Cortical/Cerebral Visual Impairment (CVI)

The Pennsylvania Advisory Committee on Education of Students Who Are Blind or Visually Impaired (PACES – BVI) responds to request for information relating to preferred practices and provision of services by appropriately credentialed professionals for students with a brain-based vision impairment. This document was originally created in 2019 and updated as of June 2023.

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What Is CVI?

CVI is an acronym for cortical visual impairment, cerebral visual impairment, or, per some doctors, central visual impairment. These are forms of neurological visual impairments, also referred to as brain-based visual impairment. What all these terms have in common is that they mean the cause of an individual's difficulty seeing is due to problems in one or more areas of the brain rather than the eyes.

Professionals who work with individuals with CVI, such as medical doctors, researchers, therapists, and teachers, have not always agreed on the definitions of these terms (Lueck, 2010). The terms are currently used as follows:

Cerebral Visual Impairment is "Visual impairment due to damage or disorder of the visual pathways and visual centers in the brain, including the pathways serving visual perception, cognition, and visual guidance of movement" (Dutton & Lueck, 2015, p. 4).

Cortical Visual Impairment is a term commonly used in the United States and, in the past, "often referred to visual impairment related to the cortical area of the brain and/or the optic radiations" (Dutton & Lueck, 2015, p. 13). It is a subset of cerebral visual impairment (Roman-Lantzy, 2018).

Central Visual Impairment is used by some ophthalmologists synonymously with "cerebral visual impairment" (M. Mills, personal communication, May 8, 2023; Solebo, et al., 2017).

CVI is becoming increasingly common as the term "when referencing the brain-based visual impairment regardless of age of injury and/or type of brain injury" (Mazel, et al., 2020, p. 1).

CVI interferes with the brain's visual systems ability to consistently understand or interpret what the eyes see. For the purposes of this document, the focus will be on CVI.

Is CVI a Visual Impairment?

The Individuals with Disabilities Education Act (IDEA) of 2004 defines **visual impairment** as, "an impairment in vision that, even with correction, adversely affects a child's educational performance. The term includes both partial sight and blindness." By this definition, CVI is a visual impairment that may qualify a child for special education and related services. CVI is the leading cause of visual impairment in developed countries (Solebo, et al., 2017), including the United States (Snyder, et al., 2020).

How is CVI Diagnosed?

When a diagnosis of CVI is assigned to a child's vision difficulties, it is done by a medical practitioner, such as a pediatric ophthalmologist or neuro-ophthalmologist. A diagnosis of CVI may be made when a child is exhibiting signs of vision loss, but the ophthalmologist finds normal eye anatomy. However, it should be noted CVI can coexist with ocular visual disorders. A medical diagnosis of CVI is not needed for a child with vision difficulties to be referred for an educational evaluation.

What is the Educational Referral and Evaluation Process?

There are situations where CVI has not been diagnosed by a medical practitioner but is suspected. A child whose use of use of vision appears to be a barrier to learning and negatively impacting educational performance needs to be referred for an educational evaluation with or without a diagnosis.

A child is referred for an evaluation to a **teacher of students with visual impairments (TVI)** who will conduct assessments and provide necessary educational interventions and specialized instruction. Assessments will include a **functional vision assessment (FVA)**, a **learning media assessment (LMA),** and an **expanded core curriculum assessment (ECC)** designed to identify appropriate educational strategies, necessary modifications or adaptations, and any technology or other tools that will ensure equal access to the child's curriculum. Evaluation and instruction by a **certified orientation and mobility specialist (COMS)** may also be recommended.

Who is Qualified to Evaluate and Provide Services to Children with CVI?

Since CVI is a form of visual impairment, children with CVI are evaluated and served by a team of specialists that includes a Pennsylvania certified Teacher of Students with Visual Impairments. Pennsylvania certified TVIs are equipped with and use multiple assessment tools to determine each student's individual sensory channels, functional vision, learning and literacy media, and expanded core curriculum needs.

Pennsylvania Certified Teachers of Students with Visual Impairments

Teachers of students with visual impairments (TVIs) are specialized teachers trained to address the needs of the heterogeneous population of children with visual impairments through the nine domains of the expanded core curriculum. TVIs may work with a variety of age groups and within a myriad of instructional settings. TVIs address the diverse needs of students with visual impairments through individualized goals and specially designed instruction and accommodations.

To Become a Certified TVI

To become TVI certified in Pennsylvania you must:

- Complete a teacher of the visually impaired preparation program at an accredited university and submit transcripts of completion. This can be done at a bachelor's or master's level.
- Successfully complete clinical experience/student teaching.
- Take the Educational Testing Service (ETS) Teaching Students with Visual Impairments Praxis test and earn a passing score. Note: if already teacher certified in Pennsylvania this is the only test needed; if this is the initial certification, the ETS Fundamentals test is also required.
- Obtain Pennsylvania Certification in Blindness/Visual Impairment through Pennsylvania Department of Education.

Preparation Programs Standards and Guidelines for Teachers of Students with Visual Impairments in Pennsylvania

There are three universities in Pennsylvania that prepare candidates to become teachers of students with visual impairments. These include Kutztown University, Salus University, and University of Pittsburgh. All three universities adhere to the Council for Exceptional Children (CEC) standards, CEC Initial Specialty Set: Blind and Visual Impairments. These standards are national guidelines for preparing teachers of students with visual impairments to work with children and youth with ocular and brain-based visual impairments with or without additional disabilities. Each program must demonstrate how the standards are met to obtain national accreditation. The standards are embedded throughout courses within each university's programs. All programs require extensive field hours working under a Level II certified teacher of the visually impaired prior to completion of the program.

To Maintain Certification

TVIs and COMS need to have access to resources and participate in professional development opportunities to maintain certification through the certifying bodies. Multiple sources, such as PaTTAN, universities, local education agencies, approved private schools, and professional organizations provide continuing education activities. Once certification is obtained 180 professional development hours are required every 5 years.

Note: TVIs, COMS, and other educational team members often pursue additional professional development activities to expand their knowledge and skills in areas relevant to their practice, including serving students with CVI. However, there is no stand-alone credential or micro-credential that uniquely qualifies an individual to evaluate and teach students with CVI. At one time there existed The Perkins-Roman CVI Endorsement, a micro-credential offered by the Perkins School for the Blind to prepare individuals to administer one specific CVI-related assessment tool, the CVI Range. That program was discontinued in 2021.

What Assessment Tools Are Used by a Program for Students with Visual Impairments to Address Referral and Service Provision?

Essential assessments for all students with visual impairments include a Functional Vision Assessment (FVA), a Learning Media Assessment (LMA) and an Expanded Core Curriculum Assessment (ECC).

These essential assessments identify areas of needed instruction, appropriate educational strategies, necessary adaptations and modifications, and technology or other tools that constitute an appropriate education for students with visual impairments.

Functional Vision Assessment (FVA)

Functional vision assessment tools provide a comprehensive assessment of aspects of visual functioning including the appearance of the eye, reflexive responses, muscle balance, eye movements, field of vision, color vision, contrast sensitivity, near vision, distance vision, and perceptual variations (Anthony, 2000). The FVA occurs when a student is first referred for services and continues as an ongoing monitoring process. The FVA provides information for the educational team regarding lighting, adaptations to materials, optimal viewing distances, and environmental and positional considerations for the student. The purpose of a FVA is to evaluate how a student uses vision for daily tasks, to identify what helps or impedes a student's use of vision, and to ensure that information is presented to a student in the most useful, accessible, and meaningful way.

When conducting a FVA, teachers of students with visual impairments gather data from a variety of sources. The FVA process includes, but is not limited to, a review of the learner's medical and vision history, interviews, observations, and direct assessment. The impact of the environment on the student's visual performance is also considered.

For students with CVI (suspected or diagnosed), a FVA may assess for visual attention and recognition; response to light, color, sensory complexity, and movement; latency; and visual field preferences. Additional areas of consideration regarding visual function may be included in the FVA based on the unique needs of the individual student.

Learning Media Assessment (LMA)

A **Learning Media Assessment (LMA)** is a systematic approach to collecting and analyzing data regarding a student's sensory use and preferences, learning environments and materials, and interventions and methods to read, write, and compute. It is used in conjunction with the functional vision assessment to describe the sensory abilities of a student with a visual impairment.

The LMA process helps determine whether a student will be a tactual, visual and/or auditory access learner. LMA results and informed IEP team discussions also help determine a

student's primary literacy medium. Media could include braille, tangible symbols, print, dual media, and/or auditory access. A LMA occurs when a student is first referred for services and continues as an ongoing monitoring process.

For students with CVI (suspected or diagnosed), results of the FVA need to be strongly considered when conducting the LMA.

Expanded Core Curriculum (ECC) Assessment

In addition to receiving instruction in the general education curriculum, students with visual impairments need assessment and explicit instruction in the areas of the ECC in order to gain skills and knowledge that typically developing learners gather incidentally through vision.

An ECC Assessment collects strength-based information on the student's compensatory access skills, social interaction skills, orientation and mobility skills, independent living skills, recreation and leisure skills, career education, assistive technology and other technology skills, self-determination, and sensory efficiency skills.

An **ECC Assessment** tool collects information from teachers, families, students, and other service providers. This tool and process start the conversation about the student's instruction in the ECC and facilitate common terminology and understanding. This tool and procedure do not replace an age-level or grade-level assessment, but rather they supplement them. ECC Assessment occurs when a student is first referred for services and continues as an ongoing monitoring process.

For students with CVI (suspected or diagnosed), results of the FVA need to be strongly considered when conducting an ECC assessment.

Are There CVI-Specific Assessment Tools?

Yes, however, it is important to remember that IDEA mandates the use of multiple assessment tools, and a multidisciplinary assessment is recommended for students with CVI due to the complex nature of the disorder and the possible presence of ocular and additional cognitive or physical disabilities that must be concurrently assessed.

Some assessments can be found within the resources section at the end of this document. Consult with your Pennsylvania Training and Technical Assistance Network (PaTTAN) educational consultant for further information.

Evaluation Process to Service Provision for Students with Visual Impairments Who May Have CVI – What Does It Look Like?

When assessing any child with a visual impairment, including CVI, it is helpful for the evaluator to have a copy of relevant medical reports, such as an eye report, for the Local Education Agency (LEA) to review and include as part of the Evaluation Report. The LEA will issue a Prior Written Notice (PWN) for Initial Evaluation and Request for Consent Form or a Prior Written Notice for Re-evaluation and Request for Consent Form to the parent/guardian as appropriate, which would include a list of assessments that should be conducted to determine eligibility or the need for additional supports and services.

CVI often coexists with ocular visual disorders, and many neurological disorders can cause CVI. Therefore, in addition to a Functional Vision Assessment, which includes, but is not limited to, a review of the learner's medical and visual history, interviews, parent/teacher input, observations, and direct assessment as conducted by a certified TVI, the evaluation may include psychological and achievement assessments, speech/language, motor, and/or behavioral assessments as deemed appropriate. Upon receipt of the signed PWN, the LEA must conduct the Evaluation Report within 60 calendar days per IDEA and Pa Chapter 14, not including summer, and provide a written report to the parent/guardian indicating whether or not the student meets the eligibility criteria. Does the student have a disability and is he/she in need of specially designed instruction? If the criteria are met, an Individualized Education Plan would need to be developed within 30 calendar days of the Evaluation Report and a Notice of Recommended Educational Placement issued to the parent/guardian indicating the type/s and level/s of support/s that the student requires in order to be academically successful as determined by the IEP Team.

An IEP for a student with CVI should include any necessary educational interventions and specialized instruction from a Certified TVI and/or Certified Orientation and Mobility Specialist. Additionally, the IEP should address the unique modifications, adaptations and/or technology needed to provide a student with CVI access to the curriculum and educational environment.

References

Anthony, T. L. (2000). Performing a functional low vision assessment. In F. M. D'Andrea & C. Farrenkopf (Eds.), *Looking to learn: Promoting literacy for students with low vision*, pp.32-83. AFB Press.

Dutton, G. N., & Lueck, A. H. (2015). Impairment of vision due to damage to the brain. In A. H. Lueck & G. N. Dutton (Eds.), *Vision and the brain*, pp. 3-20. AFB Press.

Lueck, A. H. (2010). Cortical or cerebral visual impairment in children: A brief overview, *Journal of Visual Impairment & Blindness*, 104(10), pp. 585–592. https://doi.org/10.1177/0145482X1010401003.

Mazel, E., Morse, M., & Zatta, M. (2020). Roles and responsibilities of vision educators (TVIs and O&Ms) when learners have CVI [Neurological Visual Impairment Division AER Position Paper]. https://aerbvi.org/about/divisions/neurological-visual-impairment/resources-2/.

Roman-Lantzy, C. (2018). *Cortical visual impairment: An approach to assessment and intervention (2nd ed.)*. AFB Press.

Snyder, D., Rife, D., & Lyle, L. (2022). Babies Count National Registry of Children with Blindness or Visual Impairment, Aged Birth to 36 Months: 2022 Results. Babies Count. https://babiescount.org.

Solebo, A. L., Teoh, L., & Rahi, J. (2017). Epidemiology of blindness in children. *Archives of Disease in Childhood*, 102(9), 853. https://doi.org/10.1136/archdischild-2016-310532.

Resources

American Foundation for the Blind: Cortical/Cerebral Visual Impairment, Traumatic Brain Injury, and Neurological Vision Loss

American Printing House for the Blind:

- Babies with CVI: Nurturing Visual Abilities and Development in Early Childhood
- Cortical Visual Impairment: Advanced Principles
- Cortical Visual Impairment: An Approach to Assessment and Intervention, 2nd Edition

- CVI Companion Guide to the Developmental Guidelines for Infants with Visual Impairments
- Educational Resources: Cortical Visual Impairment (CVI)
- Vision and the Brain: Understanding Cerebral Visual Impairment in Children

Association for Education and Rehabilitation of the Blind and Visually Impaired, Neurological Visual Impairment Division (Div. 20): Roles and Responsibilities of Vision Educators (TVIS and O&MS) When Learners Have CVI, June 2020

CViCONNECT: CViCONNECT

CVI Scotland: CVI Scotland

Paths to Literacy: CVI and Literacy

Pennsylvania Training and Technical Assistance Network (PaTTAN):

- CVI Spring Training Past the Basics, 2016
- YouTube CVI Series - CVI: Identification, Assessment and Intervention, 2020
- Considerations for Educating Students With CVI: The Learning Environment, 2022

Perkins School for the Blind:

- CVI Now
- e-learning CVI Resources
- The Perkins CVI Protocol

Roman CVI Resources: Christine Roman, PhD – CVI Resources

Texas School for the Blind: Essential Tools of the Trade**,** Cortical/Cerebral Visual Impairment (CVI) section

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