

The Truth About Color Vision in Healthcare

Dr. Terrace L. Waggoner Sr., O.D.
Terrace L. Waggoner Jr. (T.J.), MBA, MA

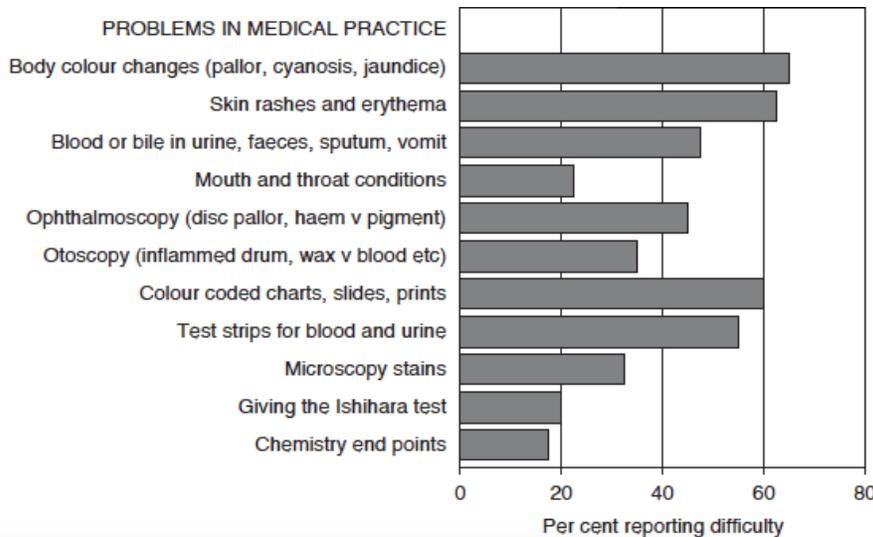
Why is color vision important in healthcare?

Color vision plays a constant role in the healthcare system. By being unaware of hospital employees with color vision deficiencies (CVD), patients' safety is at risk. Depending which study is referenced, CVD affects between 8%-12% of males and .5% of females. What's dangerous is that 20% to 30% of people with a CVD are unaware they have a CVD (Cole, 2007). With a majority of doctors being males and a significant amount of males becoming nurses, the patients' safety is potentially jeopardized if CVD is not tested both initially and routinely.

Following is a list that medical profession practitioners suffering from CVD have difficulty detecting (Cole, 2004; Spalding, 1999):

- Body color changes (pallor, cyanosis, jaundice)
- Skin rashes and erythema
- Stage I pressure ulcers
- Blood or bile in urine, feces, sputum, vomit
- Melaena
- Mouth and throat conditions
- Test strips for blood and urine
- Color coded charts, slides, and prints
- Color coded medications
- Color sensitive monitors

If a nurse or doctor were to miss certain symptoms or cues because of CVD, the patient's medical issue may be undetected and become worse when it could easily have been prevented (ex. Stage I pressure ulcer). According to Bluni & O'Shaughnessy (2009), there were 257,412 cases of Stage III and IV pressure ulcers in 2007 that cost hospitals a non-reimbursed average of \$43,180 per stay. With the increased use of color-oriented computer screens, people with CVD will likely miss important signs that indicate cancer or other



anomalies that are present. Spalding (1999) found support that doctors and nurses with CVD, specifically moderate or severe, performed worse than ones with normal color vision for certain medical procedures. In a study by Campbell, Spalding, and Mir (2004) it concluded that doctors suffering from CVD were poorer detecting physical

signs and naming the colors and were less confident about their decisions. Above is a graph showing the percentage of medical personnel that have difficulty with the indicated medical symptoms (Spalding, 1997, 1999a).

How Do We Raise Awareness and Create a Safer Environment?

There are a multitude of color vision tests that can be purchased. The most common color vision test is the Ishihara, which is a pseudo-isochromatic booklet test. The Ishihara was made in 1917 and has not been updated and therefore does not provide information about the type of CVD, its severity, and it is also unable to test for the tritan CVD (Cole, 2007). The Waggoner Computerized Color Vision Test, provided by TestingColorVision.com, is a pseudo-isochromatic color vision test that defines the type of CVD, its severity and tests for all three types of CVD.

Additionally, the test can be installed on a computer and/or integrated into a hospital's learning management system. This allows a hospital to easily test thousands of employees annually. A common misconception is that you can only be born with a CVD. This is incorrect and also why it is recommended that every employee's color vision is tested annually. Here are a few ways that CVD can be acquired:

- Diabetes
- Medications (anti-depressants, erectile dysfunction)
- Multiple Sclerosis
- Aging (discoloration of the lens)

Do Accreditations Require Color Vision Testing?

The College of American Pathologists (CAP) requires an initial color vision test when a laboratory technician is hired and when color discrimination is pertinent to the job (POC.06950). "The Joint Commission standards do not specifically require either visual acuity or color-blind testing for employees. The HR standards require assessment of the employees' abilities to fulfill the expectations of their job descriptions. Color-blind testing may be utilized as part of an organization's initial or ongoing competency assessment program, but other mechanisms that evaluate an individual's ability to interpret colorimetric determinations would also be acceptable" (Joint Commission, 2008). With that said, Joint Commission evaluators have been known to ask if a color vision test is in place at hospitals.

According to O*Net, which develops job analyses for thousands of careers and is created by the U.S. Department of Labor, nurses must be able to do the following tasks (Department of Labor, 2010):

- Monitor, record, and report symptoms or changes in patients' conditions.
- Order, interpret, and evaluate diagnostic tests to identify and assess patient's condition.
- Identifying information by categorizing, estimating, recognizing differences or similarities, and detecting changes in circumstances or events.

For doctors and nurses suffering CVD, all of these tasks would be difficult to fulfill their job expectations and ethical responsibility as stated by the Joint Commissions website, therefore placing both the patient and hospital at great risk. As for the statement "mechanisms that evaluate an individual's ability to interpret colorimetric determinations would also be acceptable," the Joint Commissions may not have a clear understanding of how color is perceived by someone with CVD. The only way to determine if someone is colorblind is by taking a color vision test.

"The evidence points to the need for CVD screening in medical students and doctors" (Spalding, 1999). Dr. Spalding is a general physician with a CVD. With the evidence stated above, it is equally important for nurses to be tested. Testing for color vision deficiencies is an important aspect, not to be ignored, within the healthcare industry, as it will help save lives and minimize legal exposure to the doctors and providers.

References:

- Bluni, R., O'Shaughnessy, J. (2009). Words that Save: Ensuring that "Never Events" Never Happen. *Health Management Systems*
- Campbell, J. L., Spalding, A. B., & Mir, F. A. (2004). The Description of Physical Signs of Illness in Photographs by Physicians with Abnormal Colour Vision. *Clinical and Experimental Optometry* 87, 334-338.
- Cole, B. L. (2004) The Handicap of Abnormal Colour Vision. *Clinical and Experimental Optometry* 87, 258-275.
- Cole, B. L. (2007). Assessment of Inherited Colour Vision Deficiencies in Clinical Practice. *Clinical and Experimental Optometry* 90, 157-175.
- Department of Labor. (2010). Summary Report for: 29-1141.00 - Registered Nurses. In O*Net OnLine. Retrieved March 16, 2012, from <http://www.onetonline.org/link/summary/29-1141.00?redir=29-1111.00>.
- Joint Commission. (November 24, 2008). Standards FAQ Details. In The Joint Commission. Retrieved March 16, 2012, from http://www.jointcommission.org/standards_information/jcfaqdetails.aspx?StandardsFaqId=30&ProgramId=1.
- Spalding A. B. (1997) Doctors with Inherited Colour Vision Deficiency: Their Difficulties with Clinical Work. In: Cavonius CR, ed. *Colour Vision Deficiencies XIII*. Dordrecht: Kluwer Academic; 20, 483-489.
- Spalding, A. B. (1999). Colour Vision Deficiency in the Medical Profession. Review article. *British Journal of General Practice* 49, 469-274.
- Spalding A. B. (1999a). Medical students and congenital colour vision deficiency: unnoticed problems and the case for screening. *Occupational Medicine* 49, 247-252.