

## CHAPTER 10: LOW INCIDENCE DISORDERS: DEVELOPMENTAL DELAY, ORTHOPEDIC IMPAIRMENT, TRAUMATIC BRAIN INJURY, HEARING IMPAIRMENT, ORTHOPEDIC IMPAIRMENT, VISION IMPAIRMENT, AND MULTIPLE IMPAIRMENTS

Nearly 90% of the students receiving special education under IDEA fall into the categories of specific learning disability, speech or language impairment, other health impairment (which includes ADHD), autism, intellectual disability, and emotional disturbance. These are the students with high incidence disabilities. Students in special education who have low incidence disorders are those with multiple impairments, orthopedic impairments, traumatic brain injury, or impairments in hearing and/or vision. The number of students served in each of these low incidence categories accounts for between 0.5% and 2% of the students receiving special education under IDEA ([NCES, 2023](#)).

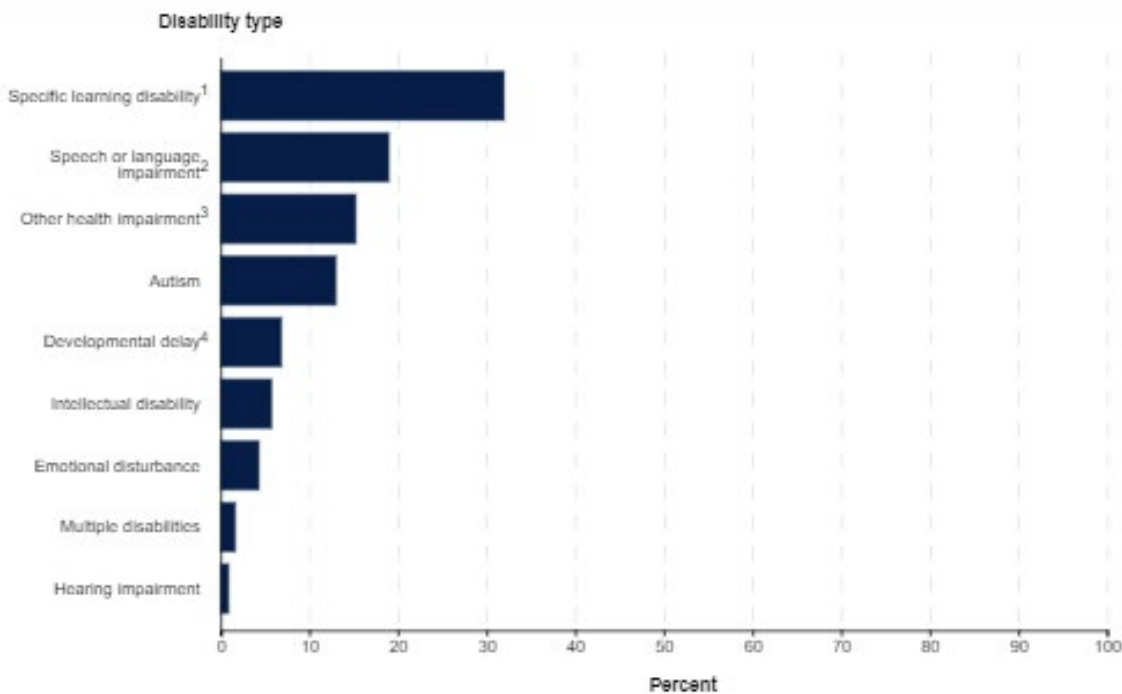
### DEVELOPMENTAL DELAY

The category of developmental delay is also a high incidence category, but it is slightly different from the other categories. It does account for another 7% of students in special education; however, this category is not based on a specific disability and can only be used for children through 9 years of age. The guidelines for this category reference a delay in meeting developmental milestones, but do not include any diagnostic requirements. While each state may adopt its own specific definition for this category, it generally includes children whose skills in the physical, cognitive, communication, social, emotional, or behavioral domains are significantly behind their peers. After age 9, if the child is still in need of special education the team must

determine which of the other categories best represents the child’s challenges ([NCES, 2023](#); [CPIR, 2022](#)).

Figure 2. Among students ages 3–21 served under the Individuals with Disabilities Education Act (IDEA), percentage distribution of selected disability types: School year 2022–23. ([NCES, 2023](#)).

Figure 2. Among students ages 3–21 served under the Individuals with Disabilities Education Act (IDEA), percentage distribution of selected disability types: School year 2022–23



<sup>1</sup> A specific learning disability is a disorder in one or more of the basic psychological processes involved in understanding or using spoken or written language that may manifest itself in an imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations.

<sup>2</sup> Speech or language impairment is defined as a communication disorder such as stuttering, impaired articulation, a language impairment, or a voice impairment that adversely affects a child’s educational performance.

<sup>3</sup> Other health impairments include having limited strength, vitality, or alertness due to chronic or acute health problems such as a heart condition, tuberculosis, rheumatic fever, nephritis, asthma, sickle cell anemia, hemophilia, epilepsy, lead poisoning, leukemia, or diabetes.

<sup>4</sup> Although federal law does not require that states/entities and local education agencies categorize students according to developmental delay, if this category is required by state law, they are expected to report these students in the developmental delay category.

NOTE: Data are for the 50 states and the District of Columbia only. Disability type refers to the specific disability for which a child is receiving services under IDEA. Disability types served under IDEA are defined under title 34. If a child has multiple types of disabilities but is receiving services for only one IDEA-defined disability, then the child is categorized under that specific disability. If a child is receiving services for more than one type of IDEA-defined disability, then the child is categorized under “multiple disabilities.” Orthopedic impairment, visual impairment, traumatic brain injury, and deaf-blindness are not shown because they each account for less than 0.5 percent of students served under IDEA. Details do not sum to total because of rounding in the data labels and the exclusion of some categories. Figures are plotted based on unrounded data.

SOURCE: U.S. Department of Education, Office of Special Education Programs, Individuals with Disabilities Education Act (IDEA) database, retrieved October 13, 2023, from <https://data.ed.gov/dataset/idea-section-618-data-products>. National Center for Education Statistics, Common Core of Data (CCD), “State Nonfiscal Survey of Public Elementary/Secondary Education,” 2022–23. See *Digest of Education Statistics 2023*, table 204.30.

## ORTHOPEDIC IMPAIRMENTS

Children with orthopedic impairments make up about 1% of the students in special education. The category of orthopedic impairment includes a variety of physical disabilities. Orthopedic impairments include disorders of the bones, joints, muscles, ligaments, tendons, nerves, and skin. These conditions affect the ways in which students are able to control and use their bodies. There may be an impact on both gross motor movements, such as walking or standing, and fine motor movements, such as holding or manipulating small objects with the hands. Some common orthopedic impairments include cerebral palsy, spina bifida, and muscular dystrophy ([NASET, 2024](#)).

While not all children with physical disabilities will require special education, these disabilities can affect school attendance and learning to the extent that the student needs specialized supports in order to receive academic benefit. The specific characteristics of the learner as well as the services and supports needed will depend on the type and severity of the learner's physical disability ([NASET, 2024](#)). The IDEA definition of this category is "a severe orthopedic impairment that adversely affects a child's educational performance. This category includes impairments caused by a congenital anomaly, impairments caused by disease (e.g., poliomyelitis, bone tuberculosis), and impairments from other causes (e.g., cerebral palsy, amputations, and fractures or burns that cause contractures)" ([IDEA, 2007](#)).



## CEREBRAL PALSY

Cerebral palsy is a neuromuscular impairment caused by injury to the brain. This injury typically occurs to the developing brain of the baby prior to birth, although it can also occur during the birth process. Cerebral palsy occurs in 2 per 1000 live births and can be mild, moderate, or severe. Events that are linked to cerebral palsy include premature birth, insufficient oxygen supply to the baby's brain, maternal infection, and maternal exposure to toxic substances. Cerebral palsy affects a child's movement, muscle tone, and posture. Some children with cerebral palsy have hypotonia, or low muscle tone, resulting in flaccid muscles and difficulty maintaining an upright posture. More commonly, children with cerebral palsy have hypertonia, or too much muscle tone, resulting in tightness and stiffness in the muscles and rigid movements of the arms, legs, and trunk. In some cases, the child may have a combination of both hypotonia and hypertonia. Cerebral palsy can also affect a person's coordination, balance, and depth perception ([NASET, 2024](#)).

School supports for a child with cerebral palsy will usually include a variety of therapies. Physical therapy will focus on strengthening the muscles, particularly those of the legs and trunk. Skills that may be targeted by a

physical therapist include walking, sitting, and maintaining one's balance. Fine motor tasks and activities of daily living can be addressed through occupational therapy. It is typical for the occupational therapist to teach skills related to handwriting as well as skills for dressing and eating ([NASET, 2024](#)). Many children with cerebral palsy receive speech therapy to work on speech and communication skills. Approximately 25% of children with cerebral palsy are not able to produce vocal speech. Cerebral palsy can affect the child's ability to coordinate the muscles of the mouth and tongue and even to manage the coordinated breathing that is needed for speech ([Cerebral Palsy Alliance, 2023](#)).

### **SPINA BIFIDA**

Spina bifida is another relatively familiar orthopedic impairment. Spina bifida affects the development of the spine and is the most common neural tube birth defect in the United States. It affects 1 out of every 2,758 children born each year. Spina bifida occurs very early in a pregnancy when the baby's spine fails to fully close, leaving a dangerous gap in the spinal column. In some cases, the spinal cord does not protrude through this gap, but 95% of the time it does, resulting in nerve damage. Typically, the baby will undergo surgery within 24-48 hours of birth to close this opening to prevent further damage from occurring. The child with spina bifida may experience weakness, loss of sensation, or paralysis below the cleft where the spinal column did not initially close. In addition, the nerves to the bladder and bowel are often damaged which can result in a lack of bladder control and a lack of bowel control ([NORD, 2007](#); [CDC, 2024b](#); [NASET, 2024](#)).

Spina bifida may also have an impact on intellectual ability, although the degree of the impact varies depending on the size and location of the opening in the spinal column and the extent of the damage to the spine and nerves. A large percentage of children with spina bifida are also born with

hydrocephalus. This is a condition where too much fluid accumulates around the brain. Hydrocephalus is usually treated surgically by inserting a shunt to drain the excess fluid. If untreated, hydrocephalus can cause brain damage, seizures, and blindness. Not all children with hydrocephalus have spina bifida, but the two conditions do often occur together. Research also shows that over 70% of those with spina bifida have an allergy to natural rubber latex, a common component in surgical gloves. For this reason, the [Spina Bifida Association](#) recommends that those with spina bifida avoid contact with all natural latex products. Synthetic latex is man-made and does not pose the same allergy problem as natural latex ([NASET, 2024](#)).



## MUSCULAR DYSTROPHY

Muscular dystrophy is a third example of a relatively common orthopedic impairment. Muscular dystrophy is a genetic disorder that affects the body's ability to make the proteins that are needed for building and maintaining healthy muscles. Muscular dystrophy is a progressive disorder and there is no cure. The child with muscular dystrophy will experience increasing muscle weakness over time which can affect daily activities like walking, maintaining an upright posture, using one's arms and hands, and even breathing. These symptoms can be managed somewhat through medication and therapy, but

typically not eliminated. There are more than 30 kinds of muscular dystrophy. Different types of muscular dystrophy begin at different ages, have different levels of severity, and affect different muscle groups. The most common type, Duchenne muscular dystrophy, begins in childhood and affects mainly boys. The prevalence of Duchenne muscular dystrophy is approximately 1 in every 3,600 boys ([NASET, 2024](#); [Venugopal & Pavlakis, 2023](#)).

This progressive weakening of the muscles in the child with muscular dystrophy affects a variety of body functions. The most obvious impact may be on a person's mobility, which can be limited due to both muscle weakness and contractures of the muscles and tendons around the joints. Eventually, the person with muscular dystrophy may need to use a wheelchair to move about. For children with Duchenne muscular dystrophy, this usually occurs by age 12. Weakened muscles can also affect the person's ability to maintain an upright posture leading to curvature of the spine. With some types of muscular dystrophy, the efficiency of the cardiac muscles will be reduced, resulting in heart problems. The muscles that are used for breathing can also weaken to the point that the person may need to use a ventilator. When the muscles used for swallowing are affected, eating can be impacted to the point that the person develops nutritional deficiencies. This situation also puts the person at risk for pneumonia due to aspiration of food or liquids into the lungs. In this situation, the person's health care provider will often suggest placement of a feeding tube as a way to safely deliver nutrition ([NASET, 2024](#))

School supports for children with spina bifida or muscular dystrophy are similar to those for children with cerebral palsy. Physical therapists work on gross motor skills, occupational therapists work on fine motor skills and activities of daily living, and speech-language pathologists work on communication skills. In addition, a child with any of these orthopedic

impairments may need an adapted physical education program. Adaptive physical education teachers develop individualized exercise programs for students with physical disabilities. These individualized programs target development of motor skills and access to activities which can support the student's physical goals as well as their recreational and leisure goals ([NCPEID, 2022](#); [NASET, 2024](#)).

Some children with orthopedic impairments will also have intellectual, learning, language, or other types of impairments, but many will not. Some will have significantly limited activity or high medical needs and others will not. As is always the case, every child is unique, and the learning environment should be adapted to meet the needs of the learner. Even if the student does not use a wheelchair, classrooms should be arranged so that the learner can move around safely and easily, tripping hazards are eliminated, and materials are accessible. Teachers will need to collaborate with other team members to schedule times when related services and medical needs can be met. It will also be important to consider how these students can be meaningfully included in extracurricular activities ([NASET, 2024](#)).





## TRAUMATIC BRAIN INJURY

According to IDEA, “Traumatic brain injury means an acquired injury to the brain caused by an external physical force, resulting in total or partial functional disability or psychosocial impairment, or both, that adversely affects a child’s educational performance. Traumatic brain injury applies to open or closed head injuries resulting in impairments in one or more areas, such as cognition; language; memory; attention; reasoning; abstract thinking; judgment; problem-solving; sensory, perceptual, and motor abilities; psychosocial behavior; physical functions; information processing; and speech. Traumatic brain injury does not apply to brain injuries that are congenital or degenerative, or to brain injuries induced by birth trauma” ([IDEA, 2007](#)).

Traumatic brain injuries are caused by damage to the brain which results in physical or learning impairments that negatively affect a child’s educational progress. Impairments that are caused by brain injury prior to or during the birth process are excluded from this category. Traumatic brain injury can occur as the result of either an open or a closed head injury. The scalp and skull provide a protective covering for the brain and an open head injury occurs when this protective covering is penetrated or broken resulting in damage to the brain. In contrast, with a closed head injury damage occurs to the brain when the head is impacted by an outside force, but this protective covering remains intact. With an open head injury, the damage tends to be limited to the area where the foreign object penetrated the brain. Damage with a closed head injury, however, tends to be more widespread. This is due to the internal compression, stretching, or shearing of the neural tissue that occurs with a closed head injury from the force of the impact ([NASET, 2024](#)).

Injuries from falls, such as falling out of bed or falling down the steps, are the most common cause of traumatic brain injury overall. The second

leading cause of brain injury for all age groups is motor vehicle accidents. However, for school-age children and adolescents in the United States, motor vehicle accidents are the primary cause of traumatic brain injuries. Other common causes of brain injury include sports injuries, violent assault, and child abuse. The injury to the brain from any of these events occurs in two ways. First there is the harm from the phenomena that occur immediately following the impact with the brain, such as bleeding and skull fracture. After this primary damage, secondary damage can develop. This includes brain injury from incidents like seizures, brain swelling, and increased pressure in the skull. This secondary damage can be more harmful than the primary damage ([Mayfield Brain & Spine, 2018](#); [NASET, 2024](#)).

How a person will be impacted by a traumatic brain injury varies depending on the location and extent of the brain injury. The effects may be mild to severe and can consist of a combination of physical, cognitive, learning, behavioral, and communication challenges. Physical problems may include impairments to muscle strength, balance, coordination, and movement, as well as dizziness, headaches, and seizures. Cognitive deficits can occur affecting the person's problem solving, reasoning, and executive functioning skills. Executive functioning skills includes activities such as planning, self-monitoring, and maintaining attention that can then affect success with typical learning tasks. Usually, long-term memory of things learned before the accident is not affected; however, new learning can be impacted by difficulties in processing and remembering new information. Behavior changes can be significant and can affect relationships and social interactions. The affected person can experience anxiety, agitation, depression, mood swings, and irritability. A person's expressive and receptive language abilities can be affected as can competence with the pragmatics of social interaction, which may also negatively affect peer relationships ([BrainLine, 2017](#); [Mayo Clinic, 2021](#); [NASET, 2024](#)).

Teachers and other school staff can assist with transitioning the child back to school from a hospital, rehabilitation, or home program. Once the child has returned to school, an individualized educational program may be needed to address any learning, communication and behavioral needs that might be present. While the effect on learning will vary depending on the location and severity of the brain injury, teachers should be prepared to provide additional strategies and supports in the areas of attention, concentration, memory, organization, and following directions. It will take time for students to learn to use these new strategies and for teachers to determine which strategies and supports are most effective. Teachers should also be aware of the emotional stress of a traumatic brain injury. A brain injury occurs as the result of a sudden, traumatic event. It may be hard for those affected to adjust to the new reality of the changes that have occurred. Family, friends, and teachers remember what the child was like before the injury. Often the child can also remember the way things were before the injury. This stress may affect the child's educational progress and, in some cases, individual or family therapy will be needed to help with this emotional stress ([NASET, 2024](#)).



## DEAFNESS AND HEARING IMPAIRMENTS

Nearly 80% of students with hearing loss are educated in inclusive schools ([NCES, 2023](#)). IDEA defines a hearing impairment as “an impairment in hearing, whether permanent or fluctuating, that adversely affects a child’s educational performance but that is not included under the definition of deafness” ([IDEA, 2007](#)). Deafness is “a hearing impairment that is so severe that the child is impaired in processing linguistic information through hearing, with or without amplification, that adversely affects a child’s educational performance” ([IDEA, 2007](#)). IDEA also specifically directs IEP teams to consider the communication need of children who are deaf or hearing impaired. “In the case of the child who is deaf or hard of hearing, consider the language and communication needs, opportunities for direct communication with peers and professional personnel in the child’s language and communication mode, academic level, and full range of needs, including opportunities for direct instruction in the child’s language and communication mode, and consider whether the child requires assistive communication devices and services ([IDEA, 2017](#)).

The first months of life are important to language learning. For this reason, all children need to be exposed to language, either spoken or signed, as early of possible. As a result of the Early Hearing Detection and Intervention program, 98% of infants born in the United States have a hearing screening done before they reach 1 month of age. In this way, children with hearing loss are identified early and can begin receiving intervention aimed at exposing them to language and helping them to develop good communication skills. Approximately 2 out of every 1,000 babies screened in the United States have hearing loss in one or both ears. For children between the ages of 3-17, this number increases to 5 out of every 1,000 children. The World Health Organization estimates that over 5% of the

world's population has a disabling hearing loss ([CDC, 2024a](#); ([NIDCD, 2024](#); [WHO, 2024](#)).

We have a good understanding of the developmental progression of language in children with intact hearing. In the first six months of life, babies should startle at loud sounds, respond to a parent's voice, and move their eyes to look in the direction of a sound. By one year of age, babies should turn when a parent calls their name, understand common words for items they encounter frequently like daddy, mommy, and juice, and listen to songs or stories for a short time ([ASHA, 2024a](#)). By two years of age, children should be able to follow simple directions like "roll the ball," respond to simple questions like "Where's your shoe?" and point to pictures in a book when the reader names the picture ([ASHA, 2024a](#)). Two and three-year-old children are busy learning many new words, can follow two-step directions, and are beginning to learn words for colors and shapes ([ASHA, 2024a](#)). Between the ages of four and five, children begin to understand words for time such as yesterday, today, and tomorrow, words for order such as first, next, and last, and can follow longer directions ([ASHA, 2024a](#)). If a child is not meeting these milestones, it may be an indication of a hearing impairment. Audiologists can test the hearing of a child of any age, including babies. For assistance in locating an audiologist, parents can contact their health provider, public school, or local health department. ([ASHA, 2024a](#)).

There are strategies teachers can use to better support their students who are deaf or hearing impaired. Basic strategies include facing their students when they speak, using pictures and graphics to support learning, and minimizing background noise as much as possible. The classroom can also be intentionally arranged in ways that better support children with hearing loss. For example, the child could be seated closer to the front of the class in order to better read the teacher's lips or to hear more clearly. Classroom seating can be arranged in a U-shape to make it easier for students with

hearing loss to see their classmates, which can facilitate communication and interaction. In addition, technology can also be used to make learning easier such as providing real-time captioning for videos that are shown in class ([PaTTAN, 2018](#); [KidsHealth, 2021](#)).

While not all children with hearing loss will benefit from hearing aids, many students do rely on these devices to amplify the sounds in the classroom. Hearing aids work best in quiet environments and when the speaker is within two feet of the wearer. Hearing aids amplify all sounds in the wearer's vicinity, so it is best if extraneous environmental noise can be minimized. They also require batteries, which generally only last for a few days or weeks, so teachers may want to keep extras at school for times when the batteries quit working in the middle of the day. Some children with hearing loss use a personal FM amplification system. With this type of system, the teacher wears a transmitter and the student wears a receiver. The advantage of these systems is that they are designed to amplify the teacher's voice over background noise and can be used with or without hearing aids. Audiologists are an important part of the educational team for children with hearing loss and will advise on the best types of hearing aids and assistive technology to meet a child's particular needs ([ASHA, 2024b](#); [PaTTAN, 2018](#); [KidsHealth, 2021](#)).



## **BILL OF RIGHTS FOR DEAF AND HARD OF HEARING CHILDREN**

Deaf children are born with the same ability to acquire language as any other children, and deserve the same chance to acquire language.

Deaf children have the right and the capacity to be educated, to graduate high school, to obtain further education, and to pursue a career.

To achieve this essential goal, all families of deaf children have the right to appropriate early intervention services as well as quality family educational services. These families have the right to accurate and comprehensive information, including access to state resources to help their deaf children reach their full potential.

Deaf children have the right to acquire both English and American Sign Language (a natural visual language). Deaf children can acquire both of these languages simultaneously, with the support of intervention services prior to entering school and reinforced within the school system.

Deaf children can fully access education and society. This means every deaf child must have full access to all information, specialized personnel, school programs, social activities, and extra-curricular activities. Communication skills and/or modes by themselves do not equate language proficiency.

Deaf children have the right to qualified professionals proficient in developing the child's acquisition of language throughout the early intervention and school years. To ensure this right is fully protected, deaf children must be assessed on a regular basis by qualified language acquisition professionals.

Deaf children require settings that utilize a critical mass of language peers to ensure age-appropriate development of learning, emotional and social skills. Deaf children require interaction with deaf adult role models to internalize their self worth and visualize their potential.

Deaf children have the right to succeed.

[\(National Association of the Deaf, 2016\)](#).

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## VISUAL IMPAIRMENT

A great deal of learning occurs visually. Although most children with visual impairment do have some amount of vision, it is so limited that it affects their learning. Under IDEA, "Visual impairment including blindness means an impairment in vision that, even with correction, adversely affects a child's educational performance. The term includes both partial sight and blindness" [\(IDEA, 2007\)](#).

Teachers should be aware that, in addition to having limited vision, children with visual impairments may experience eye fatigue and fluctuations in visual ability as a result of changes in their health or even changes in lighting. Children with visual impairments are served in a variety of settings from inclusive classrooms to residential programs; however, the percentage



of children that are educated in separate schools has greatly decreased over time. Instead, a teacher who specializes in working with the blind and visually impaired will provide specialized services in a general education school to address the needs of the child with low vision. These specialists can teach a variety of skills and strategies that may be needed for academic success including Braille and how to use appropriate technology to support learning. In addition, mobility specialists will help the child develop independence in navigating their environment and accessing the assistive technology devices that can help them be more independent ([CPIR, 2017](#); [Willings, n.d.](#); [Cameto & Nagle, 2008](#)).

In the classroom, children with visual impairments should be given preferential seating in order to maximize their visual learning opportunities. It is important that adequate lighting be provided. Glare can come from overhead lights or from windows and is a particular concern as it can create visual interference. Students should be allowed to move if needed in order to see better. Teachers should use high contrast colors when making class presentation, such as using black markers on a white board or white chalk on a green board. These students should also be given printed copies of any distance presentation activities. Print materials may need to be enlarged and should be of good copy quality. They should have a plain background and there should be enough spacing between the items to avoid visual clutter. These students may also require more hands-on type learning experiences. ([CPIR, 2017](#); [Willings, n.d.](#)).



## **DEAF-BLINDNESS AND MULTIPLE IMPAIRMENTS**

There are only two IDEA categories that apply specifically to students with more than one disability, and these are deaf-blindness and multiple impairments. Both of these categories serve small numbers of students. According to IDEA, "Deaf-blindness means concomitant hearing and visual impairments, the combination of which causes such severe communication and other developmental and educational needs that they cannot be accommodated in special education programs solely for children with deafness or children with blindness." Children with deaf-blindness have a range of sensory impairments. While some of these children are profoundly deaf and completely blind, most have some amount of usable hearing and/or vision. More than half of these students have complex health care needs and 87% have additional disabilities. Because these children have a wide variety of needs and generally require unique instructional approaches in order to learn and make educational progress, these children are educated in a variety of placements from inclusive classrooms to separate schools and residential facilities. In the United States, there are federally-funded deaf-blind projects in every state

to provide training and support for families and educators ([National Center on Deafblindness, 2024](#); [IDEA, 2007](#))

“Multiple disabilities means concomitant impairments (such as intellectual disability-blindness or intellectual disability-orthopedic impairment), the combination of which causes such severe educational needs that they cannot be accommodated in special education programs solely for one of the impairments. Multiple disabilities does not include deaf-blindness.” Multiple disabilities is not a particularly helpful term in that it doesn’t indicate which disabilities a child has or how severe they are. Different combinations of disabilities will have a different combined impact. Children with multiple disabilities may only need intermittent support or they may need more extensive ongoing support. These students will likely need accommodations and/or modifications to access grade level educational materials as well as specialized instruction to address their unique learning needs. They will likely also benefit from access to assistive technology as well as a variety of related services ([CPIR, 2019](#); [IDEA, 2007](#)).



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