. But this study also said like all the studies we've been seeing before, we need more research, we need research on preventing injuries and falls, how do we do that? We know the information but don't know how to prevent it. It is pretty significant, these falls, so we should figure out how to prevent it by doing more studies. What about people with incomplete spinal cord injuries and falls. Well there was a survey of people with incomplete spinal cord injuries and 57% of the study participants sustained at least one fall over the previous year and even though these injuries were minor, 18% of the fallers with incomplete spinal cord injuries did sustain a fracture and 45% reported reduced ability to get out into the community and engage in productive activity as a result of the fall. So the factors perceived to contribute to falls most often in this study, of incomplete people with incomplete spinal cord injuries, were decreased trunk strength, decreased trunk strength, decreased strength in lower extremities, loss of balance and environmental hazards. So it may mean that if you have incomplete spinal cord injury you need to work on your trunk strength. And see if you can increase that. But that's not what the study says, that just seems like it might suggest it. This study prospectively looked at people with SCI who experience falls and those who didn't experience falls. Six month after discharge from rehab after initial spinal cord injury. So they looked at some functional ability tests, functional ability measured by certain tests like the time get up and go test and a few others, they found falls were positively correlated with increased long-term gains at six months in functional ambulatory motor skills rather than being reflective of worsening skills. So if you had more function, more motor function, then you had an increase chance of falling. Which is kind of unusual because you would think the opposite. But what they found was that 33% of the study participants said falls caused by environmental hazards, 33% caused by loss of balance. People with spinal cord injuries who had greater functional improvement experienced a higher risk of falls and this may be because they were doing more, they were transferring more, they may be more ambulatory, they believe able to reach for things and do things more outside of their comfort zone because they got more improvement. So this study said, therefore the number falls should not be sole measure of ambulatory function or balance in spinal cord injury, some other reason, something else causing falls, if it happens with people who improve their ambulatory motor skills, that just intuitively sounds backwards. That's what happen if you improve in your functional abilities and functional motor skills then you have an increased chance of falls.

If you don't probably going to sit in the wheelchair and not move around so much and put yourself at risk. Now what about medical complications and falls in people with spinal cord injury, after completion of rehab. So this was another study by same authors, took a hundred subjects and compared them with people with spinal cord injuries who rely on a wheelchair for mobility and people who are ambulatory, after they completed rehab. Two groups, 50 in each, 38% of the wheelchair users fell compared with 54% of the people who are ambulatory, with spinal cord injuries. I had a problem with this study, I was trying to come up with my own little abbreviations they use that horrible term that, you know, um people confine to wheelchairs, it is horrible. But they are not from the United States I like to think that's why they did that, so I called the groups wheelchair users and people who are ambulatory with spinal cord injuries. Now in the wheelchair user group, falls most often occurred while performing an activity in the wheelchair within and in the house. In the people who are ambulatory group, falls occurred while they were walking inside the house, due to loss of balance and hazardous environment. So that will kind of make sense, that people who are wheelchair users are going to be performing activities in their wheelchair, the interesting part is that big falls happen in the home. And we know that people

who are ambulatory are going to walk around the house and they, you know, the loss of balance and environment. So this kind of suggests, that's not what the study said, that you have to make sure that the house is accessible and there aren't hazardous things in the environment like rugs and long extension cords and things like that, that people can fall on. So this study also showed that increase level of mobility exposes subjects with spinal cord injury to increased opportunities to fall. Now what about veterans with spinal cord injuries? In this study they looked at wheelchair related falls and community dwellers and they had a perspective cohort they studied for one year. They had 659 subjects who completed the study and of them 31% or 204 participants reported falling 553 times, so 553 falls. 95% of the subjects or 14% were injured as a result of those wheelchair falls. They identified six significant risk factors. The first is pain in the previous two months, and then alcohol abuse, greater motor function, a history of previous falls, fewer spinal cord injury years, so years post-injury, shorter length of the wheelchair. Now they also found the started points, which are pain in the previous two months, greater motor function and history of previous falls, those three, they found to be factors that predict injury falls, plus inaccessible entrance to the home. So if you have an inaccessible access to the home, history of previous falls, those are factors that predict an injurious fall, a fall where you may get injured. Now in data analyzed from the national electronic injury surveillance system, another national survey, in 2003 there were more than a hundred thousand wheelchair related injuries that were treated in the emergency room in the US and that was two times the number reported in 1991. So, you know, in just a short, ten years later roughly there were two times the number. Now tips and falls accounted for 65 to 80% of the injuries across all age groups of wheelchair users. Of emergency room injuries treated. Most children's injuries occurred outside the home and institutions, hospitals, and in environments with stairs and ramps and curbs, so 57.3%, adult injuries were more likely to occur in homes or hospitals or institutions, that was 45 to 90%. And the leading cause of injuries for all categories were tips and falls. And they identified potential risk factors, they classified them in four categories. The first is engineering factors and they looked at manual versus powered wheelchairs, the wheelchair occupant restraint system. Are they wearing a belt of some kind. Any anti-tip features and wheel locks. Then the next category were the characteristics of the wheelchair users and that included age, sex and type of disability. The third category was physical environment, which included uneven terrain, bathroom and home modification and finally fourth category was social environment, included users activities, what were they doing in the wheelchair, what were they using the wheelchair for. Inappropriate prescription by a health care professional and inadequate maintenance of the wheelchair. And they found that interventions to modify any factor may reduce the risk of tips and falls and therefore reduce the risk of wheelchair related injuries. How about people with chronic conditions? And medications. So a British study um, we have um the Framingham study where we study a large group of Framingham, in Britain similar, heart and health study, longitudinal study, studying 4286, that's a subgroup from the study but a whole bunch of people they go back to, to get different information and study different things. So they looked at the prevalence of falling in the, with increasing number of simultaneously occurring chronic conditions. So what they found, they associated with an increased, increase odds of falling if you had circulatory disease, chronic obstructive pulmonary disease, depression and arthritis. They said chronic disease may increase the risk of falls through direct effects of the condition, but also the indirect effects of the condition. So the indirect effects of the condition could include, for example, reduced physical activity or change in diet or those kinds of things. And that those all are associated with an increase odds of falling. What about multiple sclerosis and falling? Well in this study um the surveyed 1089 people from multiple sclerosis registry, 52.2 reported a fall in the past six

months, factors associated with increased risk of fall includes being male, we also found in the elderly study, we found that in spinal cord study. So if you are a guy, if you think it is just woman who are going to fall, men are at risk of falling. Fear of falling is a major risk of falling and we will see that in other studies as well. Variable or deteriorating MS status in the past year. Never or occasional use of a wheelchair, problems with balance or mobility, poor concentration or forgetfulness and incontinence of bladder. And again we looked at incontinence as an issue of, you know, you have to go to the bathroom, got to get up quickly, comes on suddenly and that puts you at risk for falls and just having to go constantly also increases that risk. Another study, a British study an observational study, um they found that 52.7% of participants reported two or more falls and there they found continence was an issue, previous history of falls and use of prescribed medications they were each associated with being a risk of a faller. They defined a faller as someone who has had two or more, two or more falls, more than two falls. A VA study that was done showed that injurious falls in female vets with MS was three times higher than in female veterans without MS. So again if you have um MS you are three times more likely to fall if you are a female vet, but they didn't find that comparing male vets to with MS to male vets without MS. In a systematic review meta-analysis, comparing studies to each other and seeing what comes out of the studies, they found 18 different risk factors within eight studies that, the meta-analysis. Meta-analysis demonstrated increase in fall risk associated with impairments of balance and cognition, so if you had balance and cognition, increased risk of falls. If you had progressive type of MS, that puts you at increase risk of falls and if you used a mobility aid, that put you at a risk for increased falls and conclusion again, like the other studies, we need more research on falls in people with MS and we're seeing that as a general theme. We need more research done on the risk of falls and people with all disabilities, so just isn't enough. Another MS study, another meta-analysis, this one looked at whether demographic, clinical and instrumental variables that are useful to defect fall status of people with MS. So can we predict who might be become a faller. So they compared fallers with non-fallers and they found that compared with non-fallers, fallers had a longer duration of the disease, they had the progressive course of the disease, with MS there is different kinds of MS, relapsing and progressive and so different types, so if you have the progressive course of MS that puts you at a risk of being a faller. If you use assistive devices for walking, that puts you at risk for becoming a faller, greater overall disability level, slower walking speed and worse performance in static and dynamic balance tests. So if you're balance is bad you have more risk of being a faller if you have MS. Now what about neuromuscular disorders? Um people with and without neuromuscular disorders were followed over time in this study and people with neuromuscular disorders fell more, 27% of the time versus 5% of the controls. And this study found that falls caused injuries, fear of falling um was falls also cause fear of falling and caused reduced activities. fear of falling is a major risk factor in just about every study for more falls. What about Parkinson's disease? There are many factors associated with falls in general population, many are associated with Parkinson's. So we know that fallers are more likely to be depressed and anxious than non-fallers, more likely to have greater disease severity like we saw with MS. And the conclusion of this study was that disease-specific factors contribute to the increased risk. So we know that depression occurs often with Parkinson's, anxiousness occurs with Parkinson's, severity of the disease, stiffness, difficult gait, all of those things contribute to falls in if Parkinson's. Another study found following factors predictive of falls, previous fall, we find in a lot of studies, loss of arm swing. When we walk we normally swing our arms um in a rhythm, when you have Parkinson's you lose that arm swing and that probably gives body feedback about where it is in space. Each year of the disease that you've had the disease is another predictive factor and we have seen that in some of the other, just with some of the



other disabilities and falls as well. And having dementia with Parkinson's. Now what about strokes and falls? Well this was a descriptive study that looked at all falls Retrospectively over 20 month period. So they had 122 patients they looked at over 21 month period and they found that they had 241 falls. Most falls occurred around the bed, 81% and toileting related falls occurred in 22.4%. But this study was interesting because they found that not all falls are the same and they created a taxonomy of seven different types of falls. So they identified these seven types of falls from strokes. The first one they called I'm giving it a go. And this was associated with better functioning at the time of the fall and better outcomes. So this was someone who is like, I'm going to try this now, giving it a go. The next one they called it's the meds, this is where someone was taking medication and their fall was caused by a side effect of that medication. So maybe they had light-headedness, maybe taking a medication that made them tired, whatever it was it was the medication. The next one they called I'm new here. This one they said was caused by a lack of orientation to a new environment. This one they found occurred to people coming into rehab for the first time or transferring from one hospital bed to another or one facility to another. Sorry, the lack of orientation to that new environment is what contributed to the fall. Next one they called I'm sick, this is where illness contributed to the fall. Somebody may have been nauseous, dizzy, sequelae of being sick contributed to them having that fall. This is my favorite one, I shouldn't have. This is doing something beyond their capability. Their intent did not equal their mobility status. And this could of been because they were tired and they got up to go to the bathroom, that's how my dad fell, had to go to the bathroom, no one to help him, he got up. So that's the, you know, I shouldn't of done it because I really wasn't thinking and what I wanted to do didn't match my capabilities. Number six, it wasn't me means it was caused by circumstances outside the person's control, like maybe somebody left something in the path not supposed ton there, floor was wet, no sign, et cetera. Number 7, I'm very dependent. This is a result of the person's high physical dependence and reliance on others for basic task, really the other persons fault for the fall, the person who they are depending on. So this study was interesting because it said that each type of fall requires a different approach to intervention and prevention, that they are each, you know, it is possible to intervene and prevent them but they are very different. You have to know what the cause of the fall is and then can't prevent something that's already happened. It is kind of a catch-22 but very interesting if you look at those different types of falls because that makes sense to me. People don't always intend to fall and it is not always their fault and sometimes they are pushing themselves and really trying and so there are different reasons why people fall. I think one makes sense. Now how about dementia and falls. Well we know that dementia is a risk for falls. We know this population of people with dementia experiences a double risk for falls in general. What does the research show in when this area with? There is no evidence that fall prevention convenience programs work in older community-dwelling cognitively impaired people. There are mixed results reported in fall prevention studies that include older adults with cognitive impairments in both hospitals and Nursing Home studies, it is mixed so there is no, it is not really good evidence. Now a recent systematic review, we know that systematic reviews very high level of evidence, it failed to provide conclusive evidence that exercise programs, including a balance component, can significantly improve balance in older people with cognitive impairments. We're going to see, when we talk about some interventions, that exercise programs often work to improve balance and improve people's or lower people's risk for falls. But not in the population of people with dementia. And cognitive impairment, it just doesn't work. Another study said there may be benefits of some other interventions such as taking vitamin D or bisphosphonates, which are what you take if you have osteoporosis, you may be able to infer some benefits from studies similar population with this group for

vitamin D and bisphosphonates. The bottom line is we need more research and we need to develop interventions like many of the other studies. Some evidence of fall prevention and some things that may work that have come out since um we originally did this presentation. A random control trial, pretty high evidence, where you have two groups, a control group and a study group and you give each one, you give the study group the intervention and control group, you don't see intervention to see if it works. What happened in this study, with MS is that they were able to lower fall risk scores on instrument they used that measured fall risk for the exercise group. Gave one group exercise and the scores, the risk for fall scores was lower in the exercise group compared to the non-exercise group following that intervention and the intervention was the exercise program. So the exercise program of people with MS seemed to lower the risk for falls. Now there was another randomized control trial, a pilot, so a small, a very small group of people with Huntington's disease and compared a home-based exercise group participates, that was the intervention group to a non-exercise group. And two of the participants, two of 13 in the exercise group lowered risk of falls as measured by the Berg balance scale, that's been shown to be of falls in people with Huntington's, to improve we don't know how many of the 13 did it. This isn't the greatest evidence but shows if you can do this again and make the study a little bit better, maybe have exercise program you are watching people do, maybe there might be some good evidence that comes out of that. This didn't show a lot, but it shows like it is worth doing again. And then there was a randomized control pilot project again a small study with two groups of, a group that you were given intervention to and a control group and they were comparing the effect of Tai Chi in sitting position, they called sitting Tai Chi on muscle strength, balance control and quality of life. What they found was, so they give the intervention group got sitting Tai Chi intervention other group didn't, dynamic sitting balance and handgrip strength improved from this Tai Chi in that group, but not quality of life. With we know the major contributor to falls is lack of balance during transfer. Tai Chi needs to be done on a bigger group, it was small, but maybe sitting Tai Chi may improve sitting and balance and decrease falls for people with spinal cord injuries. Something that needs to be looked at some more and needs to be repeated with a bigger group. What about preventing falls in community dwelling elders, what do we know works? We know from meta-analysis and by Robert son and Gillespie there are interventions that reduce falls. We know one is group and home-based exercise programs, usually containing balance and strength training exercises, which is why other studies I talked about with different disabilities tried the same stuff. This study, by Gillespie and Robert son and Gillespie sort of the study everything is measured against. It is a very good systematic review, other groups are taking pieces of it and trying to apply to other populations like disability groups. So we know that home exercise programs that contain balance and strength training work to prevent falls. We know that Tai Chi works to prevent falls, why the small study with spinal cord injury group was trying to use seated Tai Chi, still not sure what that is, I would like to see it sometime, it seemed to work but, you know, needs a bigger group, a bigger study with more participants. And then another thing that works is multifactorial interventions that assess an individual's risk of falling then carrying out treatment or arrange referrals to reduce the identified risks.

This reduces number of falls among community dwellers. So with this involves, this involves looking at everything. Looking at the home, what's in the house, what's the person's balance skills, it is multifactorial, more of a team approach. We also know interventions to improve home safety appear to be effective. Especially in people at a higher risk of falling and when carried out by Occupational Therapists, that's from the literature, I am an Occupational Therapist, but that's in the literature, not making that up, just to put in a plug. We know it works, some of home safety things when Occupational

Therapists go in the home, they are looking for, as I mentioned earlier, throw rugs that people trip on, long extension cords, things unnecessary to have in the home that block your way. I once did a home assessment on a patient and this person was a hoarder, had stacks of magazines all over the house and I was worried I was going to fall, at the time I was young and didn't have any mobility issues or anything. But, you know, when you go into a home and there are stacks of stuff everywhere puts everybody at the risk of falling. That's one of the things you look at when you do home safety assessment, how can we clear it out and make it easier for people to get around, not have as much furniture, or enough stuff that people are going to fall on. Another things that work are antislip shoe devices worn in icy conditions, they help to reduce falls, we know that. There are external like a rubber thing that you can put over your shoe that gives you traction, that um I always see those advertised on home shopping network around the holidays, people buy them as holiday presents in December. Taking vitamin D supplements does not appear to reduce falls in most community dwelling older people, but it may do so in those that have lower vitamin D levels in blood before treatment. It might help improve vitamin D levels, may not reduce the falls, it may help with fractures, we don't know that for sure but it may, you may be able to increase the vitamin D levels which may contribute to fracture reduction. Medications and falls, some medications increase the risk of falling, we know that. There are three trials in the Gillespie review that fail to reduce number of falls by reviewing and adjusting medication. We know medication causes falls but don't know if changing medication prevents them. A fourth trial that involved family physicians and their patients in a medication review and that one was effective in reducing falls. But not all of these medication reduction studies are effective in reducing falls, some are this one is the others weren't so it seems that um this is worth more exploration. We also know that, excuse me, sorry. That gradual withdrawal of a particular type of drug for improving sleep, reducing anxiety and treating depression, some of the psychotropic medications have been shown to reduce falls. We know there are certain drugs, you know, I've heard people that take Ambiiin, as soon as they take it they have to go right to sleep, it knocks them out, I imagine drugs like that could be causing some falls if people take them and are having trouble kind of seeing straight and staying upright. But we don't have evidence on that. Medical interventions and vision and heart issues. There is a study, this study showed in the systematic review that cataract surgery reduces falls in woman, having the operation on the first affected eye. Insertion of a pacemaker can reduce falls in people with frequent falls associated with carotid sinus hypersensitivity. So if heart rate changes um you are going to fall. If you get a pacemaker that changes that, you are not going to fall so much. It reduces the falls. So carotid sinus hypersensitivity causes sudden changes in heart rate and blood pressure, so the sudden changes cause you to fall, when you eliminate those sudden changes with a pacemaker then you reduce that risk of falling. Foot pain and education. What do these do? In people with disabling foot pain, the addition of a footwear assessment, customized insoles and foot and ankle exercises um to regular lie podiatry reduce the number of falls, but not the number of people falling. So people still have the same amount of falls, but they didn't fall as often. My favorite one is that there is, there isn't evidence to prove that educational materials alone prevent falls. It is inconclusive. So you can't just give somebody a booklet and say do this to your house and you are going to reduce your falls. Or you give a caregiver something say if you do all this stuff you are going to reduce the number of falls. The evidence shows that education materials alone don't help to prevent falls, it is inconclusive as an intervention. Now what about some of these evidence-based programs? There are programs out there that you can participate in. But they are not really conducive to people with disabilities, all of them. So one of them is called a matter of balance. You can find these on the Internet, you can Google them, I also have if you get a copy of the

PDF there are references that will send you to places you can find out about these. So a matter of balance or managing concerns about falls, this is a program designed to reduce fear of falling, which we know is a big cause of falls and increase activity levels among older adults. Now the problem with this is you have to be 60 years old or older, you have to be ambulatory and you have to be able to problem solve. So if you are a wheelchair user or if you use assistive devices, they may not take you in this particular program. Otago, this was developed in New Zealand and this is for people who have fallen in the past or have muscle weakness or balance problems and live in the community and can walk with or without a walking aid. So this one might work. And the, this one is the stepping on program and this is for older adults who live in their home or independent apartment. They can walk without the help of another person, they don't use a walker, scooter or wheelchair most of the time indoors. They are cognitively intact and understand the language being used by the stepping on leader. So again, this may not be for people who need any assistive devices, walker, scooters, et cetera. So what can you do to prevent falls? What does the evidence tell us? It tells us you have to get moving. That you have to try and exercise so you can improve your balance, and your strength. You can bring your medication to a pharmacy and, you know, when you get your medication you often have to sign something saying that you were counseled if you are in the US, you were counseled about your medication and you are really not counseled about your medication most of the time, if you bring all the meds to the pharmacy say I want to be counseled any of these interacting with each other, could they cause me to feel dizzy, anything that could be causing me problems from these medications. So that's something that you can do is talk to the pharmacist or talk to your primary care doctor. Tell primary care provider if you have fallen or caregiver if the person you take care of has fallen. Ask for referral for occupational therapy for home modifications. The modifications themselves may not be covered by insurance but it is certainly a worthwhile investment if it means you are not going to fall and not going to have that added burden of a decrease in your ability to function um and, you know, you may be able to find some sources if you need some grab bars and things like that. You may be able to find some sources in your community to get them if you can't afford them. Get your vision checked and wear glasses. Sounds obvious but people don't and I have to add to that, if you need hearing aid get one um, my mother would never get a hearing aid and when my dad fell he was calling my mother for help, she didn't have a hearing aid and couldn't hear him. It is important for your own sake, if you are a caregiver get a hearing aid and learn how to use it. If you are a wheelchair user, what can you do? You are the expert in how you transfer. Make sure everyone knows that and so if someone is transferring you, explain to them you be the guide you are in charge of your own transfer. Lock the Chair for transfers. Turn off power chairs and scooters when not in use. Don't remove the parts, especially the antitip parts because you can get hurt. And you throw the wheelchair or scooter off balance if you take that off. Don't add things that throw the weight off. Do whatever you can to lower the risk. Now exercise programs for people with disabilities and chronic conditions. I highly recommend this, if you go to this NCPAD.org, national center on health, physical disability, they have personalized exercise programs I'll show you, they have great stuff this is another one, how do you exercise in a wheelchair and again these references are on the PowerPoint or in the P PowerPoint. I'm going to show you some information from these. This is from NCPAD, their 14 week program. It is a free personalized Web-based physical activity and nutritional program. Go on here and you can follow a person who is talking, who will give you information and you put in information in and it gives you a very specific program on what you can do. It is a great program. And this is some more of their information from NACHPAD, has classes, classifications, if you see on the bottom. I don't know how to do the pointer, a pointer, but on the bottom you see three icons. One of

them is an icon for individuals who can use all four limbs. And individuals with limb loss um and ambulatory CP, the second one is for individuals with use of upper body, including some core and then the third one is for with limited use of the upper body. So you go down each one of those rows and it shows you the types of exercise that you can do um matched with your body type as class A, class B or class C, so that's a really good resource. This is a new one I just found. How to exercise from wheelchair, links to eight online workout videos including one from NACHPAD and some others that show you what you can do in order to exercise depending on the type of particular disability you have and the wheelchair and type of functional mobility that you have. And then this one is kind of interesting, this is the one by David Lyons, how do you exercise in a wheelchair and he goes on and on, on this Web page with a whole bunch of things with weightings and exercise bands and how to exercise from a wheelchair. Now this is one I recently found, apparently Minnesota falls leading cause of injury for children and adults 35 years or older in Minnesota. They set up a Minnesota Falls Prevention.org, which gives a lot of tips on how to prevent injuries and toolkit and all kinds of things. I'm ending a lot earlier than I thought, I probably talked a lot faster than I intended to, always worried about running out of time. The future research and promotion, what do we need? Well PCORI, the patient centered outcomes research institute, they have partnered with the um national institute of health and they've provided 30 million dollars for research into falls and they are funded these studies and we are awaiting the outcomes to see what they have come up with. The national council on aging, they sponsor the fall prevention awareness day in September. So you might look on their website to see some additional resources and activities come September. And I think the most important thing from this, this presentation is that almost every study says we need more research on people with falls, on people with disabilities and falls to prevent secondary conditions. There really isn't enough evidence, there's no evidence. I gave you what there is, we are really making inference leaps from what we do know that works with people with, in the aging population and a few bits and pieces here. There seems to be some overlap, but we don't have definitive evidence of that overlap. So we really need much more to inform where we are going and how we get there. And this is my contact information, if you have questions, hopefully you are putting them into the, in the chat box and I'm going to um go over to Bill and I guess I spoke too fast, apologize.

>> Bill: You spoke well, you well Barbara and had quite a bit of material for sure. In fact a couple of questions as they came in were ones anticipating some of your information and you sort of addressed some of that along the way. But let me give you some questions that we have. So one of the writers said what type of exercise program would you recommend? You had referred to some in your, in your direct presentation. Is there any one or other of those that you are particularly fond of or might work better, anything you can recommend quickly?

>>Barbara: Well I really think the NCPAD program is excellent, evidence-based program. NCPAD is out of University of Alabama at, I'm trying to remember the campus, Birmingham maybe, a very good researcher there working on this for years and has really come up with an excellent program. I would recommend this to begin with, for anyone who has any, any disability. I think it is excellent, it really is very complete program and it works for people with all disabilities. And, you know, specifically for that purpose. And then if you are a wheelchair user I would look at the exercises on this website, how to exercise from your wheelchair. It does take you to a NACHPAD video, they have videos out and some other videos that are pretty good. That's what I would recommend.

>> Bill: Excellent. You mentioned that fear of falls causes falls. Does it really cause the fall, I guess directly, or just correlate to falls? If so what would be the connection?

>>Barbara: Well when you are afraid of falling you walk differently, you hold yourself stiffer um, you know, you are always anticipating a fall. So you are not, when you are going to fall people's normal reaction is put your hand out to protect yourself. But if you are afraid of falling you might kind of being holding yourself real stiff and not have that natural tendency to put your hand out. That's one reason. The other thing is just, you know, the fear of constantly looking for how am I going to fall and not really concentrating on what you are doing. So there are a lot of reasons why that contributes but I can tell you that I've seen that so many times in people that tell me they are just, either don't want to do things because they are afraid of falling or reach to hold on to something because they are afraid of falling and the thing they reach to hold on to is not something that's going to hold them up.

>> Bill: Not secure.

>>Barbara: Yeah just not secure, those are three components of that but there are a lot of, you know, it is just very risky and people just are afraid to try things because they're afraid.

>> Bill: And possibly some correlation as well because of a lack of confidence.

>>Barbara: Exactly.

>> Bill: Thank you.

>>Barbara: If it you have fear of falling and don't have good balance, which comes first chicken or egg --

>> Bill: Chicken or egg, right, right, exactly.

>>Barbara: Kind of go hand in hand.

>> Bill: We had a few questions, now we are getting many, fortunately we have time and can get to those. Is there a specific OT home evaluation that focuses on fall prevention?

>>Barbara: Well um in their training OTs are taught to look at various factors um in the home. And there are different form that is are out there, there are some in the textbooks, but basically what OTs look at is they look at from the moment you get into a house, excuse me, into a home or apartment, how do you get in, how do you get around? They look at things like scatter rugs, they look at pathways and walkways, what's in the path. Is there something that needs to be moved. Are there wires, or cords. Are there unnecessary things in the way of things: OTs wills look at your kitchen and rearranging your kitchen. I tried to do this for my mother, I found mothers listen to other people but not their children. So my mother used to keep this big heavy pot in a really inconvenient spot that she had to reach for it. I finally like made the pot disappear, but you know if you are constantly reaching for the same thing over and over again and balance is a little off or maybe, puts you in a bad position, you want to move that to a better place where you are not taxing your balance. So rearranging your kitchen so the things you use the most are within reach. I mean we all have things in our kitchen we pull out once a year for a holiday or something. Those things can be hidden and you can ask somebody else to get them out what you need them. No reason for it to be in the most convenient spot in your, you know, in your she was, even your refrigerator. Keep the things you use the most in the most convenient place, those are principles OTs use in the house. They also look at your bathroom, because bathrooms are a

hot bed of um falls. And they look at how you get in and out of the bathtub, do you need grab bars, are they in the right place if you have them, would it be helpful, need a bath bench, raised toilet seat, how much space do you have in there, does your wheelchair even fit in the bathroom, what about the surface, does your, you know my favorite thing is when people use a bath bench and then the shower curtain doesn't close all the way, when you come out the floor is wet. How can you decrease those things from happening so not increasing chances of falling or slipping because the floor is wet. It is looking at all of those things, almost psychological progression. Are forms OT follow, probably one is in every major OT textbook. Really looking at how does the user use their space. How can we make it easier for the user to use their space and make it easier making it safer. And also, you know, I think I got to add there for the caregiver too. Because it may not matter to the person taking a shower if the floor is wet but may matter to the care taker taking them in and out of the shower. Also looking at the caregiver needs.

>> Bill: And their safety.

>>Barbara: Yes and their safety.

>> Bill: Next question is, unless I missed it there was no information directly relating to amputation and falls, any studies that you are aware of that relate to amputation and falls?

>>Barbara: I can tell you that there, I haven't seen them but I can tell you that um having an amputation and changing your center of gravity and body weight um would cause falls. And having wheelchairs that are designed to make up for that change in the center of gravity, because of the amputation, would be very important. When we revise it next time I will be sure to look for more specific evidence on amputations.

>> Bill: Thank you. Taking just a moment to answer folks and document your answers, very good. And there, there are a couple of comments not really um questions. But there's actually an embedded question in one part of it. On one of the attendees pointed out um very nice presentation, it is a bitter sweet comment though because relative side of a C2 caused by a fall. But they can totally appreciate the depth and breadth of your presentation on this important topic because of that have.

>>Barbara: I think that's a really important point because, you know, we think of falls, you know, you fall, you break your hip. You fall and maybe you get a head injury, but people don't, you know, you live and people just don't think that it's the second leading cause of spinal cord injuries after vehicle accidents and we all think of motorcycle, car accidents that's how people get spinal cord injuries but it can be from a simple fall and while you may not die right away, what happened to my father, you fall, you break a hip and dead in a year. And it is a horrible thing. But we just don't think of falls as being as important as they are. When you consider that we have no evidence. We don't know what interventions work and we really, hopefully the evidence or the money that NIH are pumping into this will come up with some studies that show us what works and what we can do, because we really need to stop these falls. This is um, you know, it is such a public health nightmare. It is something that we know is a problem and should be able to prevent, but we can't.

>> Bill: Understood. And again questions are still rolling in. Let me continue to move towards them, actually more of a comment. A matter of balance, that you referred to several slides ago, a matter of

balance is designed for community dwelling older adults, wheelchairs and assistive devices, partial sentence there, but they are familiar with that.

>>Barbara: I'm trying to find it, here it is, yeah. You have to be 60 or older, ambulatory and able to problem solve. So it is designed to reduce the fear of falling, increase activity levels of older adults. Again, you know, when these three programs that are evidence-based programs are really for older adults. You know, really responding to, to the older adult population, which is not really the population that um that we're, you know, yes we're concerned with older adults but in looking at people with disabilities they are not necessarily older adults.

So they are kind of left out of a lot of things.

>> Bill: Thank you for that. I apologize are to the delay, trying to answer some folks while we are doing our questions. By the way, for those who haven't noticed in the handouts sections of your control panel you'll find that each of the sections of your control panel default to um, to being chanced and you have a little X there. If you click on the X of the handout section it will reveal the PDF version of Barbara's presentation today which you can down load. Also in approximately one week we will have the entire presentation, the PDF as well as Barbara's live presentation here will be archived at [spinalcord.org](http://spinalcord.org).

>>Barbara: And if you need to reach me I'm looking to put my contact information back on the screen. Yeah the PDF has tons, I'll show you that too, tons of references, everything I refer to um, oops I didn't mean to do that. Everything is in the PDF so you'll have access to all of the, all the references. And in the last one, this is a references to the evidence-based programs. So the various places, if you are interested in um getting trained or finding out about um these various programs, the evidence-based programs.

>> Bill: Thank you.

>>Barbara: That's how you contact me if you have questions.

>> Bill: Moving on, because we are not done yet, fortunate we have more time because you went through the presentation --

>>Barbara: I talk too fast.

>> Bill: Rapidly for us. This question from a viewer, is diabetic nerve pain a factor for falls?

>>Barbara: Yes diabetic nerve pain is a factor, not just because of the pain but also because the peripheral neuropathy in general and I don't have, you know, I don't have a study to quote off the top of my head for you but yes, there is definitely evidence that that's a problem because don't, you know they may feel pain, may not feel where foot is in space. That's a big problem, we see people falling all the time with diabetic neuropathy and nerve pain, pain in general is a risk factor for falls. Pain is also, pain is distracting and if you treat the pain often the medication you are treating it with has some sorts of um side effects, balance issues, dizziness, et cetera. Or it done work. And the pain is still there. Causing the problems. So pain yeah and diabetic neuropathy is a problem.

>> Bill: Understood. And this question and comment from someone living with a C5 injury. I'm an incomplete SCI at C5. I'm wondering if it is too late to develop trunk muscles and balance to avoid falls apparently?



>>Barbara: I don't think it is ever too late to try something. You know, if, you know, it is always worth trying. If you have, you know, if you are incomplete and some muscles there, I don't know how many you are, but I would still try, definitely worthwhile if you can get some sense of balance back that's going to contribute to decreasing your risk of falls. And, you know, anything you can do to decrease risk of falls is helpful.

>> Bill: Very good.

>>Barbara: I would look at these, you are a good candidate for the NACHPAD program. I would start there and I would also look at, this slide here, this one has refers you to that and others you can do. It is interesting when you look at the, the exercise groups that are on YouTube, some of which from this, you can see different levels of spinal cord injury doing the exercise and see how they are doing it, everybody is doing it a little differently. I would advise you to try them and see if you can, at least get, plus um whatever, whatever function you have, if you buildup what you have that helps you with balance because it helps you where your body is in space.

>> Bill: Exactly. And I would add to that Barbara, um from the resource center perspective, we have a lengthy listing of more advanced, maybe that's a qualitative statement. More beyond traditional medical model therapy programs all across the country, down at Shepard center, beyond therapy, several project affiliates have a lot to offer to people that are, even if it is not going to produce ambulation for someone, for whom their body doesn't allow them to develop that much voluntary muscle movement, we hear reports of core strengthening and seated balance improvement.

>>Barbara: Yeah. That makes sense, better balance and just better um, you know, better functioning.

>> Bill: For anyone that would like to write in to us, ask@united Spinal.org and we will point you to those lists of programs. Have some comments, some professional guidance and advice. I'm going to delve into these as best I can Barbara. On slide 24, very specific, mention using two hands to repel your wheelchair increased fall risk. Why do you think that is? I guess you'll have to verify that that's the case. Slide 24 mention using two hands for to propel wheelchair increase fall rate --

>>Barbara: Yes, yeah I believe that the reason for that is that if you use two hands to proceed pole your wheelchair you have more function. You are a lower level functioning, lower spinal cord injury and remember the other study showed more function you have the greater at risk you are for falls. So in other words if you are propelling your wheelchair with a sip and puff, low risk of falls because you are not functioning as much. The other study showed level of function, if you are propelling the Chair with two hands you have a lot more function and probably going to be propelling faster, taking more risks, et cetera. That's my guess based on the totality of the studies on spinal cord injuries. It's a marker for level of functioning and the higher level functioning the more risk that you, you know, you take. Not intentional risk but more movement with your body that is putting you at risk for falls.

>> Bill: And that certainly makes sense in my, in my case I'm a pretty active para, my injury is complete but pretty active in manual wheelchair and believe me, I've been on the ground a few times because of being out there doing things as opposed to sitting at home. So I can, I can appreciate that. Bear with me one moment. Do you recommend a particular fall prevention program forepersons with intellectual disabilities?

>>Barbara: You know, it is interesting because um there, I don't know of any but what I would recommend is I would recommend special Olympics because special Olympics keeps, is very much into healthy things, there are healthy athletes where you get screened forefoot problems, dental stuff, all kinds of things that could be contributing to falls, number one. Number two, if you participate in special Olympics you'll be doing activity and exercise and one of the things that seems to be a constant theme of all of these is that the more movement you do the more you improve your balance and strength the better, you know, you lessen your falls. So while this is not evidence-based, although based on what I know about special Olympics, I used to work with them a lot, what you are doing in special Olympics is moving, improving balance, improving coordination and that would tend to um, you know, make a differential leap based on what we have seen so far that would help prevent falls. That's what I would recommend.

>> Okay. Next question and again the questions are still rolling in and somewhat diverse. The next is does aqua therapy help to improve balance or functioning versus exercise machines?

>>Barbara: Um, well water therapy gives you a lot of feedback because it helps you, it helps you to know where your body is in space, also holds you up if you can't hold yourself up. If you have trouble with weight bearing it takes the weight off. I don't know there is any research on the comparing the two. But some people can't do, you know, can only do water exercises and they can't do other exercises. If you have arthritis, for example, water exercises fibromyalgia, recommended best kind of exercise for you. If it is getting you moving, I would do it. I don't have any research comparing the two. So I can't really answer that question, but I can tell you that anything that helps with um working on balance, you know, and exercise and getting you moving from what we have seen, will help decrease falls. So I would encourage, you know, whatever you can do. If you can do exercises out of the water do those, if you can't do them in the water and if you can do both whatever preference is, as long as you are moving and doing exercises. Water exercises don't tend to be as much strengthening as non-water exercises, it depends what you are doing, you can lift weights in the water. All kinds of stuff.

>> Bill: Okay, thank you. Personal observation, it is great to see such a mix of consumers and professionals on our Webinar series. This is from a fellow, NIOT works with adults with intellectual disabilities and falls are a growing issue with this population. Notable are adults with downs who are developing dementia. So quite a combination there.

>>Barbara: Yeah it is really amazing, because people with Down's used to not live that long and now we're finding that as population, as they age, they are getting dementia. We need to do research to figure out how to address this because it's a new thing. Average person with Down Syndrome used to live 25 years, now they are living a normal average life span. So we really need to do a lot of research in this area, fall prevention certainly is going to be a part of that.

>> Bill: Comment, let me read it here instead of reading it first and evaluating it, it is a little longer. I am trained to facilitate falls prevention, interventions AMOB and Tai Chi for arthritis falls prevention. All my training is centered on the statement that most falls can be prevented. Recently I heard my state falls prevention coalition people start to question the truth of that statement. Does evidence still support that most falls can be prevented?

>>Barbara: I don't think there is evidence that most falls can be prevented. I think the evidence says that certain things may help to decrease falls. Decrease the number of falls, certain evidence may help

prevent falls. I really haven't seen anything that says, you know, if you do this, you will prevent falls for sure. That they just won't happen. And I think that part of any fall prevention program should also include how to fall, how to get up. I think that there are, you know, safe ways to fall. I think one of the most important things for a caregiver to learn, if you are doing a transfer with someone, how to stop the transfer in the middle if you don't feel like you are going to make it and ease down to the floor. Ways to do that without you and the person you are transferring getting hurt. So I don't think that, you know, I don't think that you can absolutely positively that this is a black and whitish ewe that if you do X you can prevent falls. I think that we can decrease the number of falls, we can decrease the injuries that occur from falls. And we need to look at more ways to do that. But I don't think we will ever completely prevent falls. I don't think there is evidence on anything that completely prevents falls.

>> Bill: I have to share a fall story if I could, personal fall story, just a couple weeks ago. Manual wheelchair user of a slightly downhill ramp into my garage from my home and I have a mat there that's supposed to stay in place tied up to the ramp, it sneaked away about an inch from the ramp creating a large divot for my front caster wheels to get stuck in. There I am going out, heading down the ramp already before my brain perceives that this impediment is going to be trouble. So by the time my brain caught up with my body I am now teetering, see if you can tell where I'm at. Now on my caster wheels, rear wheels up in the air, balanced straight up and down on the obstruction and I'm thinking, not going to save it, better learn how to fall. So better fall safely. So I got my hands out there and eased myself down nice and gently. But I agree, a little bit of experience or maybe a little bit of guidance on how trying to fall without getting yourself hurt is a good thing.

>>Barbara: Yeah. There is always going to be factors we can't control.

>> Bill: Of course, back to our professional side. The in-home occupational performance evaluation, I hope, by Susan Stark, OTR, Washington University and St. Louis is evidence-based with assessment of environment and persons activities in-the-home. The assessment used picture card and outcomes are related to modifications. The contributor is OT LR.

>> Thank you for sharing that, if its Washington University it has to include picture cards, that's an OT joke. [LAUGHTER]

>> Bill: Another let's go into it together. Also as a resource national falls prevention resource center at the national council on aging, [www.ncoa.org/fallsprevention](http://www.ncoa.org/fallsprevention), research community living, administration on aging, the purpose of the center is to increase public awareness and education about falls and fall prevention strategy Clerkship. Support the implementation of evidence-based fall prevention programs and concerns and national clearing house for fall prevention resources. We would be delighted to connect you with them, thanks for your presentation today.

>>Barbara: Yeah that's national council on aging, that's the group I said falls prevention awareness day and a lot of good things on their website.

>> Bill: Got it.

>>Barbara: We talked to them when we did this, original presentation done in September in connection with their fall prevention month.

>> Bill: Got it. One more, two, two more questions. We have one from a staff member that I have over on the side. But this last one from an attendee, what are the best strategies you can recommend to prevent falls that occur in hospitals and nursing homes. Pretty sure you addressed that, but you addressed a lot of things, could you touch on that again, hospitals and Nursing Home settings.

>>Barbara: Sure there were some studies I mentioned that they were able, this mixed evidence on preventing falls in hospitals and Nursing Homes and some of that involved the interventions involve training the staff and I can actually go back to that study. I think. That was on dementia, which is right here. So these two were done by Cameron looking at older adults with cognitive impairments in Nursing Homes and hospitals, if you look at this study in the references, you can look that up. One of the problems with those studies looking at people with cognitive impairment, not cognitive impairment. It is kind of complicated when you start looking at, excuse me, hospitals and nursing homes because there's issues with people who are wandering, people on medication, you know there is a lot of other issues involved, especially in hospitals. There are a lot of factors, a lot of different factors. Prevention, it could be somebody came out came out of surgery, they are having one of the things that happens to older people when they are in the hospital is they often get delirium, which is not dementia, transient state where they may be dehydrated and so they're not, they are seeing things that aren't there. They're not cognitively intact even though it is not a permanent thing. So when you are in a hospital you are dealing with things like delirium, dealing with people with dementia, dealing with an environment not normal environment. A lot of it depends on nursing staffing, there are so many issues with, you know, I used to have patients tell me all the time, I rang and rang and rang for the nurse, nobody came, I had to go to the bathroom I got up and fell. There is a lot of issues with why are people falling in hospitals and nursing homes and I think you really need to look at, you need to look at this as medical errors and study root cause and find out what's happening and fix system in the Nursing Home or the hospital based on what happened. You know, it's just a lot of those are system errors that have to be studied.

>> Bill: Sure. Final question, what about use for dementia patients used as fall prevention?

>>Barbara: There's a law that we call OBRA, every year they pass one and throw a whole bunch of things into it at the end of the year, when they passed this particular time they required that restraints not be used, that we find alternatives to restraints and that's a whole other lecture in itself. But legally you are not allowed to use physical or chemical restraints, you have to try and find other options to use with people other than restraints. Restraints, if you have to use them they require a doctor's prescription. It is a very, very big deal to have to use them and onus is not to use them. In some places they allow, it used to be if you had dementia tie everybody to the chair, some people would fall out of the posy, under the posy, a couple of people choked on them. What they try to do is allow people to walk around an maybe put a bracelet on them so if they go near the door an alarm goes off. They try all kinds of different ways of avoiding restraining people. When you restrain people what happens. They become weak, they lose their balance because they are not used to getting up and moving around and they are physically able to. So it is a matter of keeping people physically active and able to do what they are able to do and find a way to keep them safe if they are wandering. Restraints are legally not really an answer, the law says you have to find an alternative. So um, you know, it's self-fulfilling prophecy if you tie people to a chair they are going to get up and fall --

>> Bill: Getting up and moving. Thank you so much Barbara, on behalf of United Spinal Association I would like to thank Barbara so much for sharing wealth of professional knowledge with us today about prevention of falls in adults with chronic conditions, thank you Barbara.

>>Barbara: Thank you, Bill.

>> Our next Webinar will be the Disability Integration Act and why it matters to you on May 24th from 3 to 4 pm eastern time. To sign up for and receive our Webinar newsletter Advocacy Alliance visit us as [spinalcord.org](http://spinalcord.org) or visit our publication website [newmobility.com](http://newmobility.com) for coverage of everything active wheelchair users need to know. This will conclude today's presentation on fall prevention. Thank you for your time and attention to this important topic.

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