



SPECIAL EDUCATION
ASSESSMENTS

Assessment of Voice and Resonance

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DEFINITION [PI 11.36\(5\)\(a\), Wisconsin Administrative Code](#) Speech or Language Impairment means: An impairment of speech or sound production, voice, fluency, or language that adversely affects educational performance or social, emotional, or vocational development.

Administrative Rule: Voice Disorder

The child's voice is impaired in the absence of an acute, respiratory virus or infection and not due to temporary physical factors such as allergies, short term vocal abuse, or puberty.

Following consideration of the child's age, culture, language background, or dialect, the child demonstrates characteristics of a voice impairment, which include any of the following:

- a. The child's vocal volume, including loudness.
- b. The child's vocal pitch, including range, inflection, or appropriateness.
- c. The child's vocal quality, including breathiness, hoarseness, or harshness.
- d. The child's vocal resonance, including hypernasality.

The purpose of this document is to provide guidance in the areas of voice and resonance disorders. The document provides guidance in assessment of voice and resonance disorders, including recommendations for a comprehensive assessment, definitions of terms, and resources for further information.

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Key Ideas for Voice and Resonance Disorders

- The following are relevant terms and their definitions:
 - *Voice quality*: voice quality refers to the overall sound of the voice. Abnormal voice quality is sometimes described as hoarse, breathy, rough, gravelly, raspy, scratchy, squeaky. A voice quality that draws negative attention, is unusual for the age, gender, or culture of the student, or interferes with intelligibility is considered disordered.
 - *Resonance*: resonance is the amount of sound energy in the oral or nasal cavity. Too much sound in the nasal cavity is hypernasal. This may occur in cases of cleft palate, velopharyngeal dysfunction, and velopharyngeal mislearning. Not enough sound energy in the nasal cavity is hyponasality. This often sounds like someone has a cold or plugged nose. It is also possible to have mixed resonance (both hyper- and hypo-nasal resonance), and “cul-de-sac” resonance, which sounds as if there is an obstruction in the back of mouth or throat.
 - *Volume*: this is the perceptual loudness of the voice. It can be too loud for the situation, too quiet for the situation, or have inappropriate variability.
 - *Pitch*: pitch is the perceptual correlate of frequency, and refers to tone, how high or low the voice is. Pitch is judged by appropriateness for age, and for appropriate variability.
- Obtain information about voice and resonance in all languages spoken by the student. Parents and caregivers can give important information regarding whether or not the student’s voice quality and resonance in their native language differs from what is expected.
- “A comprehensive voice and resonance examination should include information obtained from both subjective measures (e.g., perceptual ratings and clinical impressions based on observations and analysis of speech samples) and objective measures (e.g., standardized tests or instrument evaluations). Observations should take place in situations calling for both low and high vocal demand:
 - low vocal demand: utterances produced in a relatively quiet environment or short responses that do not require talking over a prolonged period of time.
 - high vocal demand: talking in a noisy environment (e.g., in the cafeteria), for a prolonged period of time (e.g., oral presentation or reading aloud), or controlling the voice over a wide pitch range (e.g., singing)” (VDOE 2018, p. 102).
- Ensure the IEP team is conducting a comprehensive special education evaluation which includes obtaining information from all of the following: [academic activities](#) (including observation), [contextualized measurement](#), [SLP probes](#), as well as [norm-referenced assessments](#), if appropriate.
- Any documented disorder must impact the student’s educational performance (i.e., academic, social, emotional, vocational) in order to identify a student with a Speech or Language Impairment in public schools. See the [Understanding Academic Language and Adverse Effect section](#)

Procedures and Tools for Assessment Voice and Resonance

Academic Activities

Engage in Discussion with Classroom Teacher(s)

- Classroom teachers provide important information on progress toward age or grade level academic standards, and comparison of typical academic and functional classroom expectations to grade level peers.
- Educate classroom teachers on characteristics of voice and resonance disorders. Enlist the classroom teacher to make observations on overall communication skills, participation in class discussion, reading, and group activities.
- Data provided from classroom teachers can include a description of the student's communication skills in natural settings and how those skills affect classroom functioning (academic performance or social, emotional, or vocational development). Consider a teacher questionnaire or rating scale specific to voice and resonance.
- The Quick Screen for Voice (Lee et al. 2004) is an example of a checklist intended for teachers or parents to complete. Checklists for parents and teachers are included as [appendices](#) to this document.

Observation Tips and Tools

- Observations should take place in the context of daily activities or routines in multiple settings and situations with different peers and adults, such as during a time of social interaction (e.g., morning meeting, recess or lunch) and during academic time.
- Observations should focus on the functional impact of skills rather than isolated discrete skills. An observation of a student's speech and language skills during oral language activities in the classroom or school environment should provide information on the quality of their voice, volume of their voice, pitch of their voice, and how their voice is impacting intelligibility and overall communication.
- Data collection during observations should include quantitative data in addition to qualitative information (e.g., description of what the practitioner is observing). For more information regarding Systematic Recording Methods, go to the [Assessment Tools for Speech or Language Impairment webpage on the DPI website](#).
 - The Consensus Auditory Perceptual Evaluation of Voice (CAPE-V) is a validated rating scale of perceptual aspects of voice and can be used to quantify perceptual aspects of a voice disorder. This scale can be used with standardized stimuli and connected speech (Kempster et al. 2009).
 - Resonance differences (hypernasality or hyponasality) can be quantified using a scale of absent, mild, moderate, severe. A line for resonance can also be added to the CAPE-V.

Contextualized Measurement

Review student data to look for factors that may indicate a voice disorder.

- Consider whether district-wide and statewide assessment performance is below the expected range for the student's age or grade level.
- Are there other possible reasons why the student may not score within the expected range for their age or grade that are due to issues with instruction, curriculum, or environment? For additional information about the ICEL and RIOT frameworks, go to the [DPI Comprehensive Special Education Evaluation website](#).

SLP Probes

Case History and Interviews

- Families or caregivers should be active participants in the evaluation process, sharing information about how the student communicates wants and needs, engages with other students, and transitions between home and community. The [Wisconsin Statewide Parent-Educator Initiative \(WSPEI\) website](#) offers some resources, including “Snapshot” forms and “Positive Student Profile” to assist family members in active IEP team meeting participation.
- Specific to voice, the Pediatric Voice Related Quality of Life (P-VRQOL) is a parent and student report questionnaire related to the impact of the voice disorder on quality of life (Boseley et al. 2006).
- Specific to resonance (e.g., hypernasality), the Velopharyngeal Effects on Life Outcomes (VELO) is a parent and student report questionnaire that measures the impact of resonance on quality of life (Skirko et al. 2013).
- Obtain case history from the family to determine the following:
 - Onset of voice or resonance problem (if known)
 - Progression of voice or resonance problem (fluctuating, worsening, improving, stable)
 - Previous medical diagnoses related to voice or resonance, including but not limited to:
 - Cleft palate
 - Vocal fold nodules or other vocal fold lesions
 - Allergies
 - Reflux
 - Adenoid or tonsil hypertrophy
 - Vocal fold immobility
 - Scarring of vocal folds
 - Previous surgeries related to voice or resonance, including but not limited to:
 - Airway reconstruction
 - Cardiac surgery
 - Cleft palate surgery (or surgeries)
 - Any surgeries to head or neck
 - Injuries to head or neck
 - Breathing difficulties

- Swallowing difficulties
- Hearing loss
- Ear infections
- Vocal use
- Household vocal habits
- Interview the student whenever possible. The student can provide firsthand information about peer relationships, attitudes toward school, hobbies and interests, strengths and challenges, sensory concerns, and activities outside of school. A student may be able to express what they may be thinking and feeling about their voice and how it is impacting them in school. View the assessment process as the initial steps to forming a relationship with the student.

Criterion-Referenced Assessment

Criterion-referenced assessments “are...tests [and procedures] that measure an individual's performance against a set of predetermined criteria or performance standards (e.g., descriptions of what an individual is expected to know or be able to do at a specific stage of development or level of education)” (ASHA n.d.). They may be standardized or more informal or clinician-developed. These assessments have a narrower focus of content when compared to norm-referenced assessments and often have a percentage, mastery/non mastery or pass/fail result. A student would be scored as “pass” if a particular skill was mastered and as “fail” if they did not demonstrate mastery of the content.

Criterion-referenced assessments grew out of a need for better assessment methods. Norm-referenced tests were found to be inadequate for determining present levels of performance and identifying targets for intervention. They also have limited utility when a student is not represented in the normative sample due to their cultural and linguistic background (McCauley 1996).

Speech Samples: Perceptual Assessment of Voice

Speech samples can be used to characterize and assess the severity of a voice disorder. The evaluator can use a validated scale to quantify the voice or resonance disorder across multiple contexts. It is recommended that speech samples be obtained in a quiet room, in a noisy environment, and in contexts of varying difficulty. The CAPE-V can be used as a perceptual scale for voice (Kempster et al. 2009), while the Cleft Audit Protocol for Speech-Augmented (CAPS-A) is a method of quantifying resonance (John et al. 2006). Resonance may also be quantified using a mild-moderate-severe scale, or by adding a descriptor to a 100 mm line on the CAPE-V.

In addition to spontaneous speech samples, standard stimuli are useful in assessing voice and resonance to account for differences that may occur based on context. For voice, the CAPE-V is designed to be used with 6 standard sentences, prolonged vowels, and a spontaneous speech sample. The CAPS-A is intended to be used with a list of sentences and spontaneous speech.

Dynamic Assessment

Dynamic assessment is extremely useful in the evaluation of voice and resonance disorders. This method can assist in determining potential for change with intervention, strategies that might be used, and the need for further assessment.

Voice: The examining clinician can assess whether there are changes in voice quality, pitch, or volume with introduction of voice exercises, prompts, or attention.

Resonance or cleft-specific errors: Examining clinician can assess whether resonance changes with nose plugged. Examining clinician can assess whether the student is stimulable for production of speech sounds in error, either with nose plugging, with placement cues, or shaping from other sounds. Dynamic assessment may be instrumental in determining whether the errors are due to structure, mislearning, or if they are compensatory.

Other Criterion-Referenced Assessments

In addition to perceptual assessment some commonly utilized criterion-referenced assessments for voice disorders include:

- Pediatric Voice Outcome Survey (PVOS) (Hartnick 2002)
- Pediatric Voice Related Quality of Life (PVRQOL) (Boseley et al. 2006)
- Pediatric Voice Handicap Index (pVHI) (Zur et al. 2007)
- VPI Effects on Life Outcomes (VELO)(Skirko et al. 2013)

Norm-Referenced Assessments

Norm-referenced assessments are standardized tests designed to compare students' performance with the performance of same-age peers nationwide (ASHA n.d.; McCauley 1996). A student's performance is reported as a percentile or standard score that is a comparison to the normative sample. Tests are designed to include test items that those with disorders get wrong while those without disorders get right (McCauley 1996).

Norm-referenced assessments are most often broad areas of assessment (e.g., oral language skills). In selecting norm-referenced assessments, evaluators should review the psychometric properties of the test in order to determine whether each test is appropriate for particular students and their area(s) of need. Information about the Limitations of Norm-Referenced Assessments can be found on the [Assessment Tools for Speech or Language Impairment webpage on the DPI website.](#)

Acoustic and aerodynamic measures can be considered norm-referenced assessments for voice. Most schools do not have the equipment for a comprehensive acoustic or aerodynamic evaluation of voice, but the following measures can be taken:

- Maximum phonation time
- s/z ratio
- Speaking fundamental frequency
- Fundamental frequency range
- Cepstral peak prominence (a measure of vocal signal quality)
- Vocal loudness (amplitude) measured in dB

Collaborating with the Medical Team

Voice and resonance disorders can be symptoms of serious medical conditions. Different causes of voice and resonance disorders require different types of behavioral treatment and may require surgical or medical management. If the student has seen an otolaryngologist, a cleft palate or craniofacial team, or a medical speech pathologist, school clinicians should collaborate with the family to obtain relevant medical information. If an underlying medical issue is suspected, collaboration with the family and potentially the school nurse to help the student receive needed medical care is best practice.

It is considered standard of care for children with a repaired cleft palate to follow up with a cleft palate or craniofacial team on a regular basis (ACPA 2019). This team includes a speech language pathologist, and with the family's permission, they can provide information about medical speech evaluations, past and future surgeries, and velopharyngeal function.

Children with a history of airway surgeries are often already established with an otolaryngologist, and collaboration and communication with the medical team, with permission from the family, can provide needed information about laryngeal structure and function, as well as prognosis for improvement.

Understanding Academic Language and Adverse Effect

When conducting assessments for speech-language eligibility, it is a *requirement* that there includes documentation of the impact of the identified speech-language delay or disorder on educational performance or social, emotional, or vocational development.

The educational impact of a voice disorder typically does not correlate with reading and writing measures in the same manner that a language delay may impact reading comprehension, or a speech sound delay may impact spelling. Instead, the academic impact usually results from a student not participating to their fullest extent in communicative opportunities beneficial to the learning process. Reading fluency should not be used as a measure of reading proficiency for a student with a suspected or known voice disorder. Examples of how voice disorders impact a student's academics may include:

- Decreased oral participation in classroom activities and discussions, including asking and answering questions
- Difficulty reading aloud and giving oral presentations
- Increased absences or increased somatic complaints when classroom oral demands increase
- Difficulty participating in small group discussions
- Difficulty participating in ambient noise

Social or emotional impact may be documented through observations, interviews (including with the student), and questionnaires. They may reveal some of the following impacts:

- Student withdrawing from social situations
- Student being teased by peers
- Student withdrawing from large and small group conversations
- Students choosing classes and extracurricular activities based on speaking demands rather than interests and aptitudes

Vocational impact could involve career planning or limitations in getting a part-time job in the following ways:

- Student avoiding career path due to verbal communication requirements
- Student unable to secure part-time job due to speaking demands or interview requirements
- Student choosing vocation based on speaking demands rather than interests and aptitudes

Summarizing Assessment Data

- Evaluators should consider information from a variety of sources when determining whether a student has a Speech or Language Impairment.
- When determining a student's academic or functional performance in any area, the team should not rely on a single data point (i.e., one assessment or test score). Triangulating data is a strategy that can be used to compile multiple (at least 3) types of data from different sources.
- Assessment results should include sufficient information so the IEP team can consider the student's previous rate of academic growth, and whether the student is on track to achieve or exceed age or grade level standards and expectations. It should also note and account for any behaviors interfering with progress, the effectiveness of instructional interventions, and any additional information and input provided by the student's parents.
- Wisconsin has adapted the Virginia Department of Education's Rubric for Considerations of Voice Disorders which can be found on the [Assessment Tools for Speech or Language Impairment page on the DPI website](#).

Frequently Asked Questions

Q: Does a student with a voice disorder need a medical evaluation or diagnosis before a referral for a special education evaluation in the schools can occur?

A: A referral for a special education evaluation can be made before the student has seen a medical team or before a medical evaluation or diagnosis. The speech and language pathologist can begin to describe, quantify, and determine educational impact as part of the special education evaluation. However, voice disorders can be a sign of a medical issue and knowing the cause of the voice or resonance disorder guides the determination of disability-related needs and educational planning, including speech and language therapy. Whenever appropriate, the IEP team should collaborate with medical professionals about voice disorders.

Q: If a student has an unrepaired cleft palate, or needs a revision surgery, and surgery is planned for the near future, should evaluation wait until after the surgery?

A: An unrepaired cleft palate in a school-aged student is unusual but can occur. Depending on the timing of the surgery, evaluation can occur prior to surgery. Resonance (hypernasality) will change after the surgery, but any compensatory speech sound errors are likely to persist and can be evaluated prior to surgery. Treatment for placement on these can begin before surgery but may require supports such as nasal occlusion.

Q: Should a student with a cleft palate be considered for a speech sound disorder or a voice disorder?

A: A student with a cleft palate might have adverse educational impact due to speech sounds, voice, or both. They may also have an adverse educational impact due to language. A comprehensive special education evaluation will help determine needs and educational impact.

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Appendices of Resources and Tools

The following are additional resources and tools referenced in this document as well as helpful websites for further investigation.

Parent Checklist: Voice

Child's name: _____ Date of Birth: _____

Person completing this form: _____ Date: _____

Your input will help us understand your child's speech skills. Please check the following items. Thank you.

My child...	Yes	Sometimes	No
has a hoarse voice			
clears their throat frequently			
sounds nasal-talks through their nose			
sounds stuffed up			
speaks too quietly			
speaks too rapidly			
has pitch unusual for their age or gender			
speaks in a monotone			
has breaks in their voice			
has a family member with a similar difficulty			
has allergies			
has frequent ear infections			
is exposed to environmental factors like kerosene fumes, wood or cigarette smoke			
frequently yells or plays loud games (for example, car, gun or animal noises)			
participates in sports or activities (singing) where they use their voice loudly			
doesn't like the sound of their voice or is teased about the sound of their voice			
appears to use a lot of effort to talk			
voice sounds worse after singing, yelling, or talking for a long time			

is difficult to understand			
loses their voice frequently			

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Rate your concern for the child's communication skills. None 1 2 3 A lot

Does your child's voice change during the day? Yes No

If so, when is it better?

Has your child had any surgeries to their throat?

Please share information you think would be helpful.

Please return to: _____ by: _____



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