

DSHS-School Nurse Notes | June 2021

Vagus Nerve Stimulation for Epilepsy

To address the needs of school nurses, the Texas Department of State Health Services (DSHS) School Health Program has developed this repository of information. With each issue of DSHS-School Nurse Notes (DSHS-SNN), professionals receive the latest research, evidence-based practices, and resources in school nursing related to a topic of interest. The School Health Program wishes to thank the Texas Board of Nursing for their collaboration on this publication, in particular Linda Laws, MSN, RN for her contributions. If you have any questions or comments about this issue of DSHS-SNN, please contact the DSHS School Health Program at schoolhealth@dshs.texas.gov.

Background

Epilepsy is a neurological condition that leads to seizures. A seizure is a disruption of the normal electrical communication between neurons in the brain and it can cause symptoms such as muscle jerking, stiffness, loss of consciousness, staring spells, changes in sensation, thinking, mood, or cognition, which the person experiencing the seizure cannot control.¹ There are many types of seizures and a person with epilepsy can have more than one type. Although most seizures typically last for short periods of time (seconds to a couple of minutes), there can be long-term health consequences associated with frequent or prolonged seizures.² For this reason, a treatment plan to prevent seizures for every child with epilepsy is important, and for some children, vagus nerve stimulation (VNS) can be a part of that plan.²

According to national estimates from the Centers for Disease Control and Prevention (CDC), approximately 470,000 children have epilepsy.^{3,4} The latest estimates show 0.6 percent of children between 0-17 years of age have active epilepsy, roughly 6 per 1,000 students.³ Common treatment for epilepsy includes prescription medications, or in some cases surgery. Approximately 35 percent of people with epilepsy do not respond fully to anti-seizure drugs.⁵ However, an additional treatment option for drug-resistant epilepsy is VNS.

The body contains two vagus nerves, running from the brainstem, through the chest, to the abdomen on either side of the body. These nerves send

information from the brain to other areas of the body and carry information back from the body to the brain. Vagus nerve stimulator devices are surgically implanted in the left upper chest and send electrical pulses along the vagus nerve to the brain, which can help to stop or prevent seizures.³

While VNS is not a cure for epilepsy or meant to replace traditional treatments, it can reduce seizure frequency and intensity and improve mood and quality of life.⁵ Certain types of vagus nerve stimulators require the use of a special magnet to be trigger the device during a seizure, therefore school nurses should be trained to assist students that require VNS as a part of their seizure treatment plan.

Nursing Standards and License Considerations

The mission of the BON is to protect and promote the welfare of the people of Texas by ensuring that each person holding a license as a nurse in the State of Texas is competent to practice safely. The Board fulfills its mission through the regulation of the practice of nursing and the approval of nursing educational programs. The Board licenses nurses and regulates nurses in the State; the Board does not have purview over practice areas, facility operations, or most facility policies and procedures.

The Nursing Practice Act (NPA) and Board rules and regulations are *written broadly* so all nurses can apply them in various practice settings across the State. Because each nurse has a different background, knowledge, and level of competence, the Board does not have an all-purpose [list of tasks that every nurse can or cannot perform](#), and it is up to each *individual* nurse to use sound judgment when deciding whether or not to perform any particular procedure or act.

The NPA defines legal scope of practice for both the professional nursing (Registered Nurse [RN] level of licensure) and vocational nursing (LVN level of licensure) in NPA sections [301.002\(2\) &\(5\)](#). The NPA describes a defined limit to nursing practice, as nursing practice “**does not include acts of medical diagnosis or the prescription of therapeutic or corrective measures**” [NPA Sec. [301.002\(2\)&\(5\)](#)]. Professional and vocational nursing requires the acts/procedures being performed be within the scope of that particular nurses’ practice and appropriate orders be in place for acts that go beyond the practice of nursing. Resources providing a comprehensive description of the [LVN scope of practice](#) and the [RN scope of practice](#) can be

reviewed on the [BON website](#). A nurse must follow the NPA and Board rules when practicing nursing regardless of the setting.

Board Rule 217.11 [Standards of Nursing Practice](#) is an important reference for nurses in making a scope of practice determination as it outlines the minimum standards of nursing practice applicable to all levels of licensure (LVN, RN, and APRN). Although Board staff recommend reading this rule in its entirety, in part, this rule states:

- (1)(A)- know and conform to the Texas NPA and the board's rules and regulations as well as all federal, state, or local laws, rules or regulations affecting the nurse's current area of nursing practice;
 - A nurse is responsible for knowing and complying with any applicable regulations related to their area of practice; however, Board staff cannot speak to the laws/rules of other agencies or regulatory bodies.
- (1)(B)- Implement measures to promote a safe environment for clients and others;
- (1)(C)- Know the rationale for and the effects of medications and treatments and shall correctly administer the same;
- (1)(D)- Accurately and completely report and document the client's status, including signs and symptoms; nursing care rendered; physician, dentist or podiatrist orders; administration of medications and treatments; client response(s); and contacts with other health care team members concerning significant events regarding client's status;
- (1)(F)- Promote and participate in education and counseling to a client(s) and, where applicable, the family/significant other(s) based on health needs;
- (1)(G)- Obtain instruction and supervision as necessary when implementing nursing procedures or practices;
- (1)(H)- Make a reasonable effort to obtain orientation/training for competency when encountering new equipment and technology or unfamiliar care situations;
- (1)(R)- Be responsible for one's own continuing competence in nursing practice and individual professional growth;
- (1)(M)- Institute appropriate nursing interventions that might be required to stabilize a client's condition and/or prevent complications;
- (1)(O)- Implement measures to prevent exposure of infectious pathogens and communicable conditions;
- (1)(Q)- Consult with, utilize, and make referrals to appropriate community agencies and health care resources to provide continuity of care; and

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- (1)(T)- Accept only those nursing assignments that take into consideration client safety and that are commensurate with the nurse's educational preparation, experience, knowledge, and physical and emotional ability.

Additionally, Board staff recommend reading the following:

- Position Statement 15.14 ([Duty of a Nurse in any Practice Setting](#)) because it uses a landmark court case to demonstrate how every nurse has a duty to promote patient safety, and this duty to a patient supersedes any physician order or facility policy, and
- Position Statement 15.13 ([Role of LVNs & RNs in School Health](#)) which discusses the role of the LVN and RN in school health.
 - Including information related to an RN's delegation decision, to an unlicensed person, the emergency administration of medications or treatments.

On a final note, the Board's [Scope of Practice Decision-Making Model](#) (DMM) is a step-by-step tool all nurses practicing in Texas can use to determine if any given task/procedure is within their individual scope of practice. The DMM is designed to be used in sequence, beginning at the top with question number one. In the model, nurses are asked reflective questions, and depending on how they answer, they are directed to continue through the model or stop. As nurses progress through the model, they can also reference professional nursing organizations or specialty associations to assist in determining the standard of care in the setting described and/or the nurse's individual scope of practice. At any point, if a nurse reaches a Stop Sign, he/she should consider the activity or intervention in question beyond (or outside) his/her scope of practice. For example, the nurse may wish to consider if the act or procedure is consistent with current nursing evidence-based practice guidelines, and prevailing nursing standards of care.

Texas Board of Nursing (BON) Resources

1. [Nursing Practice Act](#), Nursing Peer Review & Nurse Licensure Compact: Occupations Code and Statutes Regulating the Practice of Nursing. As Amended September 2019.
2. [Rules and Regulations](#) relating to Nurse Education, Licensure and Practice. Published October 2019.

3. [Position Statement:](#)
 - 15.14 Duty of a Nurse in any Practice Setting
 - 15.13 Role of LVNs and RNs in School Health
4. [Scope of Practice Decision-Making Model](#)

National Association of School Nurses (NASN)

- [Code of Ethics](#)
- Position Brief (2018): [Wearable Medical Technology in Schools- The Role of the School Nurse](#)
- Position Statement (2018): [IDEIA and Section 504 Teams- The School Nurse as an Essential Team Member](#)
- Position Statement (2017): [Students with Chronic Health Conditions: The Role of the School Nurse](#)

Texas School Nurses Organization (TSNO)

- School Nursing: [Scope and Standards of Practice](#)

Research

The following articles come from a review of the scientific literature. For assistance in obtaining an article, please contact the DSHS Library at library@DSHS.texas.gov and mention inclusion of the requested article in the *DSHS-School Nurse Notes*. Following each citation is a portion of the article's abstract or a summary of the article.

1. Johnson R, Wilson C. **A review of vagus nerve stimulation as a therapeutic intervention.** *Journal of Inflammation Research.* 2018;11 203-213

Vagus Nerve Stimulation (VNS) is currently FDA approved for therapeutic use in patients aged >12 years with drug-resistant epilepsy and depression. Recent studies of VNS in in vivo systems have shown that it has anti-inflammatory properties which has led to more preclinical research aimed at expanding VNS treatment across a wider range of inflammatory disorders. This article provides an overview of the US Food and Drug Administration (FDA)-approved clinical uses of vagus nerve stimulation (VNS) as well as information about the ongoing studies and preclinical research to expand the use of VNS to additional applications.

2. Roesler M, Obst B. **Hidden Devices in the School Setting: What the School Nurse needs to know about vagus nerve stimulation.**

Sage Journal, NASN School Nurse. 2019; 34(5), 257-261.
DOI:10.1177194260

Vagus nerve stimulation involves an implanted medical device used to deliver electrical pulses to the vagus nerve for additional seizure management. The school nurse needs to understand the purpose and function of the hidden medical device, including the parameters for use of the device and magnet, safety considerations, and side effects. SHNIC has developed educational materials specific to vagus nerve stimulation to aid the school nurse in providing staff training, developing care plans, and creating a safe school experience for students with special health needs.

3. Fan H-C, Hsu T-R, Chang K-P, Chen S-J, Tsai J-D. **Vagus nerve stimulation for 6- to 12-year-old children with refractory epilepsy: Impact on seizure frequency and parenting stress index.** *Epilepsy & Behavior.* 2018;(83)119-123.

Refractory epilepsy (RE) is frequently associated with neuropsychological impairment in children and may disrupt their social development. Vagus nerve stimulation (VNS) had been reported to have beneficial effects on behavioral outcomes. The aim of this study was to compare Parenting Stress Index (PSI) scores before and after VNS device implantation in children with RE. Seizure frequency and PSI were measured before VNS implantation and 12 months after in a group of school-aged children. Treatment with VNS was significantly associated with reduced seizure frequency and improved PSI scores, especially within the child domain on the mood and reinforces parent subscales.

4. Terry D, Patel AD, Cohen DM, Scherzer D, Kline J. **Barriers to Seizure Management in Schools.** *Journal of Child Neurology.* 2016; 31(14)1602-1606.

The purpose of this study was to assess school nurses' perceptions of barriers to optimal management of seizures in schools. Eighty-three school nurses completed an electronic survey. Most agreed they felt confident they could identify a seizure, give rectal diazepam, and handle cluster seizures; but fewer were confident they could give intranasal midazolam, had specific information about a student's

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seizures, or could swipe a vagus nerve stimulator magnet. Nurses were more likely to be available at the time of a seizure in rural versus suburban or urban schools. School nurses are comfortable managing seizures in the school setting. However, a specific seizure plan for each child and education on intranasal midazolam and vagus nerve stimulator magnet use is essential.

Resources

General Information

- Centers for Disease Control and Prevention (CDC): [Epilepsy](#)
- Citizens United for Research in Epilepsy: [About Epilepsy](#)
- Texas Department of State Health Services (DSHS) and Texas Health and Human Services (HHS):
 - School Health Services: Nursing Practice Resources-[Individualized Healthcare Plans - Seizures IHP](#)
 - Texas Guide to School Health Services: Health Conditions-[Epilepsy and Seizures](#)
 - [Texas Health and Human Services - Epilepsy Program](#)
- Epilepsy Foundation:
 - [A Quick Reference Guide for School Nurses: Managing Students with Seizures](#)
 - [Recommendations for Care of Children with Epilepsy](#)
 - [Treating Seizures and Epilepsy](#)
 - [Placement, Programming and Safety of Vagus Nerve Stimulation](#)
 - [Vagus Nerve Stimulation](#)
- National Association of School Nurses (NASN):
 - [School Nurse Evidence-based Practice Clinical Guideline: Students with Seizure and Epilepsy](#)
- National Association of Epilepsy Centers: [Patient Resources](#)
- Kennedy Krieger Institute:
 - [Fact Sheet: Vagus Nerve Stimulator](#)

Continuing Education

- [CDC Training for Professionals Epilepsy](#)
- [First Responder Training | Epilepsy Foundation](#)
- [Seizure Training for School Personnel | Epilepsy Foundation](#)
- [Managing Students with Seizures Program for School Nurses | Epilepsy Foundation](#)

Books for Purchase

- Epilepsy Foundation: [Books about Epilepsy](#)
- [Pellock's Pediatric Epilepsy: Diagnosis and Therapy, 4th Edition](#)

References

1. American Academy of Neurology. Vagus Nerve Stimulation the Treatment for Epilepsy. <https://www.aan.com/Guidelines/Home/GuidelineDetail/618> Updated July 20, 2019. Accessed April 5, 2021.
2. Joshi SM, Singh RK, Shellhaas RA. Advanced Treatments for Childhood Epilepsy: Beyond Antiseizure Medications. *JAMA Pediatr.* 2013;167(1):76–83. doi:10.1001/jamapediatrics.2013.424
3. Zack MM, Kobau R. National and state estimates of the numbers of adults and children with active epilepsy — United States, 2015. *MMWR.* 2017; 66:821–825. DOI: 10.15585/mmwr.mm6631a1.
4. Centers of Disease Control and Prevention. <http://www.cdc.gov/epilepsy/about/fast-facts.htm> Updated September 30, 2020. Accessed April 5, 2021.
5. MayoClinic.org. Vagus nerve stimulation - Mayo Clinic. <https://www.mayoclinic.org/tests-procedures/vagus-nerve-stimulation/about/pac-20384565>. Updated November 17, 2020. Accessed April 7, 2021.

For assistance in obtaining any resources, please contact the DSHS Library at library@DSHS.texas.gov and mention inclusion of the requested resource in the *DSHS-School Nurse Notes*.

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