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# Visibility

Education and Research  
from Envision

## Keeping Older Adults Safe: Mobility Considerations and Fall Prevention.....

*Anne Riddering, OTR/L, CLVT, COMS*

**F**alls in the older adult population may be an indicator of poor health or declining function. In 2005, it was estimated that approximately 30 percent of healthy adults over the age of 65 fall each year, with approximately 1.8 million seniors being treated for fall-related injuries at emergency rooms. The risk of falling increases with age; in fact, an 85-year-old is four to five times more likely to fall as compared to a 65-year-old.<sup>1</sup>

Vision rehabilitation professionals are often working in a client's home environment. This offers a unique opportunity to discuss fall history and offer specific suggestions for fall

prevention. The American Geriatrics Society, British Geriatrics Society and the American Academy of Orthopedic Surgeons Panel on Fall Prevention developed guidelines for assessing the fall risk of an older adult. According to the panel's recommendations, a risk assessment begins with a thorough review of a client's medical history, with special attention given to the health conditions and diseases that increase one's risk for a fall. Range of motion, muscle strength, balance, endurance, reflexes, sensation in the legs and feet, and cognition all affect a person's ability to complete functional and community mobility

tasks. Other health conditions, such as hearing loss, osteoporosis, postural hypotension, depression, foot problems, urinary incontinence and vision loss, can also increase one's risk for a fall.<sup>2</sup> A qualified medical professional, such as the client's primary care physician (PCP), should conduct a medication review, musculoskeletal assessment and foot assessment. In addition, a home/environmental safety evaluation should be completed for all inside and outside areas of the home used by the client, including bathrooms and stairways.

When reviewing the fall history with the older adult client,

Feature Article

Case Study

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The mission of the Envision Foundation is to secure funding for the successful delivery of services offered by the Envision Vision Rehabilitation Center and the education programs of the Foundation. Envision Foundation focuses on fundraising to ensure that no patient is ever turned away—regardless of ability to pay; public education to help prevent blindness; and professional education to determine best practices in order to serve patients who are blind or low vision.

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Keeping Older Adults Safe: Mobility Considerations and Fall Prevention continued from front page

ask if a fall has occurred anytime in the past year. Document the location, date and time of day the fall occurred, as well as the circumstances surrounding the fall, such as environmental conditions, clothing and shoes worn, assistive devices being used and the activity which took place prior to the fall. Record the specifics of injuries sustained, loss of consciousness and any medical treatment required. If only minor injuries or no injuries were sustained, it is unlikely that the patient reported the fall to the PCP.<sup>1,2</sup> The client should be encouraged to discuss the incidence with their doctor as well as with family members. A summary of the fall screening should be sent to the PCP, especially when the patient has multiple risk factors.

During a comprehensive fall assessment, physical therapists (PT) and occupational therapists (OT) may evaluate deficits and choose functional balance tests that will provide an appropriate challenge for the client. Unfortunately, many of these tests require specialized knowledge and additional time to complete with an older adult. The Timed Up and Go Test, or TUG, is a functional tool developed to quickly screen older adults for balance and mobility deficits. It requires minimal

time, preparation and equipment. Whether administered in the clinic or in the home, the older adult is required to walk without the aid of another person, but is allowed to use an adaptive mobility device. The professional administering the test will need a stopwatch with a

the starting chair. “Normal range” is scored when a person performs the test with an average time of 10 seconds or less. A score of 20 seconds or more indicates that the older adult is at a higher risk for a fall and is likely to be less independent in functional mobility tasks.<sup>3,4</sup>



The Timed Up and Go (TUG) Test requires minimal equipment and time to quickly screen an older adult for balance or mobility deficits.

second hand, a chair with arms and a second chair or something to serve as a marker. The back legs of the second chair or marker should be placed a distance of three meters from the first chair; it is only used as a highly visible target for the visually impaired client to walk around. One practice trial is completed and then the average time of the three trials is recorded.

The older client is instructed to stand up from the armchair on the word “go”, walk at a comfortable pace down and around the other chair, then walk back and sit down again. Timing begins when a person starts to stand, and ends once he or she returns and is seated in

Critical information can also be gained from observing the client walking through the house or clinic. The vision rehabilitation professional should carefully observe and note any limitations in the client’s ability to perform simple mobility tasks. Does the client have any difficulty standing up from the chair? Are the arms of the chair used? When walking, does each foot clear the floor? Are the person’s steps symmetrical or equal in length? Do the patient’s feet shuffle when walking? Does the older adult client stand with his or her heels close together? Document any balance deficits and send a report to the PCP. A referral to a PT may also be appropriate.

Once fall risk is assessed, simple interventions to increase safety can be included in vision rehabilitation training with emphasis on activities of daily living (ADL) training, environmental modifications and exercise routines. Eccentric



High contrast, non-skid outdoor tape is available at local hardware stores to mark step edges.



viewing or training of a preferred retinal locus (PRL) should include exercises in a dynamic environment and at a distance of five to 10 feet. The client should learn organized, systematic scanning strategies and should practice until the compensatory techniques become automatic during daily mobility tasks. Scanning training for mobility should include strategies for both organized environments, such as the aisles of a small store or church, and random environments, such as moving through an airport terminal or the lobby of the movie theater. Orientation and mobility specialists are a valuable referral source for training in more complicated environments.

Professionals should discuss the risk of unsafe shoes, such as clogs or flip-flops. There is an increased risk of falls associated with bare feet, stocking feet, slippers, sandals

and higher heeled shoes. Shoes with lower heel height, and broad, thick soles such as an athletic or canvas shoe, decrease one's risk.<sup>5,6</sup>

Making environmental modifications in the home can reduce fall risk. Throw rugs should be removed and replaced with those featuring a non-skid backing. Non-skid strips should be placed on tub and shower floors; grab bars should be installed. Towel bars should not be used for support. Bath seats and tub transfer benches can be recommended for those who have mobility limitations or balance issues to ensure the client's safety when getting in or out of the tub or shower. Raised shower thresholds can be marked with high-contrast material.

Transporting items safely can be difficult for older adults, especially those with visual impairments.




*Large-button telephones and push-button emergency call systems allow visually impaired clients to quickly access emergency assistance when needed. Large button cell phones are great options to consider for those older adults who are active in the community.*

Walker baskets and bags allow clients to cart items from room to room while travel mugs allow for safe transport of hot liquids. Apron pockets are also handy for hands-free transport of a cordless phone or other needed supplies. Canvas bags with long straps, backpacks or rolling carts can make carrying groceries safer for older adults.

Older adults should be instructed on a safe way to get up from the floor if a fall occurs. The person who has fallen should first check for dizziness or injuries and, if possible, call for help. If uninjured, the client should roll on his or her hands and knees and crawl to a sturdy piece of furniture. The older adult should pull up using the furniture and immediately sit down, reassess for injuries and then call for assistance.

Regular exercise is a key to maintaining one's independence in

home and community mobility tasks. Exercise programs should focus on range of motion, strengthening, balance and endurance. Older adults with low vision may need assistance in modifying exercise activities, fitness routines and the environment. Exercise alternatives can be suggested for use during inclement weather, such as walking at indoor malls or riding a stationary bike. Carrying a cell phone can allow the client to quickly call for help when walking in the community. Recommend activities that require minimal modification for the person with a visual impairment including tandem cycling, canoeing, snowshoeing, tai chi, tae kwon do, aerobic programs, dancing, ice skating, swimming, water aerobics and golf.

Vision allows a person to gather crucial information while moving safely around the environment. Individuals with even a mild impairment of visual acuity or visual field can experience difficulty completing daily living tasks around their home and in the community.<sup>7</sup> Since many older adults do not recognize the increased risks for a fall<sup>2</sup>, vision rehabilitation professionals can provide valuable information to clients by assessing risk, discussing prevention and implementing changes in the home. 



*Bathrooms often have low contrast, shiny surfaces. Contrast strips, tape or even a washcloth can be placed on the edge of the tub or shower to increase contrast.*



*Older adults with vision loss can lower fall risk by wearing shoes with broad, thick soles and a lower heel height.*

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# Case Study: Mobility Issues to Keep Grandma Safe and Active.....*Anne Riddering, OTR/L, CLVT, COMS*

F all-related injuries cause an increase in medical costs with 10 percent of falls resulting in serious injury.<sup>1</sup> An additional 20-30 percent of people sustain moderate to severe injuries which limit activities of daily living (ADL), independence and mobility.<sup>2</sup> Many seniors who have recently fallen report an increased fear of falling and decreased independence with daily tasks.<sup>3</sup> Vision rehabilitation professionals can help to decrease their patient’s chance of falling by suggesting adaptations to make the environment, as well as activities of daily living, safer.

Ms. Elizabeth, a 76-year-old widow, was seen in a comprehensive vision rehabilitation clinic in August 2010. For the past 25 years, she has lived in the same two-story house with a basement. She stopped driving about three months ago. For transportation, she now relies on a few friends and two of her children, both of whom live within 30 minutes.

A review of Ms. Elizabeth’s medical history revealed that she was on medication for hypertension and high cholesterol. She had arthritis in her knees and stated that her knees only bothered her in damp weather. About nine months ago, she had a small stroke with no residual deficits. She was diagnosed with age-related macular degeneration in 2005 following cataract surgery. She complained

that her decreased vision was causing problems completing ADLs and inhibiting mobility around the neighborhood and in the community. She admitted that she was afraid of falling after recently tripping a couple of times. She said that she planned to resign from her volunteer position at the public library, located within walking distance of her home.

Ms. Elizabeth’s low vision exam revealed her visual acuity was 20/160 in the right eye and 20/400 in the left eye. Her contrast sensitivity was severely reduced (Pelli Robson 0.6 with the range between 0-1.95). Macular perimetry with a scanning laser ophthalmoscope revealed a large dense central scotoma in the right eye. Functionally, the patient’s best vision is located above her scotoma. In her left eye, her best vision functionally is located to the left and above her large, dense scotoma.

In the past six months, Ms. Elizabeth had reduced her volunteer time at the library to the one day a week when she could ride with a friend. She admitted to stumbling in the neighborhood and stated she was afraid to cross the streets since she often could not see the pedestrian signals. She reported having difficulty seeing when she entered and exited a building. When asked about sunglasses, she stated she used the pair the doctor gave her following cataract surgery.

Ms. Elizabeth’s children try to take her to the grocery store once a week and take her to most doctor appointments.

Ms. Elizabeth had no difficulties walking around her house, but she did hesitate and cautiously proceed when ascending and descending the steps. Her gait was symmetrical and equal. The average of three trials of the Timed Up and Go (TUG) Test was 9.3 seconds, which is considered in the normal range.

The OT trained Ms. Elizabeth to use her best vision, above her scotomas, over several treatment sessions. Ms. Elizabeth learned to scan the environment left to right, first in a static environment and progressing to a dynamic environment. After she was comfortable, Ms. Elizabeth began to integrate use of the scanning techniques while walking. After scanning four or five steps ahead, she would quickly scan back toward her feet, spotting upcoming drop-offs or obstacles. By scanning several steps ahead, she was able to adjust her path of travel. The OT had Ms. Elizabeth practice this technique until the technique was spontaneously used.

The occupational therapist completed a home evaluation and gave recommendations to improve safety to Ms. Elizabeth and her son. It was suggested that the crumbling cement on the front steps be repaired and a railing installed. Her family opted

to replace the broken cement with wooden steps and a railing on both sides. The occupational therapist placed strips of black, non-skid, outdoor tape on the edge of each step to increase contrast and safety.

The railing on the basement steps was unstable and needed to be better secured. Ms. Elizabeth stated that she did not always realize when she had reached the last step. The OT reminded Ms. Elizabeth that when her railing stopped she had one more step to go. A stripe of yellow duct tape was placed across the edge of every step to increase contrast. The OT also recommended that Ms. Elizabeth place her laundry in a bag that could be thrown down the steps instead of carrying a basket. This technique will allow Ms. Elizabeth to concentrate on safely descending the steps.

The OT suggested that Ms. Elizabeth consider adding some dark, non-skid mats to her all-white bathroom floor. The OT explained that a dark mat in front of the commode and tub would allow her to better see the edges. To aid Ms. Elizabeth while getting in and out of the tub, it was advised that she install grab bars or consider the purchase of a tub bench, which would allow her to sit first and then swing her legs into the tub area.


In addition to safety around the house, community mobility was addressed. Ms. Elizabeth did not like to ask her family to take her to the beauty salon and grocery store, both located about three miles from

her house. Information was given to her about the community curb-to-curb transportation available to seniors. Ms. Elizabeth scheduled the first trip with community transportation and met her OT at the library at which she volunteered.

The library was located within walking distance – about a half mile from her house. Ms. Elizabeth had previously stopped walking to the library because she could not consistently see the pedestrian signals. The occupational therapist presented Ms. Elizabeth with several different wrap-around sun filters to control glare on both sunny and cloudy days. A visor was found to also be helpful. It was suggested that she carry a cell phone with her whenever she was out walking, whether she was in the neighborhood or walking to the library. Lastly, Ms. Elizabeth was referred to an orientation and mobility specialist to address the issue of crossing the five-lane street in front of the library and to explore the use of a long cane.

The OT and Ms. Elizabeth discussed ways she could safely exercise, especially in inclement weather. The shopping mall or high school track, located next to the library, would provide a controlled environment in which she could walk and remain safe. Ms. Elizabeth decided to consider participating in one of the exercise programs offered at the senior center.

Approximately six months after discharge, Ms. Elizabeth called with an update for her OT. She had finished her training with the

orientation and mobility specialist. He had taught her to cross the street at the light by the library, using both her vision and her hearing. He recommended she carry a white cane when crossing the street so cars are more aware that she does not see well. Ms. Elizabeth proudly told the OT that her O&M specialist told her where to hold the cane so that all directions of traffic could better see it. Three to four days a week, she was walking to the library or, if the weather was not agreeable, using community transportation. Based on her suggestions, the library had recently agreed to make some changes to improve the environment for seniors, including incorporating yellow stripes on the front cement steps, high contrast, large print signage and yellow stripes on protruding objects, such as the easel legs and stepstools. Ms. Elizabeth asked the OT if her friend who has diabetes could come to the clinic because, “she is really having some problems around the house.” 



# Toxicology Early Detection and Effects on Color Vision

.....Lloyd G. Powell

**T**oxicity to prescription drugs is reportedly on the rise. Many such drugs address conditions associated with the nervous system and one major “trip wire” for toxic effects is color vision deficiency (CVD), especially in the blue and yellow (tritan) range. As a result, the importance of color vision testing has expanded beyond congenital defects to include early toxicity identification. Moreover, low vision patients are increasingly prescribed corrective medication, further heightening toxicity concerns.

There are two recognized types of CVD. Most cases are hereditary (congenital), while others are acquired—mainly caused by ocular or neurological disease, drug toxicity or exposure to certain solvents. This article discusses the latter two causes, their detection and the effectiveness of current and possible future treatment methods.

## SUBSTANCE EFFECTS

Ocular toxicology research has shown that certain prescription and over-the-counter drugs, and some industrial chemicals and herbal compounds, can induce ocular side effects in humans. A change in visual acuity and/or color perception/appearance is often an early indication of these side effects. Types of substances include antibiotics, antidepressants, chemical solvents and dietary supplements. In cases where substance toxicity is known to affect color vision, it may be caused by exceeding the prescribed dosage, prolonged usage, or the development of hypersensitivity to the offending drug or chemical. If any of these side effects are detected, a more extensive medical history is advised to determine what is causing the harmful affect on the eye.

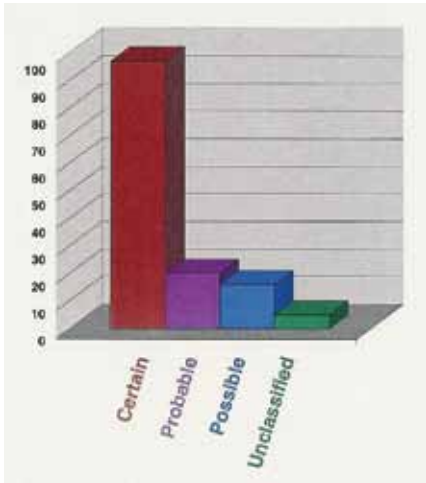
Frederick T. Fraunfelder, MD, Head of Ophthalmology at Oregon Health and Science University’s Casey Eye Institute, Portland, Ore.,

is an authority on toxicology effects on visual acuity and color vision. He has co-authored two major publications<sup>2,3</sup> on these subjects, which are intended as references to help the busy clinician decide whether a visual problem is related to a chemical or is medication-induced.

The books describe a large number of drugs, industrial chemicals and herbal compounds that may induce ocular side effects in humans. Specifically, there are 96 substances listed that are “certain” to cause color vision defects, 21 substances are listed as “probable” and 16 more as “possible.” These statistics are illustrated in Figure 1. This list has continued to grow due to the development of new drugs, especially those that treat conditions of the nervous system.

## CVD DETECTION BACKGROUND

The primary purpose of screening and testing for CVD is to determine if a patient has normal color vision

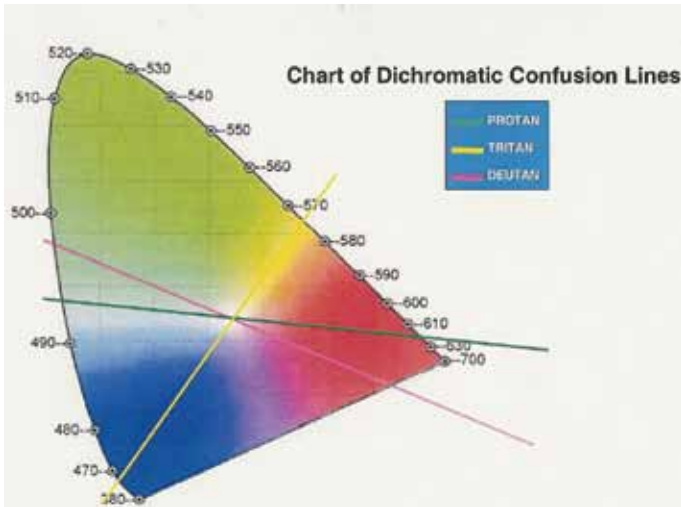


**Figure 1.** Probability (x-axis) and number (y-axis) of chemical and herbal substances that may cause color vision defects

{Source: Richmond Products, adapted from Clinical Ocular Toxicology – Fraunfelder et al<sup>2</sup>}

or not. If defective, further testing is usually necessary to ascertain the type of deficiency – whether *protan*, *deutan* or *tritan*. These terms correspond to characteristics derived from possible anomalies of the eye’s photosensitivity to pigments of green, red and blue/yellow, respectively. Figure 2 shows a chromaticity diagram that illustrates

the relationships of perceptible colors. The red, green and yellow lines extending across the diagram and crossing near its geometric center pass through various color sub-sets that cannot be distinguished by CVD individuals who lack sufficient density of one of the three receptors.



**Figure 2.** Chart of Dichromatic Confusion Lines. Pure colors, with their wavelengths (nanometers - nm), are situated around the edge of the figure.

{Source: Richmond Products, J. Bailey et al<sup>1</sup>}

The most effective testing methods employ pseudoisochromatic plates, the principle of which is based on a patient’s ability to recognize figures (letters, numbers or geometric shapes) within colored dots of various sizes. Currently, the most frequently used pseudoisochromatic tests are the Richmond HRR 4th Edition and the Ishihara. For many physicians, the Ishihara, which does not test for blue/yellow, is now considered obsolete. The HRR has almost completely replaced the Ishihara in the prescribed kits in optometry colleges in the United States.

There are many variables that lead to the assessment of a cause-and-effect relationship between a

large number of drugs, chemicals and herbs and any particular visual anomaly. The clinician must keep in mind the strong variability of how humans metabolize or react to a drug or other substance, where the variability may affect the incidence data. A significant change in the

expected course of a disease after starting treatment should heighten the physician’s suspicion of a drug-related event.

If screening reveals an acquired CVD, it is strongly advisable to check the patient’s medical history to determine if the cause

is either drug-induced or secondary to disease. Early treatment may therefore be effective by changing or reducing that patient’s prescription. Some acquired color vision defects, caused by disease such as cataracts, can be corrected by surgery. Many acquired CVD cases caused by optic nerve disease can be effectively treated. Other cases caused by prescription drug or exposure to solvents can often be overcome when exposure to the offending substance is eliminated.

## DIETARY SUPPLEMENTS AND VITAMIN DEFICIENCY

The worldwide dietary supplementary industry exceeds \$60 billion and is increasing. Unfortu-

nately, in many countries, especially the U.S., dietary supplements are not subject to government regulations concerning pre-marketing safety, efficacy claims or adverse effects. Therefore, much care is advised before using dietary supplements, in number of types, dosage, prolonged usage and in combination with over-the-counter and prescribed medications.

Fraunfelder et al<sup>2</sup> also report that Vitamin A deficiency is often associated with alcoholism and some rare metabolic storage diseases in which lack of an enzyme affects various organs, especially the liver, and tissues. Predominant ocular anomaly symptoms of Vitamin A deficiency are night blindness and limited field vision, often resulting in acquired *tritan* defects. In extreme cases, this can lead to a total loss of hue discrimination and other color vision anomalies. In most such CVD cases, recovery can be effected by oral dosage of Vitamin A, as typically indicated using a hue discrimination test such as the *Farnsworth-Munsell 100-Hue*. However, prolonged usage of Vitamin A supplements can cause intracranial hypertension and subsequent adverse color vision effects.

Adverse ocular reactions can occur through deficiency of Vitamin D, but seldom include CVD. However, the treatment of any adverse vision effect should be analyzed in the context of possible drug side effects that may lead to one or more color vision anomalies.

TREATMENT, “COMPENSATION” AND CURE

There is currently no known medical cure for congenital CVD. However, some CVD sufferers can be helped by color filters that increase contrast and can make it possible to distinguish colors close to the confusion lines (see Figure 2). Some patients benefit from the use of an X-Chrom contact lens, while others find that spectacles that reduce glare also help. Although the use of color-enhancing lenses can improve performance on some CVD tests, extreme caution is advised for a person seeking a job in which good/normal color vision is a prerequisite.<sup>4</sup> For example, one survey identified 12 critical job areas where defective color vision would seriously affect the work of firefighters.<sup>6</sup> Further, a website has been established which identifies

various tasks in the medical field where color vision deficiency could lead to misjudgement.<sup>7</sup> Therefore, in the absence of the development of a cure for congenital CVD, safety remains a key issue, which emphasizes that CVD could be a risk factor or a serious handicap in many occupations or everyday tasks.<sup>5</sup>

GENE THERAPY RESEARCH

In 2009, the Departments of Ophthalmology at the University of Washington in Seattle, the University of Florida in Gainesville and the Medical College of Wisconsin in Milwaukee published the results of a research program aimed at correcting the red/green vision of squirrel monkeys with congenital (dichromatic) CVD using gene therapy.<sup>8</sup> It was shown that after applying gene therapy, the monkeys were able to distinguish

between patterns of gray, green and red dots. The researchers used a computerized version of a pseudoisochromatic plate based on the *HRR 4th Edition* tests. As with humans who suffer from red/green CVD, the monkeys could not distinguish between these colors. Following treatment that added the missing visual pigment gene, known as the L opsin (the one missing or altered/anomalous gene), into the retina, the monkeys were able to pass the test for all colors.

Further gene therapy research<sup>9</sup> in 2010 confirms that it should be possible to cure human red/green color vision deficiency in adults and permission to perform such therapy on human subjects with CVD has been requested.<sup>Note</sup>



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The Falling Less in Kansas Toolkit:  
A Self-Care Intervention

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BACKGROUND

Falling is not a normal part of advancing age. It is, however, an unfortunate and common experience of later life. Approximately one-third of older adults fall annually. Falls may result in significant individual, social and economic consequences, including the loss of personal independence for the person who falls, a reduction in social activity and physical function, and placement in skilled care facilities.

According to the Kansas Trauma Program, “falls are the most common cause of trauma in Kansas . . . falls result in a significant amount of morbidity.” What do we know about the characteristics of Kansans who fall?<sup>1</sup>

1. While people of all ages fall, most falls are experienced by older adults.
2. The rates of falling are highest among women over age 75.
3. Almost 45 percent of falls are reportedly the result of slipping, tripping or falling on stairs or steps.
4. Most falls (more than 60 percent) reportedly happen in the home.

But, falls are preventable.

RISK FACTORS FOR FALLING

A risk factor is a characteristic that increases the likelihood that something will occur. Over the last several decades, there has been significant research on and attention to risk factors for falls by older adults and to the development of

safety hazards, some specific diseases and conditions, medication usage and polypharmacy, foot problems and poorly fitting footwear, problems with memory, attention and decision making, and slowed reaction times.<sup>2,3,4</sup> Research findings indicate that some of the identified risk factors are more

potent than others, and that some are more amenable to intervention. The Centers for Disease Control and Prevention (CDC) and the National Council on Aging (NCOA) recommend that programs and interventions to reduce the risk of falls by older people include strategies for (1) improving balance and strength; (2) reviewing medication use and reducing polypharmacy, if possible; (3) assessing and modifying home safety hazards; and (4) assessing and correcting visual impairments.<sup>2,3</sup>

While the major risk factors for falls are well understood, there remains an important gap in our

national research effort: The development of prevention tools and programs that address all four risk factors and can be implemented without the assistance

interventions to reduce these risk factors. Many risk factors have been identified and include age-related decline in strength and balance, visual impairments, home





of health care professionals. Until now, multi-component fall risk reduction and education programs have been largely confined to urban areas and have relied on health care professionals to deliver the programs.

TOOLKIT DEVELOPMENT

The Falling Less in Kansas (Falling LinKS) Toolkit is a collaborative effort among residents, community advocates, health care providers, the Departments on Aging in Harvey and Elk Counties, Envision Vision Rehabilitation Center, and Wichita State University investigators from three colleges and five departments. The Falling LinKS Toolkit was designed as a community-grounded, evidence-based falls education and prevention tool that allows communities to tailor programs to the needs, resources, infrastructure and dissemination preferences in their setting.

Rural populations in the United States are aging more rapidly than urban populations. Moreover, rural locations often lack adequate numbers of health care professionals to provide even minimal services. The Falling LinKS Toolkit was developed to address the mismatch between the high population density of older adults in rural areas and minimal availability of health care resources. The Toolkit’s purpose is to reduce falls, an expensive and frequent event of later life.

While the Toolkit was developed to address an unmet need of rural-residing older adults, its use is not restricted to rural America. It can

be utilized by any older adult, any friend or family member on behalf of the older adult, or by urban community advocates where there are abundant health professionals and self-care programs.

TOOLKIT SECTIONS

The Toolkit contains four major sections addressing the risk factors identified by CDC and NCOA:

(1) **Regular physical activity and balance training** have been demonstrated to be beneficial in the prevention of falls. Benefits occur if the intervention is physical activity only, or if physical activity is coupled with other interventions. The Falling LinKS Toolkit uses the *First Step to Active Health (FSAH™)* program for this section as it is flexible and evidence-based. *FSAH™* progresses through the four components of fitness (i.e., aerobic, flexibility, strength and balance) in a step-by-step progression.<sup>5</sup>

(2) **Medication usage and poly-pharmacy** (taking more than four medications) are often contributing factors to falls. Many prescription and over-the-counter medications have side effects alone and/or in combination, and may lead to dizziness, drowsiness, gait problems, postural hypotension, confusion, blurred vision and other adverse events. Studies indicate that many older adults are at risk for poly-pharmacy because of the number of prescription drugs and over-the-counter medications used by this group. The major focus of this

section is to provide information about medication usage and to empower older adults to take control of and understand some of the unexpected effects of medication usage. The Falling LinKS Toolkit provides information on talking with a health care provider about medications and reviewing one’s own medication usage, tracking medication usage through the “File of Life” and “Vial of Life,” and taking and storing medications safely.

(3) **Evaluating and resolving home safety hazards** have been well documented in research worldwide and are important strategies to reduce the risk of falls. The Falling LinKS Toolkit provides instructions on how to assess the home environment for safety hazards that may increase the risk of falling and makes specific recommendations for how to modify each identified hazard. A list of home modification tips is included. The modification costs range from little to no cost (e.g., remove throw rugs and reduce clutter) to moderate cost (e.g., install handrails in bathrooms or ceiling lights where needed) to significant cost (e.g., install walk-in showers that are easy to enter and exit). This section concludes with “My Home Safety Plan,” a document for recording identified hazards and a timeline for making the necessary modifications.

(4) **Visual impairments** increase the risk of falling because of the decreased ability to detect obstacles and reduced physical stability.


Unfortunately, older adults are more likely to develop visual impairments, specifically low vision and blindness. The Falling LinKS Toolkit includes a number of resources to help identify and screen for vision problems. The Amsler Grid, a tool for home monitoring of vision, and the Functional Vision Screening Questionnaire (FVSQ), a tool to help individuals decide if they have a vision problem, are both included.<sup>6</sup> The FVSQ contains 15 questions and a score of nine or more indicates the need for an examination by a low vision eye doctor or ophthalmologist. A low vision tip sheet offering simple strategies for enhancing personal safety and reducing fall risk, and recommendations on how to seek help for orientation and mobility problems, is also included. Because environmental

modifications are often prescribed following a low vision evaluation, the home assessment is a critical component of fall education and prevention for Falling LinKS Toolkit users with low vision.

Fortunately, Medicare covers evaluation and basic low vision rehabilitation. Limited funding for low vision aids may be available through the federally funded older blind independent living grant, administered in Kansas by the Department of Social and Rehabilitation Services. Supplemental funding may also be obtained through the Lions Clubs and the Veterans Administration. Areas of Kansas with scarce vision resources may consider the Kansas Lions Mobile Screening unit for vision screening. Envision serves much of the state focusing on clients within a 200-

mile radius of Wichita, reaching into a number of resource-scarce counties.

CONCLUSION

Low vision and vision rehabilitation professionals have key roles to play in the prevention of falls by older people. Screening and correction of visual deficits is critical. Assessing home safety hazards is also central and should be partnered with the low vision assessment. The Falling LinKS Toolkit provides resources for these interventions as well as for reviewing medication usage and for increasing physical activity. The Falling LinKS Toolkit is a unique and important resource in the armamentarium of low vision professionals as they assess and treat their clients. 

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The Falling Less in Kansas Toolkit can be accessed online at [www.wichita.edu/aging](http://www.wichita.edu/aging).

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## The CNIB TAPE Measure ..... Alexander Shaw, PhD and Deborah Gold, PhD

The CNIB Tool to Assess Preparedness for Employment (CNIB TAPE Measure) is an instrument for people to use in assessing the success factors for employment that are in place for individuals who are blind or visually impaired. In this article, we describe the tool and encourage its use. It is available free of charge from the CNIB website ([www.cnib.ca](http://www.cnib.ca)). Scores on each TAPE scale have shown a statistical relationship to employment status. The TAPE can be used by vocational counselors, educators, guidance counselors and family members to provide support to clients wanting to improve their opportunities for employment. The tool can also be used by individuals to identify their areas of strength or need. Ideally, this tool should be used in conjunction with other appropriate assessment approaches and personal inventories. It should factor in the individual's occupational interests and personal needs. It does not cover everything that could be assessed, but it is unique as it is based on a model of success and has been tested with persons who are blind or visually impaired.

### BACKGROUND

Employment rates for people with visual impairments are low throughout the world.<sup>1</sup> According to 1994-1995 statistics compiled by the American Foundation for the Blind, only 30 percent of people of working age who are legally blind

are employed.<sup>2</sup> Despite this, there are many who have found gainful employment – some in high-ranking positions. At the Canadian National Institute for the Blind (CNIB), research was conducted seeking answers to the question: “What is it that enables these successful individuals to find gainful employment despite low employment rates for this population overall?” The content of the CNIB TAPE Measure was based on focus groups with people with vision loss who are successfully employed, a survey of successfully employed persons with vision loss and hiring managers, and on the wealth of literature on factors that affect employment outcomes. We believe that the strength of the tool stems from the diverse sources used in its development. The item pool was further refined and augmented by a panel of experts in the field of vision loss and by a National Advisory Committee of experts and consumers. Statistical analyses (factor analyses) were conducted to group the items and create the scales of the TAPE measure. Preliminary construct validation of the TAPE was achieved with a sample of working-age visually impaired clients from the CNIB database. More details on the construction of the TAPE can be found in the May 2011 issue of the journal, *WORK: A Journal of Prevention, Assessment & Rehabilitation*.<sup>3</sup>

### THE SCALES OF THE TAPE MEASURE

Each of the TAPE Scales is scored on a Likert scale from 1 to 5 where 5 = “strongly agree”, 4 = “agree”, 3 = “neutral”, 2 = “disagree”, 1 = “strongly disagree.” Scale scores are calculated by averaging individual item scores. The scales are organized into three sections: Scales relevant to everyone, scales relevant to those looking for work, and scales relevant to persons who are gainfully employed. There are two versions of the TAPE: The practitioner version and the research version. A few of the scales (“Upbringing” and “Access and Supports”) are only in the research version of the tool.<sup>4</sup>

### SCALES RELEVANT TO EVERYONE

(regardless of labor force status)

The first six scales are answered by everyone and include “Technology,” “Support,” “Disability,” “Communications,” “Work History” and “Language.”

The Technology scale focuses on both proficiency with technology and access to technology. Example items from the scale include, “I am skilled in working with files on a computer, including creating folders and moving files between folders,” “I feel comfortable receiving and sending attachments through email,” and “I have access to the adaptive technology that I need to look for work.” The Disability scale

deals with a person's knowledge of his or her rights as someone with a disability, as well as his/her skills and comfort in self-advocating and educating others about the disability. Example items include, “I am able to state my needs to others,” and “I am familiar with policies in place to help people with disabilities.” The Communications scale assesses proficiency in reading, writing and oral communication. Example items include, “I frequently read books, magazines or newspapers,” “I have no problem reading material about job search strategies” and “I write daily.” The

version of the TAPE, there is also a scale called “Upbringing” which focuses on early life experiences. Sample items from the Upbringing scale include, “When I was growing up, my parents did almost everything for me because of my disability,” and “My parents encouraged me to hold some kind of paid employment.”

### SCALES RELEVANT TO THOSE LOOKING FOR WORK

Four scales are relevant to those who have recent (in the last five years) or current experience looking for work. These include “Look-

people I know to ask for advice or job leads,” and “I ask people who I know for names of others who could help me in a job search.” The Job Search scale focuses on strategies used to find work despite one's disability. Items include, “I approach employers who I know have experience hiring someone with a visual impairment,” and “In my job search, I target organizations that I believe provide adaptive technology.” The Targeted Job Search scale addresses the extent to which job seekers try to find a position for which their qualifications are well matched and the extent to which they learn about the position and adapt their application to the position. Items include, “I have spoken with people who are employed in my area of interest and I now understand what is involved in that job,” and “I change my résumé to suit the actual job.”

### SCALES RELEVANT TO PERSONS WHO ARE EMPLOYED

This section of the TAPE measure includes a single scale named, “Access and Supports.” This scale (and this section) is only included in the research version of the TAPE measure. Sample items include, “My coworkers are able to help me if I need any assistance in the workplace,” and “I have the assistive technology I need to perform my job.”

### BACKGROUND INFORMATION

An “Educational and Employment Background” section inquires about

“Employment rates for people with visual impairments are low throughout the world...despite this, there are many who have found gainful employment—some in high ranking positions.”

Work History scale looks at employment history and the track record of persons with vision loss. Items include, “I have received enough training in how to job search,” and “I started working for pay early in life.” The Language scale inquires about whether the person can communicate in more than one language. Items include, “I am able to write in more than one language,” “I am able to read in more than one language,” and “I can speak more than one language.” In the research

ing for Job,” “Networking,” “Job Search” and “Targeted Job Search.”

The Looking for Job scale assesses proactive behavior in the job search and preparation for job interviews. Sample items include, “I practice my conversations with possible employers ahead of time,” “I frequently read the job postings,” and “I frequently fill out job applications.” The Networking scale assesses ability and willingness to network. Sample items include, “I frequently get in touch with




highest level of education achieved and labor force status. Questions are also asked regarding recent job search experience and the outcome of these efforts (i.e., job interviews, job offers).

### SCORING OF THE TAPE MEASURE

Tables with baseline scores are provided on the CNIB website. These scores are based on analyses of data from a CNIB sample of persons who are blind or visually impaired and with varying affiliations to the labor market. The numbers can be used as a rough gauge of how the respondent fared. The numbers found in the tables are not, however, a gold standard. They are based on a single sample of 239 people that may or may not be representative of all working-age persons living with vision loss in Canada. Scoring requires first calculating mean scores for each of the scales and then comparing an individual's scores to the mean scores in the appropriate table. Different sets of comparison scores are provided for different labor force status groups (i.e., out of labor force, looking for work, employed).

### USE OF THE CNIB TAPE MEASURE

We have set up a companion website for the CNIB TAPE at <http://www.cnib.ca/en/research/toolsandresources/> where information regarding the tool can be shared by researchers and practitioners. On this site, you will find the most current information pertinent to the TAPE including baseline/comparison data as well as a detailed scoring protocol. A link is provided through which you can download the latest version of the TAPE and through which you can provide your feedback and relevant info. While use of the tool is free, we ask that you share with CNIB a summary of any research you conduct using the TAPE and include aggregated scores (along with standard deviations) for each of the scales. Please also include a detailed description of the study sample. If you have sufficient sample sizes to provide scores separately for different socio-demographic or occupational groups, this would also be very helpful. These findings would be made available via the companion website to others in the research and practice community. If you are using the TAPE with clients, or are

using it on your own and have case examples to share of its use, these would also be much appreciated. In sharing case examples, please do not use the person's name unless they have explicitly given permission. We would also like to be made aware of any publications (either in peer reviewed journals or elsewhere) based on work that has used the TAPE. In offering this instrument, we wish to build an international research and practice community. 

completed his doctorate in Experimental Psychology at Simon Fraser University in 2002, with a focus on health and cultural issues. Since 2003, Dr. Shaw has worked in the position of Senior Researcher at CNIB and has conducted a wide range of studies relevant to persons who are blind or visually impaired. These include research on physical activity, employment and quality of life. Dr. Shaw also co-developed the psychometric tool addressed in this article that can be used to assess preparedness for employment of persons with disabilities. Dr. Shaw has published a number of articles in the field of blindness and visual impairment including several in the *Journal of Visual Impairment and Blindness* and *AER Journal*.



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## “Excellence in Research” Programming Set for Envision Conference 2011

*“The Envision Conference has become the national leader in multi-disciplinary low vision rehabilitation programs. The high quality, scope, depth and timeliness of the lectures and the workshops are exceptional. I highly recommend any professional engaged in the care of the low vision patients attend.”* — Alfred A. Rosenbloom, MA, OD, DOS, Chair Emeritus, The Chicago Lighthouse Low Vision Rehabilitation Service

The program for Envision Conference 2011 has been set, and we hope you will join us in St. Louis, Missouri, at the Hilton St. Louis at the Ballpark, September 21-24. There is still time to register online at [www.envisionconference.com](http://www.envisionconference.com).

### PROGRAM TOPICS AND SESSION HIGHLIGHTS

#### Optical Devices and Prescribing

##### OT: Optics for Therapists

James Deremeik, CLVT; Alexis Malkin, OD; Robert Massof, PhD

This presentation will be a lecture and hands-on workshop focusing on clinical understanding of optics. Theory and practical application will allow therapists to communicate with prescribing doctors and have an interactive session to master training techniques with optical devices for near tasks emphasizing spectacle and hand-held magnifiers.

#### LOW VISION AND DRIVING

##### Evidence-based Visual Assessment for Driving

Kevin Houston, OD

This course is intended for optometrists, ophthalmologists, driving specialists and other professionals working with or interested in low vision and driving. The session will review important studies related to low vision and driving, and suggest an in-office testing protocol. Eye doctors and driving specialists are often faced with the uncomfortable task of requesting that a patient stop driving. An in-depth knowledge of the research data allows a doctor to objectively assess a patient. The doctor can then confidently discuss their recommendation with the patient citing the supporting research. A multidisciplinary approach is discussed and emphasized.

#### TRAUMATIC BRAIN INJURY

##### Beyond ‘Look to the Left’ ... Understanding Unilateral Visual Neglect (UVN): Anatomy, Assessment and Intervention Options With Links to Evidence-based Practice

Keith Gentry, MS, OTR/L, SCLV

A growing body of evidence suggests that there are a variety of interventions to address neglect which collectively represent a move toward a multi-sensory approach. Applications for limb activation, VST, neck muscle vibration, electrical stimulation, trunk rotation and prism adaptation, among others, will be explored.

#### PROFESSIONAL ISSUES

##### Utilizing a Nonprofit for Providing Comprehensive Statewide Low Vision Care to School-Age Children

Jennifer Coy, TVI, CLVT, COMS; Scott McDougal, OD; John Thompson, President, LHB-St. Louis

This presentation highlights the outcomes of using a nonprofit for supporting a comprehensive, multidisciplinary, mobile low vision clinic for providing comprehensive care to school age children with low vision. Discussion centers on how to provide exceptional pediatric care that embraces the student and family, the student's educational team and the learning environment.



**PEDIATRICS, EARLY INTERVENTION****Clinical Low Vision Examinations and the IEP Process: What Do Parents Really Think?***Kerry Lueders, TVI, COMS, CLVT*

This presentation explores the relationship and gaps between clinical low vision examinations and the Individualized Education Program (IEP) process, via the experience of parents of children with low vision. Results of a parent survey administered by the William Feinbloom Vision Rehabilitation Center (Philadelphia, Pa.) will be presented.

**CLINICAL PRACTICE APPLICATIONS****Documentation and Billing of Low Vision Rehabilitation Services***Kendall Krug, OD*

A discussion of the current documentation and billing strategies for low vision rehabilitation services as required by Medicare. A special emphasis will be placed on specific billing codes and the proper documentation for both low vision consultation services and rehabilitation services.

**OTHER TOPICS INCLUDE:**

- Psychosocial Issues in Vision Loss
- Disease Etiology
- Multi-disciplinary Models of Low Vision Rehabilitation
- Adding Low Vision Rehabilitation to Your Practice

The Envision Conference website has been updated to include the Envision Conference 2011 clinical education and research sessions schedule. Visit the Sessions & Events section at [www.envisionconference.org](http://www.envisionconference.org). There, you will find the times of each clinical and research session. Click on the links to view session descriptions and speaker bios. If you have any questions about workshops, clinical education or research sessions at Envision Conference 2011, email Michael Epp at [michael.epp@envisionus.com](mailto:michael.epp@envisionus.com).

**SPECIAL SESSIONS AT ENVISION CONFERENCE 2011****“EXCELLENCE IN RESEARCH” KEYNOTE****Thursday, September 22 | 8 – 9:30 am***Gary Rubin, PhD, FARVO*

Professor Rubin is a Gold Fellow of the Association for Research in Vision and Ophthalmology and an Honorary Fellow of the College of Optometrists in the UK. In addition to publishing more than 100 scientific papers and book chapters, some of his noted research includes reading and face recognition in people with impaired vision, a study sponsored by the National Eye Institute. He has also researched the effect of visual impairment on older people's daily lives, a study sponsored by the National Institute on Aging. Rubin has also devoted considerable time to the development and validation of new clinical vision tests used in a wide range of eye diseases including cataract, macular degeneration and diseases of the optic nerve. In addition to being this year's keynote speaker, Rubin will also moderate a vision research panel, Clinical Trials for Low Vision Rehabilitation: Interventions & Methodologies, Friday, September 23, 10:45 – 11:45 am.

**Expand Your Experience, Register for a Pre-conference Workshop**

Envision Conference 2011 pre-conference workshops are a great way to get hands-on training. The in-depth, extensive workshops will take place Wednesday, September 22, from 9 am – 12 pm and 1 – 4 pm. You may choose one from each time slot. Workshops are not included with conference registration, but may be purchased for an additional \$100 per session.

Visit the Envision Conference website at [www.envisionconference.org](http://www.envisionconference.org) and click on the workshop you are interested in to view the workshop summary.

**ENVISION CONFERENCE 2011 RESEARCH SESSION HIGHLIGHTS**

*“The close co-working between people with different professional backgrounds that exists at the Envision Conference is extremely good. I think we can really make sure our research goes forward to best benefit people with low vision.” - Michael Crossland, PhD, MCOptom, FAAO*

**Health States of Patients Seeking Outpatient Low Vision Rehabilitation Services Within LOVRNET.***Moderator: Judith Goldstein, OD*

Patients seeking vision rehabilitation services often report other co-morbidities or otherwise impaired health states. This research panel looks at the health states of nearly 800 patients within the Low Vision Research Network (LOVRNET) study.

**Trouble Seeing ... Trouble Sleeping: How Are They Related? Moderator: Olga Overbury, PhD**

This panel presents previously unconsidered issues related to the relationships between sleep disorder and visual impairment, including the relationship between sleep quality and visual impairment, prevalence rates of sleep disorders among the visually impaired, and the physical and cognitive effects of sleeplessness, as well as others.

**Dual Sensory Impairment. Moderator:***Walter Wittich, PhD*

In the coming decades, the number of seniors affected with dual sensory impairment (hearing/vision) will drastically increase; rehabilitation agencies need to prepare for efficient service provision. Resource allocation is based, in part, on the clientele profile; however, little information is available describing this population.

This panel includes research presentations on:

- Dual Sensory Impairment Rehabilitation
- The Relevance of Providing Both Auditory and Visual Speech Cues to Older Adults With Sensory Impairments
- Pilot Studies in Speech-Reading and Way-Finding With Dual Sensory Loss Impairments
- Psychosocial Impact of Vision and Hearing Loss: Counseling as Preparation for the Rehabilitation Experience
- Psychosocial Adjustment for Persons Aging With Hearing and Vision Loss

**Mobility Panel. Moderator: Shirin Hassan, OD, PhD**

This panel includes research presentations on:

- Can Pedestrians Judge the Time-to-Arrival of Approaching Vehicles?
- The Development of the Falling Less in Kansas (Falling LinkS) Toolkit
- Enhanced Orientation and Mobility in the Visually Impaired Using Virtual Audio-based Environments

- Objective Measurement of Real-World Physical Activity in Glaucoma and Macular Degeneration Using Accelerometer Devices
- Restriction of Travel Outside the Home in Glaucoma and AMD: Direct Measurement Using a Cellular Network-based Tracking Device

**Functional Performance and Outcomes. Moderator: Ronald A. Schuchard, PhD**

This panel includes research presentations on:

- Impact of Glaucoma on Activity Participation
- Visual Field Loss Due to Neurological Event; The Team Approach to Rehabilitation vs. the Prescription of Gottlieb Prisms
- Key Life Stages and Transition Points for Young People With Sensory Impairments Between Birth and Age 25 Years
- Increased Sleepiness and/or Perceived Stress Predict Reduced Attention During Visual Acuity Testing in Retinitis Pigmentosa
- Increased Visual Field Variability in Newly Diagnosed Glaucoma Patients is Partly Related to Increased Depressive Symptoms or Worry About Blindness

**Diagnostics and Assistive Technology.***Moderator: Robert Massof, PhD*

This panel includes research presentations on:

- The BrainPort® Vision Device: A Visual Information Prosthetic for the Blind
- The Retinal Locus for Reading: What We Can Learn From Text Location on the Retina Just Before Word Enunciation
- Evaluation of Fixation Stability by Bivariate Contour Ellipse Area (BCEA) Using the MP-1 Microperimeter in Mild Visually Impaired Patients
- Developing a Model to Predict Low Vision Users' Performance When Operating Small Visual Displays
- Envision Assistive Technology Camp: Results of Computer Training for Youth With Low Vision and Blindness

To view the conference programming and to register, visit the conference website at [www.envisionconference.org](http://www.envisionconference.org). Please contact Michael Epp, Director, Professional Education, with questions about the Envision Conference at (316) 440-1515 or email [michael.epp@envisionus.com](mailto:michael.epp@envisionus.com).



## Coming Attractions in Envision Research...

### 2011 AT Camp Data Analysis

The 2011 Envision Assistive Technology (AT) Camp took place June 5-10 and was a great success. Twenty students from across Kansas, ranging in age from 11 to 18, attended the weeklong residential camp hosted at Envision in Wichita, Kan. As a focus of the camp, participants' computer skills and knowledge were assessed at the beginning of the session. During the week, attendees participated in four hours of assistive technology and computer skills training each day. At the end of the weeklong session, participants were given a post-assessment on their computer skills and knowledge. Look for the analysis of the pre- and post-camp participant data in a future issue of *Visibility*, with analysis of parent observation to follow.

### Good Clinical Practices Training

In preparation for participation in clinical trial research studies, members of the Research team and Envision Vision Rehabilitation Center (EVRC) staff began Good Clinical Practices (GCP) guidelines training on June 21. GCP guidelines are an international quality standard that provides principles on the protection of the human rights of participants in clinical trials, and defines the roles and responsibilities of clinical trial sponsors and clinical research investigators. GCP training is required for establishing Envision as a clinical trial site.

### Envision Research Presentations at Envision Conference 2011

Envision Conference 2011 is September 21-24 in St. Louis, Missouri. This will be another great year for both clinical and research sections, as there will be sessions on a wide variety of low vision topics. In addition to the other quality presentations to be seen this year, Envision Research, in collaboration with the Envision Vision Rehabilitation Center, will be giving the following presentations:

- Envision Assistive Technology Camp: Results of Computer Training for Youth With Low Vision and Blindness – Shannon Riley, MA; Bonnie Cochran, CLVT, CPOA
- The Development of the Falling Less in Kansas (Falling LinkS) Toolkit – Karen Kendrick, OTR/L, CLVT; Shannon Riley, MA
- Visual Field Loss Due to Neurological Event; The Team Approach to Rehabilitation vs. the Prescription of Gottlieb Prisms – William Park, OD, FAAO; Shannon Riley, MA

View a complete listing of all research and clinical education sessions at [www.envisionconference.org](http://www.envisionconference.org)



## Envision Professional Education Calendar

### Envision Conference 2011, St. Louis, MO.

CE - ACCME, ACVREP, AOTA, COPE, CRCC

### Low Vision Grand Rounds - Vision Rehabilitation for Neurological Vision Loss. Wichita, KS.

CE - ACCME, AOTA, COPE

### November 5, 2011

### Behavioral Health and Low Vision Rehabilitation: A Multi-disciplinary Approach. Wichita, KS.

CE - ACVREP, AOTA, COPE

**For more information, visit the Education and Resources page at [www.envisionus.com](http://www.envisionus.com).**