School Nursing Evidence-based Clinical Practice Guideline: Students with Seizures and Epilepsy

NASN
National Association of School Nurses

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Project lead and author

Angela Lepkowski, DNP, RN, NCSN, PHNA-BC
Clinical Assistant Professor
University of Illinois at Chicago College of Nursing
Chicago, IL

Special Acknowledgement

Robin Adair Shannon, DNP, RN, NCSN, PHNA-BC
Clinical Assistant Professor
University of Illinois at Chicago College of Nursing
Chicago, IL

Erin D. Maughan, PhD, MS, RN, PHNA-BC, FNASN, FAAN
Director of Research
National Association of School Nurses
Silver Spring, MD

School Nursing Evidence-based Clinical Practice Guideline: Students with Seizures and Epilepsy was developed using a *Model for Developing Evidence-Based Clinical Practice Guidelines for School Nursing* (2019) authored by Dr. Shannon and Dr. Maughan. This model is endorsed as the standardized structure and process for composing scholarly school nursing clinical practice guidelines under the auspices of NASN.

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Epilepsy Foundation
Landover MD

Nancy Antonini BSN, RN, PEL-CSN
Nurse, Lincoln-Way Area Special Education 843
Frankfort, IL

Joan K Austin PhD, RN, FAAN
Distinguished Professor Emerita, Indiana University School of Nursing
Indianapolis, IN

Sara M. Bode MD
Pediatrician, Nationwide Children's
Council on School Health, American Academy of Pediatrics
Columbus, OH

Denise Buffin MSN, MEd, RN
School Nurse, Brandywine School District
Wilmington, DE

Cynthia Hiltz, MS, RN, PHN, NCSN
Anoka-Hennepin Health Service Coordinator
Anoka, MN

Ron Marino DO, MPH
Associate Chair, Pediatrics at NYU Winthrop
Pediatric Residency Program Director, Good Samaritan Hospital Medical Center
Professor Clinical Pediatrics, Stony Brook School of Medicine
Council on School Health, American Academy of Pediatrics
New York

Jan Olson MSNEd, BSN, RN
District Nurse, Molalla River School District
Molalla, OR

Brenna Quinn PhD, RN, NCSN, CNE
Assistant Professor, University of Massachusetts Lowell
Lowell, MA

Andrea L. Tanner, MSN, RN, NCSN
Coordinator of Health Services, New Albany Floyd County
New Albany, IN

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Rationale

Seizures result from unpredictable, abnormal electrical brain activity that causes a range of mild to severe symptoms and clinical manifestations; epilepsy is a chronic condition that involves recurrent seizures (Sirven & Shafer, 2014). Failure to effectively treat and manage seizures can have serious consequences, ranging from elevated healthcare costs to poor health outcomes, including status epilepticus, permanent neurologic devastation, and death (Hartman et al., 2016). Approximately 470,000 children ages 6–17 years old in the United States have epilepsy, with a prevalence rate of 6.3/1,000 (Zack & Kabou, 2017). Fifteen percent of U.S children have special healthcare needs, and 3% of these are diagnosed with epilepsy (Pastor, Reuben, Kobau, Helmers, & Lukacs, 2015; U.S. Department of Health and Human Services, 2013).

Children and adolescents with epilepsy incur $9,103.25 per child annually in healthcare costs compared to their counterparts without epilepsy (Miller, Coffield, Leroy, & Wallin, 2016). This cost burden can increase exponentially if seizure first aid is not administered per the child's healthcare provider seizure action plan. Further, children with epilepsy miss more days of school, experience more difficulty with fine and gross motor function, and receive more special education services compared to children without epilepsy (Pastor et al., 2015; Russ, Larson, & Halfon, 2012). These functional and academic components significantly impact learning among these students.

The complex and unique healthcare needs of school children with epilepsy are not consistently met in the school setting due to issues related to discordant school nursing care, knowledge deficits related to seizure management among school personnel, and medication delegation barriers (Hartman et al., 2016). These challenges and barriers can potentially contribute to increased healthcare costs, less than optimal health outcomes, and lower academic outcomes for students with epilepsy. Additionally, the lack of a school nursing-specific clinical practice guideline leaves school nurses ill-equipped to effectively and safely address seizures and epilepsy in the school setting and also hinders the ability of school nurses to provide standardized care and systematically measure outcomes. This clinical practice guideline will provide evidence-based best practice recommendations for school nurses, thereby improving the health and safety of students with seizures and epilepsy.

Purpose

The purpose of this clinical practice guideline is to provide the professional school nurse with evidence-based practice recommendations for high-quality care of students with seizure disorders and epilepsy. Implementation of this guideline will assist school nurses in improving the health and safety of students with epilepsy—subsequently enhancing learning and academic success—by achieving the following outcomes:

- Increasing the number of students with epilepsy who have an emergency care plan and access to prescribed emergency medications in the school setting.
- Improving seizure first aid and care management provided by school nurses and school personnel.
- Decreasing unnecessary emergency room visits.
- Increasing return to class when safe and appropriate (e.g., student returns to baseline).
- Decreasing the number of inpatient hospital admissions among students with seizures and epilepsy who receive rescue medication in the school setting, when indicated.

Note that the care of students with seizures and epilepsy is highly complex, individualized, and directed by healthcare provider (e.g., neurologist, epileptologist, primary care provider physician or nurse practitioner) treatment recommendations and orders. Specific complex treatment regimens established by the healthcare team will not be discussed in detail within this guideline. Rather, this guideline is intended as an overview to guide professional school nurses in implementing provider-developed treatment regimens, as well as to apply nursing judgment based on students' individual needs within the domains of education/training, care plans, care coordination, special education, and rescue medication. Specific seizure and epilepsy disorders as well as implications specific to complex treatment regimens are beyond the scope of this clinical practice guideline. In addition, this guideline outlines steps specific to seizure disorders. Other activities carried out by a school nurse for students with chronic conditions should still be completed but are not included in this guideline. Such activities may include assessing and addressing student developmental stage and social determinants of health, developing student/family goals, and providing student-specific education/empowerment.

This guideline is intended as an overview to guide professional school nurses in implementing the most recent, evidence-based practice recommendations as of the date of publication. Recommendations are subject to change based on the availability of new scientific information.

The practice recommendations in this guideline are NOT a substitute for nursing judgment and do not dictate an exclusive course of action. Professional nursing care is based on individual student circumstances, clinical presentation, and authorized policies in accord with local state board of nursing and related nurse practice act.

Methodology

This evidence-based clinical practice guideline was developed according to the National Association of School Nurses (NASN) *Model for Developing School Nursing Evidence-Based Practice Clinical Guidelines* (Shannon & Maughan, 2019).

Definitions and Abbreviations of Terms

504: Plan developed under Section 504 of the Rehabilitation Act of 1973.

CDC: Centers for Disease Control and Prevention.

Children with Special Healthcare Needs: Defined by the U.S. Department of Health and Human Services, Health Resources and Services Administration, Maternal and Child Health Bureau, as "those who have or are at increased risk for a chronic physical, developmental, behavioral, or emotional condition and who also require health and related services of a type or amount beyond that required by children generally" (U.S. Department of Health and Human services, 2013, p. 9).

CPG: Clinical Practice Guideline.

EBP: Evidence-Based Practice.

EAP: Emergency Action Plan. This plan is developed by the registered professional school nurse using clear terminology that can be easily understood by school personnel and non-medical professionals. The EAP outlines the action steps involved in recognizing and responding to a health crisis. Development of an EAP is vital in the absence of an HCP SAP. An EAP uses the medical information found in the SAP and expands it to include nursing considerations and school-site-specific processes, such as where medication is stored, who will do what, and what procedures school personnel should follow.

EMS: Emergency Medical Services.

ER: Emergency Room.

HCP: Healthcare provider; includes neurologist, epileptologist, or primary care provider (physician or nurse practitioner) responsible for diagnosis and medical treatment.

IEP: Individualized Education Program developed under the Individuals with Disabilities Education Act. (IDEA, 2004).

IHP: Individualized Healthcare Plan. NASN's position is that the IHP is "developed by the school nurse using the nursing process in collaboration with the student, family and healthcare providers. The school nurse utilizes the IHP to provide care coordination, to facilitate the management of the student's health condition in the school setting, to inform school-educational plans, and to promote academic success" (NASN, 2015, final paragraph). An IHP uses the medical information found in the SAP and expands it to include nursing considerations beyond emergencies, such as student and family goals and educational needs as well as school-site-specific processes.

IOM: Institute of Medicine. In 2015, the name was changed to the National Academy of Medicine.

Least Restrictive Medication: A medication that is administered via the least invasive route. Rectal administration is invasive, while buccal and intranasal routes are noninvasive.

SAP: Seizure Action Plan. This plan is typically completed by the healthcare team and includes parameters for emergency care in the event of a prolonged seizure as well as prescribed rescue medications and instructions for use. The school nurse often uses this SAP to develop an individualized and/or emergency care plan.

Special Education Services: Free and appropriate education for children with disabilities that is designed to meet their unique needs and is administered by means of an Individualized Education Program (IDEA, 2004).

UAP: Unlicensed Assistive Personnel.

Search and Selection of Relevant Literature

The systematic literature search and selection was conducted according to the steps outlined in the *Model for Developing School Nursing Evidence-Based Clinical Practice Guidelines* (Shannon & Maughan, 2019). Once a body of literature was located, the EBP Guideline Evidence Decision Tree (Appendix A) was applied to ensure inclusion of only strong, high-quality, relevant evidence. The first step of the decision tree is the application of Quick Filter Criteria: Reputable source? Relevant to population? Applicable to practice? Literature that met these criteria was further evaluated and graded. Fifty-five articles and EBP resources were obtained in the collective search; Quick Filter Criteria were applied, resulting in 27 articles and EBP resources for critical appraisal in the final body of evidence. The final body of evidence represents the most recent, applicable, and best available articles related to school nursing practice. A subsequent limited literature search and selection was completed in 2019 to capture updated and current scientific literature and EBP resources.

The academic database PubMed was searched using MeSH subject headings (i.e., epilepsy, children, healthcare, and prevalence) to establish the prevalence and impact of epilepsy among school-age children. Next, several key word searches were conducted in CINAHL, PubMed, and Educational Resources Information Center (ERIC) databases to review literature relevant to both stable and acute management of epilepsy, the management of epilepsy in school and community settings, and the role of healthcare providers and professionals in managing epilepsy. The first search within CINAHL included the following search terms: seizures AND epilepsy, children, school. Two key word searches were performed in PubMed with the following search terms: (1) seizures AND epilepsy, emergency treatment, schools; (2) seizure guideline AND children AND school OR community. These searches yielded a total of eight and four articles, respectively. Lastly, key word searches were performed in ERIC to capture epilepsy research within education-related literature. The key word searches included the following terms: (1) epilepsy OR seizures AND management AND children NOT adults; (2) epilepsy OR seizures AND emergency AND children NOT adults. Fourteen and eight articles were obtained, respectively, from these searches. The limits of English language and date (excluding articles published prior to 2007) were applied to all keyword searches in each database. Duplicates were removed, and the combined searches yielded 44 documents.

A hand search of reference lists was performed to build upon the body of evidence captured in the database searches. Additionally, the Agency for Healthcare Research and Quality's National Guideline Clearinghouse and the National Institute for Health and Care

focused on managing epilepsy in the school setting specifically, but one general epilepsy management guideline was included (NICE, 2016), as relevant information to management in non-acute settings and communities was contained within the guideline; these recommendations are applicable to the school environment. Additionally, the American Association of Neuroscience Nurses (AANN, 2016) "Care of Adults and Children with Seizures and Epilepsy" Clinical Practice Guideline was also included in the body of evidence. Further, the websites of the Centers for Disease Control and Prevention (CDC), the National Association of School Nurses (NASN), the Epilepsy Foundation, the American Epilepsy Society (AES), and the International League Against Epilepsy (ILAE) were searched to locate evidence-based materials such as expert panel recommendations, position statements, toolkits, and training resources specific to the care and management of children with seizures and epilepsy.

Critical Appraisal of Evidence

The final body of evidence was critically appraised to establish level, quality, and subsequent strength of practice recommendations (Appendix B). A panel of experts, including members of the Professional Advisory Board of the Epilepsy Foundation, practicing expert school nurses, and physicians, reviewed and contributed to the evidence appraisal and practice recommendations. The panel used the AGREE II Instrument to assess the quality of the guideline and recommendations for use. Selected modifications based on expert panel critical appraisal were incorporated into the guideline and practice recommendations. NASN also completed an independent review.

Translation into Practice Recommendations

The following practice recommendations are based on the most recent, quality evidence to inform professional school nursing care of students with seizures and epilepsy. Recommendations are organized by the following domains of care: care coordination, clinical guidelines, education/ training, rescue medication, seizure action plan, and special education.

National Association of School Nurses

School Nursing Evidence-based Clinical Practice Guideline:

Students with Seizures and Epilepsy Translation into Practice Recommendations

School Nursing Evidence-Based Practice Guideline	Domains of Care	References by Strength* (A, B, C) (See Appendix B)

ASSESSMENT
 	
The professional school nurse will assess:
 	
• Student health history.
 	
• Annually assess student access to a medical home and specialized care, including physical access to care and medical coverage.
 	
• Family and caregiver knowledge, engagement, coping and compliance in caring for the student with seizures and epilepsy.
 	
• Mechanism or plan for communication with HCP.
 	
• Student baseline seizure type and activity, including antecedents, presentation, frequency, and severity.
 	
• Presence of Seizure Action Plan.
 	
• Rescue medication accessibility, if indicated.
 	
• Presence of physical/medical co-morbidities, social/familial isolation, behavior/mental health concerns, and developmental/cognitive delays and disorders.
 	
• School and district policies, protocols, and procedures related to:
  ○ Seizure and epilepsy training, including seizure first aid training.
 	
  ○ Medication administration to allow for delegation of rescue medication administration to UAP (if allowed per state/local policies), or plan for medication administration in absence of school nurse.
 	
  ○ Medical emergency preparedness and response.
	Care Coordination	A: 28, 31
		
		B: 10, 11, 19
		
		C: 1, 5, 12, 22, 24, 25, 26

	Education/Training	A: 21, 28, 31 B: 6, 16, 19 C: 1, 2, 3, 5, 17, 22, 25, 26, 33
	Seizure Action Plan	A: 21, 28, 31 B: 16, 19 C: 1, 2, 3, 5, 17, 22, 25, 26, 33
	Rescue Medication	A: 4, 7, 13, 28, 30, 31 B: 9, 16, 18, 19, 20, 29 C: 1, 8, 15, 22, 26, 33

This Guideline is intended to be a decision-making tool and doesn't replace clinical nursing judgement (see full disclosure).

School Nursing Evidence-Based Practice Guideline	Domains of Care	References by Strength* (A, B, C) (See Appendix B)
NURSING DIAGNOSES • Risk for **ineffective airway clearance** among students with seizures and epilepsy, as evidenced by **accumulation of secretions during seizure**. • Risk for **injury** among students with **seizures and epilepsy**, as evidenced by **environmental factors present during seizure, lack of SAP and/or IHP**; secondary to seizure first aid knowledge deficit. • Risk for **social isolation** among students with seizures and epilepsy, as evidenced by **unpredictability of seizures, community-imposed stigma.** • Risk for **delayed development** among students with seizures and epilepsy, as evidenced by **potential neurological deficits**. • **Ineffective therapeutic regimen management** among students with seizures and epilepsy related to **complexity of therapeutic regimen, knowledge deficit, perceived barriers, and powerlessness**, as evidenced by **student-specific assessment findings.** • **Ineffective community therapeutic regimen management** among **school personnel** related to **lack of knowledge of seizure first aid and management of students with epilepsy**, as evidenced by **reported lack of confidence and understanding in working with students with epilepsy.**	Care Coordination	A: 28, 31 B: 10, 11, 19 C: 1, 5, 12, 22, 24, 25, 26
	Education/Training	A: 21, 28, 31 B: 6, 16, 19 C: 1, 2, 3, 5, 17, 22, 25, 26, 33
	Rescue Medication	A: 4, 7, 13, 28, 30, 31 B: 9, 16, 18, 19, 20, 29 C: 1, 8, 15, 22, 26, 33
OUTCOMES IDENTIFICATION *The student will:* • Receive health and educational support by means of an SAP, ECP, IHP, 504 Plan, or IEP. • Receive seizure first aid while experiencing a seizure in the school setting. (See Appendix C for Seizure First Aid Recommendations). • Experience reduced risk of injury during the school day, including school-provided transport. • Remain free from injury while experiencing a seizure in the school setting. • Return to class following a baseline seizure, if vital signs are stable and post-ictal phase has resolved.	Education/Training	A: 21, 28, 31 B: 6, 16, 19 C: 1, 2, 3, 5, 17, 22, 25, 26, 33
	Seizure Action Plan	A: 21, 28, 31 B: 16, 19 C: 1, 2, 3, 5, 17, 22, 25, 26, 33

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School Nursing Evidence-Based Practice Guideline	Domains of Care	References by Strength* (A, B, C) (See Appendix B)
• Receive rescue medication as ordered by HCP and outlined in SAP. • Be transported to the emergency room for assessment and treatment via EMS if: ○ The seizure continues five minutes after rescue medication has been administered, or as otherwise specified by HCP. ○ This is the student's first episode requiring rescue medication, in students with history of frequent serial seizures or convulsive status epilepticus. ○ The student experiences any concerns with airway, breathing, circulation, or other vital signs. ○ The student experiences a seizure in water or sustains a traumatic injury as a result of the seizure. ○ The student experiences a first-time seizure.	Rescue Medication	A: 4, 7, 13, 28, 30, 31 B: 9, 16, 18, 19, 20, 29 C: 1, 8, 15, 22, 26, 33
	Special Education	A: 27, 28, 32 B: 11 C: 12, 26
PLANNING *The professional school nurse will:* • Collaborate with HCP to obtain an SAP and orders for use in the school setting. (Click here for example). • Develop a modifiable, customizable ECP and /or IHP template that includes steps for basic seizure first aid, other student considerations, and school-site specific considerations. • In collaboration with primary HCP or medical home, refer student with suspected or actual seizures and epilepsy to specialty care provider, or to the most qualified provider with experience in pediatric neurology if access to specialty care providers is limited. • Advocate for the ***least restrictive*** medication choice (buccal or nasal rather than rectal) in the child's environment: ○ Significant body of evidence demonstrates safety and efficacy of non-rectal preparations of benzodiazepines (particularly buccal and nasal) as rescue therapy to treat prolonged acute seizures and seizure clusters. ○ Rectal diazepam, intranasal midazolam, and intranasal diazepam are FDA approved seizure emergency rescue medications; however, providers also also prescribe non-rectal preparations of other benzodiazepines on an off label basis given the existing body of literature.	Care Coordination	A: 28, 31 B: 10, 11, 19 C: 1, 5, 12, 22, 24, 25, 26
	Clinical Practice Guidelines	A: 14 B: 19 C: 25
	Education/Training	A: 21, 28, 31 B: 6, 16, 19 C: 1, 2, 3, 5, 17, 22, 25, 26, 33
	Seizue Action Plan	A: 21, 28, 31 B: 16, 19 C: 1, 2, 3, 5, 17, 22, 25, 26, 33

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School Nursing Evidence-Based Practice Guideline	Domains of Care	References by Strength* (A, B, C) (See Appendix B)
• Collaborate with families/caregivers, student, and HCP to develop a comprehensive, mutually agreed upon IHP to be implemented in the school setting. • Consult and collaborate with student in planning IHP and health-related goals to increase self-advocacy and self-management of seizures and epilepsy. • Develop an IHP to address the student's individual needs related to seizures and epilepsy, including (but not limited to): ○ Avoidance of seizure triggers/antecedents. ○ Anti-epileptic drug side effects, such as drowsiness, fatigue, nausea, anorexia, headaches, hyperactivity, somnolence, gastrointestinal upset, and rash. ○ Use (including parameters, instructions, and delegation/training, if applicable) of a Vagal Nerve Stimulator (VNS), as outlined in HCP orders. ○ Dietary modifications, as indicated by HCP orders, and mechanism to assist student adherence to diet. ○ Recording of seizure occurrence and/or seizure-like activity in an observation log (may be done by school nurse, teacher, or other trained individual) and communicating events to families/caregivers and HCP. • Observation log should include date/time of occurrence and description of what happened before (pre-ictal), during (ictal), and after (post-ictal) the event. • Develop a 504 plan with accommodations or IEP health recommendations/ modifications/goals to ensure that the student can access the educational environment in the same manner as nondisabled peers. This may include: ○ Access to an individual paraprofessional classroom aide. ○ Ensuring access to a professional school nurse for assessment, treatment, and monitoring. ○ Classroom and testing accommodations based on individual student's needs, as assessed by the school nurse, if indicated such as seating area/type, rest period. ○ Transportation recommendations.	Rescue Medication	A: 4, 7, 13, 28, 30, 31 B: 9, 16, 18, 19, 20, 29 C: 1, 8, 15, 22, 26, 33
	Special Education	A: 27, 28, 32 B: 11 C: 12, 26

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School Nursing Evidence-Based Practice Guideline	Domains of Care	References by Strength* (A, B, C) (See Appendix B)
IMPLEMENTATION *The professional school nurse will:* • Develop policies, protocols, and/or procedures related to: ○ Seizure and epilepsy training, including seizure first aid training. ○ Medication administration to allow for delegation of rescue medication administration (if allowed per state/local policies) or plan for medication administration in absence of school nurse. ○ Delegation and procedure for use of VNS magnet (if allowed per state/local policies). ○ Resources and support to ensure adherence to special diets. ○ Medical emergency preparedness and response plan specific to seizure emergencies. • Implement SAPs/ECPs, IHPs, 504 plans, and IEPs as appropriate, communicating with student, family/caregivers, education, team, and HCP to improve and revise as needed. • Collaborate with families/caregivers, school administrators, and HCP to identify and train school personnel to administer rescue medication in the absence of the school nurse, in accordance with district policies, competency training and criteria, and state Nurse Practice Act and Rules. • Provide evidence-based seizure and epilepsy education and training, including seizure first aid, to school teachers and staff. If unable to provide education directly, arrange for in-person or online training to be provided through the local Epilepsy Foundation (recommended by the CDC and IOM). ○ Such training should include student-specific considerations for school personnel who care for student directly, per IHP. • Establish collaboration between school nurse, families/caregivers, and HCP to ensure consistent communication. ○ School nurse will communicate occurrences of seizure emergencies and rescue medication administration to families/caregivers and HCP as soon as possible by caregivers' preferred method of communication.	Care Coordination	A: 28, 31 B: 10, 11, 19 C: 1, 5, 12, 22, 24, 25, 26
	Clinical Practice Guidelines	A: 14 B: 19 C: 25
	Education/Training	A: 21, 28, 31 B: 6, 16, 19 C: 1, 2, 3, 5, 17, 22, 25, 26, 33
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School Nursing Evidence-Based Practice Guideline	Domains of Care	References by Strength* (A, B, C) (See Appendix B)

EVALUATION
The professional school nurse will collect the following information and evaluate:
• Number of students who experience a seizure in the school setting.
• Number of students diagnosed with a seizure disorder/epilepsy.
• Number of students who have a seizure SAP (completed by HCP).
• Number of students who have an IHP, 504 plan, or IEP to address seizure/epilepsy-related needs in the school setting.
• Student and family/caregiver satisfaction with care coordination efforts of school nurse (qualitative and anecdotal evidence) among students with seizures and epilepsy.
• Academic outcomes of students with seizures and epilepsy.
  ○ Time spent in class.
  ○ Chronic absenteeism.
  ○ Other outcomes, as specific to student.
• Attendance and number of health office visits of students with seizures and epilepsy.
• Number of students who have access to seizure rescue medication.
• Number of students who receive seizure rescue medication in the school setting for a prolonged convulsive seizure (or per parameters delineated in SAP).
• The disposition and outcome of students who experience a seizure in school: EMS and ER (discharged from ER or admitted to inpatient unit), home, return to class.
• Frequency of school personnel seizure and epilepsy training (all personnel should be trained).
• Emergency response of school staff in the event of a seizure occurrence in the absence of school nurse; subsequent outcome and disposition.
• Successes and barriers in developing/implementing school health policies, protocols, and procedures relevant to the effective and appropriate management of students with seizures and epilepsy.
	Care Coordination	A: 28, 31
		B: 10, 11, 19
		C: 1, 5, 12, 22, 24, 25, 26

	Clinical Practice Guideline	A: 14 B: 19 C: 25
	Seizure Action Plan	A: 21, 28, 31 B: 16, 19 C: 1, 2, 3, 5, 17, 22, 25, 26, 33
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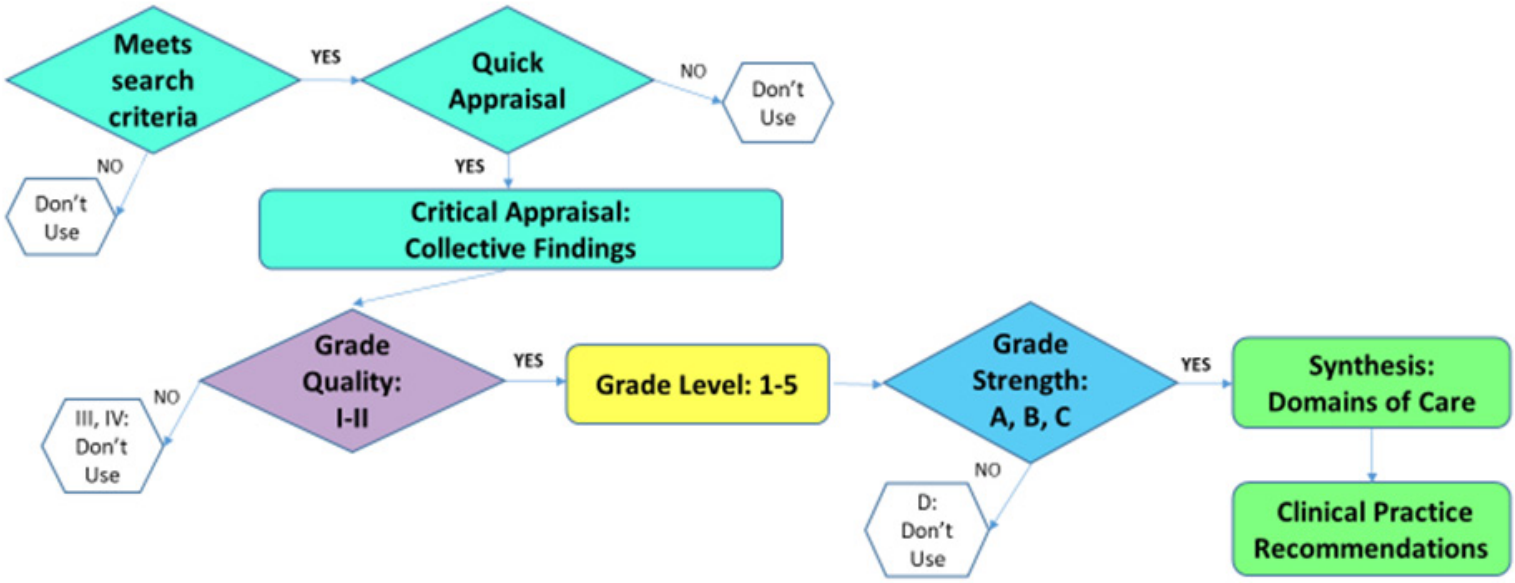
Appendix A

Clinical Practice Guideline Evidence Decision Tree



Appendix B

Collective Findings Table: Critical Appraisal of Evidence

RESEARCH ARTICLES								
Reference (Author, Year, Title)	**Purpose/Research Question**	**Study Design, Sample Size, and Characteristics**	**Major Strengths (S) and Limitations (L)**	**Summary of Findings and Recommendations**	**Theme(s)**	**Quality/ Level/ Strength of Evidence (See tables below**		
1. Arzimanoglou, A., Lagae, L., Cross, J. H., Beghi, E., Mifsud, J., Bennett, C., . . . Harvey, G. (2014). The administration of rescue medication to children with prolonged acute convulsive seizures in a non-hospital setting: An exploratory survey of healthcare professionals' perspectives.	To learn the opinions of European healthcare professionals (HCPs) on how children who experience a prolonged convulsive seizure at home, in schools, or in other non-hospital settings, are managed.	Exploratory telephone survey. Qualitative analysis. 128 HCPs: (pediatric) neurologists, pediatricians, epilepsy nurse specialists.	(S): Validated interview questions. (L): Relatively small sample size, included only European HCPs.	• Lack of general awareness among HCPs regarding how prolonged seizures are managed in the school/community setting. • Need for clear, easily understood guidelines. • Need for individualized care plan that outlines emergency management. • Lack of seizure training in schools. • Need for improved communication between HCP and schools.	Education/Training Care Coordination Seizure Action Plan Rescue Medication	III	5	C
2. Austin, J. K., Kakacek, J. R. M., & Carr, D. (2010). Impact of training program on school nurses' confidence	Assess impact of epilepsy-focused training program on school nurses ("Managing Students with Seizures" training program).	Quantitative. Quasi-experimental. Nonrandomized one-group pre-test/ post-test design.	(S): CDC developed and validated survey with pilot training; content experts reviewed, edited.	• Significant improvement among participants in confidence across nine areas of epilepsy knowledge/ management post training intervention.	Education/Training	I	3	C

Reference (Author, Year, Title)	Purpose/Research Question	Study Design, Sample Size, and Characteristics	Major Strengths (S) and Limitations (L)	Summary of Findings and Recommendations	Theme(s)	Quality/ Level/ Strength of Evidence (See tables below		
levels in managing and supporting students with epilepsy and seizures.		1,080 practicing school nurses from 33 state school nurse associations across the United States.	(L): No control group; convenience sample limits generalizability.					
3. Brook, H. A., Hiltz, C. M., Kopplin, V. L., & Lindeke, L. L. (2015). Increasing epilepsy awareness in schools.	Improve health outcomes of students with seizures by implementing the "Seizure Smart Schools Project," including education and empowerment of school health, teaching, and administrative staff.	Mixed methods: Quantitative. Quasi-experimental. Nonrandomized one-group pre-test/ post-test design. Chart review/audit. 26 practicing school nurses, school staff, and administrators at 42 schools in large Midwestern school districts.	(S): Post-evaluation survey with 100% (n=26) response rate; use of validated, piloted "Managing Students with Seizures" questionnaire. (L): Small sample size; does not differentiate between rural/ urban areas; level of expertise, training completed.	• Formal education/training using a variety of teaching interventions results in improved outcomes. • Increased school nurse confidence in managing students with seizures. • Improved student outcomes of >80% newly diagnosed children with seizure care/management documentation in place upon review of EHR. • District emergency care plan and individual health plan templates revised, incorporating Epilepsy Foundation recommendations to improve and standardize documentation.	Education/Training Seizure Action Plan	II	3	C
4. Detyniecki, K., Van Ess, P. J., Sequeira, D. J., Wheless, J. W., Meng, T., & Pullman, W. E. (2019). Safety and efficacy of midazolam nasal spray in the outpatient treatment of patients with	To evaluate the safety and efficacy of a midazolam single-dose nasal spray (MDZ–NS) in the outpatient treatment of patients experiencing seizure clusters (SCs).	Phase III, randomized, double-blind, placebo-controlled trial (ClinicalTrials.gov NCT01390220) n= 292 Patients age ≥12 years on a stable regimen of antiepileptic drugs.	(S): Strong study design and relatively large sample size for study of this nature (L): sample excluded children younger than 12 years	• Use of intranasal midazolam was associated with rapid and sustained seizure control, and a favorable safety profile in patients as young as 12 years • During double-blind treatment, no patient experienced acute central respiratory depression and none discontinued due to adverse events	Rescue Medication	I	2	A

Reference (Author, Year, Title)	Purpose/Research Question	Study Design, Sample Size, and Characteristics	Major Strengths (S) and Limitations (L)	Summary of Findings and Recommendations	Theme(s)	Quality/ Level/ Strength of Evidence (See tables below		
5. Dumeier, H. K., Neininger, M. P., Bernhard, M. K., Syrbe, S., Merkenschlager, A., Zabel, J. ö., . . . Bertsche, A. (2015). Knowledge and attitudes of school teachers, preschool teachers and students in teacher training about epilepsy and emergency management of seizures.	Assess knowledge and attitudes about epilepsy among teachers in Germany.	Correlational descriptive design. Survey developed by expert panel (pediatric neurologists, pharmacists, teacher). n= 1243, consisting of school teacher, preschool teachers, and student teachers in two German municipalities.	(S): Large sample size. (L): Voluntary survey may skew toward participants who have existing knowledge of seizures/ epilepsy; included only Germany, which limits generalizability.	• Knowledge gap among teachers regarding seizure first aid and general seizure/epilepsy knowledge. • Teachers expressed desire for formal training and increased link between physician and school.	Education/Training Care Coordination	II	3	C
6. Eze, C. N., Ebuehi, O. M., Brigo, F., Otte, W. M., & Igwe, S. C. (2015). Knowledge and attitudes of school teachers.	To examine "the effect of health education on the knowledge, attitudes, and first aid management of epilepsy on trainee teachers in Nigeria"(p. 46).	Quantitative. Quasi-experimental. One-group pre-test/post-test design. N= 226 randomly selected trainee teachers at the Federal College of Education, Lagos, Nigeria.	(L): Validity and reliability of questionnaire not reported; sample limited to Nigeria; no comparison group; limited generalizability.	• Significant increase in knowledge and seizure first aid skills, improved attitudes regarding epilepsy post-training. • Training facilitates appropriate seizure first aid to students with epilepsy.	Education/Training	II	3	B

Reference (Author, Year, Title)	Purpose/Research Question	Study Design, Sample Size, and Characteristics	Major Strengths (S) and Limitations (L)	Summary of Findings and Recommendations	Theme(s)	Quality/ Level/ Strength of Evidence (See tables below		
7. Glauser, T., Shinnar, S., Gloss, D., Alldredge, B., Arya, R., Bainbridge, J., . . . Treiman, D. M. (2016). Evidence-based guideline: Treatment of convulsive status epilepticus in children and adults: Report of the guideline committee of the american epilepsy society.	To analyze efficacy, tolerability and safety data for anticonvulsant treatment of children and adults with convulsive status epilepticus and use this analysis to develop an evidence-based treatment algorithm.	Integrative literature review. n= 38 RCTs. Population= adults and children.	(S): Studies included only RCTs of anti-convulsant treatment of seizures lasting longer than 5 minutes. (L): Findings specific to hospital settings; limited RCTs among the child population due to ethical concerns.	• In children, rectal diazepam, intramuscular midazolam, intranasal midazolam, and buccal midazolam are probably effective at stopping seizures lasting at least 5 minutes. • A meta-analysis of six class III pediatric studies found non-IV midazolam (IM/intranasal/buccal) was more effective than diazepam (IV/rectal) at achieving seizure cessation.	Rescue Medication	I	1	A
8. Klimach, V. J., & Epic Clinical Network. (2009).The community use of rescue medication for prolonged epileptic seizures in children.	To determine the prevalence of use, safety, and efficacy of different rescue medication used for prolonged seizures in children in the community.	Descriptive statistical survey. n= 190 parents/ caregivers. n= 203 clinicians (pediatricians/ epilepsy nurse) providing care to children with epilepsy. Five municipalities within the UK.	(S): High response rate (100% clinician; 93% parent). (L): Questionnaire validity not discussed; lack of statistical analyses other than providing percentages; sample limited to UK; limited generalizability.	• Buccal midazolam is the rescue medication most frequently prescribed. • Parents and clinicians perceived buccal midazolam to be the safest and most efficient rescue medication. • Benefits of rescue medication administration include decreased number of hospital admissions.	Rescue Medication	III	3	C

Reference (Author, Year, Title)	Purpose/Research Question	Study Design, Sample Size, and Characteristics	Major Strengths (S) and Limitations (L)	Summary of Findings and Recommendations	Theme(s)	Quality/Level/ Strength of Evidence (See tables below		
9. McIntyre, J., Robertson, S., Norris, E., Appleton, R., Whitehouse, W. P., Phillips, B., . . . Choonara, I. (2005). Safety and efficacy of buccal midazolam versus rectal diazepam for emergency treatment of seizures in children: A randomised controlled trial.	To compare safety and efficacy of rectal diazepam and rectal midazolam as rescue medication in children experiencing afebrile and febrile seizures.	Multicenter RCT. Compared buccal midazolam with rectal diazepam for emergency-room treatment of children aged 6 months and older presenting to hospital with active seizures and without intravenous access. 219 separate episodes involving 177 patients.	(S): Four different hospital centers; randomization. (L): Sample limited to patients experiencing generalized tonic-clonic seizures; sample not intended to include partial or nonconvulsive seizures. ethical issues involving obtaining consent in emergency situations, which limited sample size. Children who received rectal diazepam and responded to treatment prior to arrival from ER were not included in study.	• Therapeutic success was 56% (61 of 109) for buccal midazolam and 27% (30 of 110) for rectal diazepam (percentage difference 29%, 95% CI 16–41). • Buccal midazolam was more effective than rectal diazepam for children presenting to hospital with acute seizures and was not associated with an increased incidence of respiratory depression.	Rescue Medication	I	2	B
10. Miller, G. F., Coffield, E., Leroy, Z., & Wallin, R. (2016). Prevalence and costs of five chronic conditions in children.	To examine prevalence and healthcare associated with the chronic conditions (including seizures) among children age 0–18 years, which can inform school nurse practice.	Data analysis from 2005–2012 Medical Expenditure Panel Surveys (MEPS). Data analysis: Odd ratios, estimate of medical expenditures while controlling for a variety of variables; two-part models.	(S): Data analyses mechanisms and procedures. (L): Issues within MEPS of underreporting, ICD9 coding errors.	• Children and adolescents with epilepsy incur an additional $9,103.25 per child in healthcare costs per year, compared to those without epilepsy. • Care coordination provided by school nurses optimizes health and learning by improving communication between school, parents, and healthcare providers to ensure appropriate care is in place.	Care coordination	II	3	B

Reference (Author, Year, Title)	Purpose/Research Question	Study Design, Sample Size, and Characteristics	Major Strengths (S) and Limitations (L)	Summary of Findings and Recommendations	Theme(s)	Quality/Level/ Strength of Evidence (See tables below		
11. Pastor, P. N., Reuben, C. A., Kobau, R., Helmers, S. L., & Lukacs, S. (2015). Functional difficulties and school limitations of children with epilepsy: Findings from the 2009–2010 national survey of children with special health care needs.	Compare functional difficulties and school limitations among children with special healthcare needs (CSHCN) with and without epilepsy.	Data from 2009–2010 National Survey of CSHCN (31,897 children age 6–17 years) with and without epilepsy analyzed in two groups: (1) with comorbid conditions (intellectual disability, cerebral palsy, autism, traumatic brain injury) and (2) without comorbidities. Functional difficulties and school limitations examined, while adjusting for sociodemographic characteristics.	(S): Large national sample; control/ adjustment for sociodemographic variables; descriptive statistics described in-depth. (L): Measures of functioning limited to parent report; lack of detailed information regarding type/ frequency/severity of seizures.	• CSHCN with epilepsy (compared to those without): o Miss more school days. o Have more functional difficulties, including fine/ gross motor and communication concerns. o Receive more special education services. • This population would benefit from care coordination services.	Care coordination Special Education	I	3	B
12. Russ, S. A., Larson, K., & Halfon, N. (2012). A national profile of childhood epilepsy and seizure disorder.	Determine socio-demographics patterns of comorbidities, and function of US children with seizures/epilepsy.	Bivariate and multivariate cross-sectional analysis of data from 2007 National Survey of Children's Health. 91,605 children age 0–17 years; 977 reported to have epilepsy/ seizure disorder.	(S): Large, representative national sample. (L): Reliance on parent report, issues with assignment to diagnostic categories; self reporting potentially impacts reliance.	• 56% prevalence of learning disabilities among children with epilepsy/seizure disorder. • Children with seizures are at increased risk for mental health, developmental, and physical comorbidities. • This population is less likely to receive care in a medical home and have increased risk of having unmet medical and mental health services.	Care Coordination Special Education	III	3	C

Reference (Author, Year, Title)	Purpose/Research Question	Study Design, Sample Size, and Characteristics	Major Strengths (S) and Limitations (L)	Summary of Findings and Recommendations	Theme(s)	Quality/Level/ Strength of Evidence (See tables below		
13. Sánchez Fernández, I., Gaínza-Lein, M., & Loddenkemper, T. (2017). Nonintravenous rescue medications for pediatric status epilepticus: A cost-effectiveness analysis.	To compare cost effectiveness of rescue medications in acute management of pediatric status epilepticus in the United States	Cost effectiveness study 24 studies included in quantitative analysis of effectiveness Meta-analysis evaluates aggregate effectiveness over different studies of rectal diazepam, nasal midazolam, buccal midazolam, intramuscular midazolam, and nasal lorazepam	(S): First of its kind study to analyze cost effectiveness of seizure rescue medications in US (L): Different patient populations in different countries limit ability to compare study populations in meta-analysis	• Multiple studies demonstrate safety, efficaciousness and cost effectiveness of non-invasive seizure rescue medications • Most cost effective rescue medication is buccal midazolam followed by nasal midazolam • Rectal diazepam was more costly and less effective than other rescue medications	Rescue Medication	I	3	A
14. Sauro, K. M., Wiebe, S., Dunkley, C., Janszky, J., Kumlien, E., Moshé, S., . . . Institutionen för neurovetenskap (2016). The current state of epilepsy guidelines: A systematic review.	Systematic review by the International League Against Epilepsy to identify and appraise international epilepsy clinical practice guidelines and determine subsequent gaps/ areas of need.	Systematic review. Six electronic databases, 1985–2014 years of publication, six gray literature databases, two independent data reviewers to screen, review and perform data abstraction. Descriptive statistics and meta-analysis generated.	(S): 63 CPGs identified from 28 countries; Search strategies and statistical analysis described in depth. (L): Potential to miss some existing CPGs due to search criteria; systematic review limited to management and clinical care, not technical aspects of care.	• Overall quality of guidelines rated as moderate with significant heterogeneity. • Most guidelines were aimed at guiding clinical practice in acute care settings. • Gaps exist in topics and setting.	Clinical guidelines	I	1	A

Reference (Author, Year, Title)	Purpose/Research Question	Study Design, Sample Size, and Characteristics	Major Strengths (S) and Limitations (L)	Summary of Findings and Recommendations	Theme(s)	Quality/Level/ Strength of Evidence (See tables below		
15. Sofou, Kristjánsdóttir, R., Papachatzakis, N. E., Ahmadzadeh, A., & Uvebrant, P. (2009). Management of prolonged seizures and status epilepticus in childhood: A systematic review.	Systematic review examining management of prolonged seizures and status epilepticus in children.	n= 8 studies met inclusion/exclusion criteria for systematic review.	(S): Wide search criteria—no limits of seizure type, language, or date restrictions applied. (L): Search conducted in a single databased (MEDLINE).	• Buccal midazolam was significantly more effective than rectal diazepam. • Buccal midazolam is both efficacious and safe. • Failure to diagnose and treat status epilepticus in a prompt and accurate manner has been shown to result in significant overall mortality and neurological morbidity.	Rescue Medication	II	1	C
16. Terry, D., Patel, A. D., Cohen, D. M., Scherzer, D., & Kline, J. (2016). Barriers to seizure management in schools: Perceptions of school nurses.	To "obtain pilot data assessing school nurses' perceptions of barriers to seizure management in school." (p. 1602)	Descriptive correlational, one group, electronic survey. 83 school nurse members of the Ohio School Nurses Association.	(S): Demographics included practice setting (urban/ suburban vs. rural). (L): Small sample size, nonrandomized; limited generalizability.	• Only about half of the responding nurses reported being usually available to respond to a seizure emergency (more likely in rural vs. urban/suburban). • Lack of confidence in using a vagal nerve stimulator and intranasal versed. • School nurses are not confident in the school staff's ability to respond appropriately to seizure emergency, in absence of the school nurse. • Lack of emergency care plans for students with seizures.	Education/Training Seizure Action Plan Rescue Medication	II	3	B
17. Ugalde, M. R., Guffey, D., Minard, C. G., Giardino, A. P., & Johnson, G. A. (2018). A survey of school nurse emergency	To examine the preparedness of school nurses in responding to emergencies.	Observational study design One time, 2 part questionnaire emailed to 275 school nurses in large, diverse school district in	(S): Descriptive statistics; Fisher's exact test; multivariate logistic regression (L): Questionnaire validity not discussed; small,	• 34 % of school nurses reported feeling less confidence in managing seizure emergencies. • Awareness of and practicing a school- and/or district-wide emergency plan may increase school nurses' confidence in managing emergencies.	Education/Training	III	3	C

Reference (Author, Year, Title)	Purpose/Research Question	Study Design, Sample Size, and Characteristics	Major Strengths (S) and Limitations (L)	Summary of Findings and Recommendations	Theme(s)	Quality/Level/ Strength of Evidence (See tables below		
preparedness 2014–2015.		Southeast Texas. 201 surveys completed and analyzed (73% response rate) Survey questions included clinical background, demographics, self-report of frequency of emergency response, and perceived preparedness and confidence.	geographically limited sample size					
18. Vigevano, F., Kirkham, F. J., Wilken, B., Raspall-Chaure, M., Grebla, R., Lee, D., . . . Lagae, L. (2018). Effect of rescue medication on seizure duration in non-institutionalized children with epilepsy.	Observational, retrospective study examining effect of benzodiazepine rescue medication use on seizure cessation among European children experiencing prolonged seizures in the community setting.	Observational retrospective study n= 286 children (non-institutionalized) with diagnosis of epilepsy for at least 12 months, history of prolonged acute seizure, and prescribed at least one rescue medication.	(S): sample consisted of children from 4 European countries and allowed for collection of real-world data on children whose seizure emergencies are managed by caregivers in the community (L): Parental recall bias; sample may consistent of children with more severe or frequent seizures; gender differences	• Reduced seizure duration when benzodiazepine (midazolam or diazepam, intranasal, buccal or rectal) rescue medication administered by parent, teacher or caregiver in community setting.	Rescue Medication	I	3	B

Reference (Author, Year, Title)	Purpose/Research Question	Study Design, Sample Size, and Characteristics	Major Strengths (S) and Limitations (L)	Summary of Findings and Recommendations	Theme(s)	Quality/Level/ Strength of Evidence (See tables below		
			not addressed; study did not allow for comparison of different drug therapies or routes of administration. Potential conflict of interest due to funding source being pharmaceutical company that produces treatments for epilepsy.					
19. Wait, S., Lagae, L., Arzimanoglou, A., Beghi, E., Bennett, C., Cross, J. H., . . . Harvey, G. (2013). The ad-ministration of rescue medication to children with prolonged acute convul-sive seizures in the com-munity: What happens in practice?	Phase 1 of the **P**ractices in **E**mergency and **R**escue medication For **E**pilepsy managed with **C**ommunity administered **T**herapy (PERFECT) initiative.	Pragmatic review of literature and evidence conducted to identify clinical practice guidelines, policies, protocols, and legal frameworks in managing prolonged convulsive seizures in community settings. Search limited to six European countries, local languages and English.	(S): Although not systematic, comprehensive review located material and research relevant to schools and community settings. (L): Findings not validated by empirical research; experience of schools driven by use of rectal diazepam, which carries concerns of liability, etc. among teachers; limited generalizability	• Gaps in available evidence and practice revealed the following: o Systematic training for all caregivers. o Link between treating physician and school. o Systematic training for all caregivers. o Comprehensive clinical guidelines.	Care Coordination Rescue Medication Clinical Guidelines Seizure Action Plan Education/Training	I	3	B

Reference (Author, Year, Title)	Purpose/Research Question	Study Design, Sample Size, and Characteristics	Major Strengths (S) and Limitations (L)	Summary of Findings and Recommendations	Theme(s)	Quality/Level/ Strength of Evidence (See tables below		
20. Wallace, A., Wirrell, E., & Payne, E. (2019). Seizure rescue medication use among US pediatric epilepsy providers: A survey of the pediatric epilepsy research consortium.	To assess how pediatric neurologists prescribe home seizure rescue medications to treat acute prolonged seizures and clusters of seizures in children.	Email survey to the members of the Pediatric Epilepsy Research Consortium Responses anonymous n=36 (47% response rate)	(S): respondents included pediatric neurologists and epileptologists (L): Small sample size; overrepresentation of Midwest,	• Preference to prescribe intranasal midazolam for convulsive seizures in older patients (16 years +) • Rectal diazepam more frequently prescribed developmentally delayed and/or younger patients. • Alternate preparations (buccal, intranasal, OTD) of rescue therapy benzodiazepines are safe and efficacious and have been frequently used on an off label basis for several years • Collective preferences demonstrate that easy to use form of a non-rectal delivery device would likely become the drug of choice for prolonged seizures.	Rescue Medication	II	3	B

OTHER EBP RESOURCES (Non-research articles, electronic sources)

Reference (Author, Year, Title)	Purpose	Description (literature review, guideline, practice/policy, etc.)	Major Strengths (S) and Limitations (L)	Summary of Findings and Recommendations	Theme(s)	Quality/Level/ Strength of Evidence (See tables below		
21. American Association of Neuroscience Nurses. 2016. Care of Adults and Children with Seizures and Epilepsy.	To provide evidence-based practice recommendations to optimize care of children and adults with seizures and epilepsy.	Evidence-based clinical practice guideline.	(S) Comprehensive body of literature to address care and implications of such for patients with seizures and epilepsy. (L) Directed to the bedside caregiver; limited information specific to caring for students with seizures/epilepsy within the school setting.	• Caregivers and medical emergency staff should be properly trained in the pre-hospital management of seizures in patients without venous access. • School nurses should write individualized health plans for students with epilepsy that include plans for management of prolonged seizures. • Nurses should be aware of community resources such as the Epilepsy Foundation, which offers standardized seizure action plans.	Education/Training Seizure Action Plan	I	1	A

OTHER EBP RESOURCES (Non-research articles, electronic sources)								
Reference (Author, Year, Title)	**Purpose**	**Description (literature review, guideline, practice/policy, etc.)**	**Major Strengths (S) and Limitations (L)**	**Summary of Findings and Recommendations**	**Theme(s)**	**Quality/Level/ Strength of Evidence (See tables below**		
22. Centers for Disease Control and Prevention. (2017a). School Health Policies and Practices Brief: Epilepsy and Seizure Disorder.	Review of epilepsy-related data from the 2014 School Health Profiles collected through state and local education and health agencies regarding school policies and practices.	Case reports and CDC expert opinion.	(S): Data was used to identify general strengths and weakness of school policies and practices related to epilepsy among students; data used to generate action recommendations. (L): Data was not reported by all 50 states; Data apply only to public middle and high schools; data reported by school principals might be subject to bias.	• Monitoring and addressing any related medical conditions, including mental health concerns, such as depression. • Understanding the importance of medication adherence and supporting students who take daily medications. • Helping students avoid seizure triggers, such as flashing lights or other triggers identified in their seizure response plan. • Educating school nurses, teachers, other staff members, and students about epilepsy and its treatment, seizure first aid, and the possible stigma associated with epilepsy. • Following the individualized seizure response plan created for each student and administering first aid, including the use of rescue medications, when needed. • Referring students with uncontrolled seizures to medical services in the community or to the Epilepsy Foundation for more information. • The CDC and the Epilepsy Foundation work collaboratively to develop comprehensive, evidence-based seizure/epilepsy training to meet the learning needs of community members, school personnel (including school nurses), and individuals and families affected by epilepsy.	Care Coordination Education/Training Rescue Medication	II	5	C

OTHER EBP RESOURCES (Non-research articles, electronic sources)							
Reference (Author, Year, Title)	**Purpose**	**Description (literature review, guideline, practice/policy, etc.)**	**Major Strengths (S) and Limitations (L)**	**Summary of Findings and Recommendations**	**Theme(s)**	**Quality/Level/ Strength of Evidence (See tables below**	
23. Centers for Disease Control and Prevention. (2017b). Seizure First Aid.	To increase awareness and understanding among the community in providing basic seizure first aid to someone experiencing a seizure.	CDC expert recommendation.	(S): Simple, easy-to- follow guidelines that can be implemented by non-healthcare professionals. (L): Inconsistency in directive to NOT put anything in the mouth of a person having a seizure; buccal midazolam is considered first-line treatment for convulsive status epilepticus.	• Priority = safety.	Seizure Action Plan	II	5 C
24. Council on School Health. (2016). Role of the school nurse in providing school health services.	American Academy of Pediatrics (AAP) position statement regarding the benefits, role, and responsibilities of current school nursing practice.	Position paper.	(S): Strong evidence-based references to demonstrate the AAP's position on school nurses' role in providing school health services. (L): None noted.	• School nurses improve management of chronic diseases, including seizures, by providing feedback mechanism to HCP. • School nurses interpret medical recommendation and apply such to the school environment. • Implementation of a coordinated school health program by school nurses improves health and education outcomes of students.	Care Coordination	I	5 C
25. Cross, J. H., Wait, S., Arzimanoglou, A., Beghi, E., Bennett, C., Lagae, L., . . . Harvey, G. (2013).	Discuss issues related to administration of rescue medication to children experiencing prolonged convulsive seizures	Evidence paper from review of practice guidelines, clinical reference texts, clinical research critiques.	(S): Review of guidelines and current school practices. (L): None noted.	• Provide clear guidance and education regarding administration of rescue medication in school by non-nurses. • Create and implement individual healthcare plan for students with seizures.	Care Coordination Seizure Action Plan Education/Training Clinical Practice Guideline	I	4 C

OTHER EBP RESOURCES (Non-research articles, electronic sources)								
Reference (Author, Year, Title)	**Purpose**	**Description (literature review, guideline, practice/policy, etc.)**	**Major Strengths (S) and Limitations (L)**	**Summary of Findings and Recommendations**	**Theme(s)**	**Quality/Level/ Strength of Evidence (See tables below**		
Are we failing to provide adequate rescue medication to children at risk of prolonged convulsive seizures in schools?	in the school setting.		Discuss issues related to administration of rescue medication to children experiencing prolonged convulsive seizures	• Comprehensive guidance regarding seizure management in the educational sector. • Establish a link between school and treating HCP, resulting in integration of care in medical, home, and school settings.				
26. Hartman, A. L., Devore, C. D. L., Doerrer, S. C., Section on Neurology, American Academy of Pediatrics, Council on School Health, American Academy of Pediatrics, and the SECTION ON NEUROLOGY, & COUNCIL ON SCHOOL HEALTH. (2016). Rescue medicine for epilepsy in education settings.	Highlights issues HCP should consider when prescribing rescue medication and creating school medical orders or emergency action plans for students with epilepsy.	Clinical report / expert opinion.	(S): Overview of pertinent issues related to management of seizures/epilepsy in school setting. (L): None noted.	• Prescribers should familiarize themselves with local and state regulations as well as school limitations. • A collaboratively (HCP, family, school) developed individualized action plan will benefit students prescribed with rescue medication. • Most effective action plan will include least restrictive medication choice (buccal or nasal vs. rectal) in the child's environment. • Action plan should include when to activate EMS. • Prescribers should provide appropriate education to school personnel or direct them to educational programs. • Action plan and transportation recommendations can be included in IEP or 504 plan. • Create school Emergency Action Plans using a modifiable, customizable template.	Rescue Medication Care Coordination Seizure Action Plan Education/Training Special Education	I	5	C

OTHER EBP RESOURCES (Non-research articles, electronic sources)								
Reference (Author, Year, Title)	**Purpose**	**Description (literature review, guideline, practice/policy, etc.)**	**Major Strengths (S) and Limitations (L)**	**Summary of Findings and Recommendations**	**Theme(s)**	**Quality/Level/ Strength of Evidence (See tables below**		
27. Individuals with Disabilities Education Act, 20 U.S.C. § 1400 (2004).	Federal law that mandates a free and appropriate public education to all students (regardless of disability) in the least restrictive environment.	Legal mandate.	NA	• Students have the right to receive services that are necessary to allow them to access their education environment. • Related services include school health and nursing services for students who qualify for special education.	Special Education	IV	1	A
28. Institute of Medicine. (2012). Epilepsy across the spectrum: Promoting health and understanding	To promote health and understanding of epilepsy among healthcare professionals and community stakeholders.	Expert panel recommendation based on evidence summaries.	(S): Comprehensive report based on high-quality evidence summaries addressing epilepsy across the lifespan and in various settings. (L): None noted.	• Increase timely referral and access to specialty care. • Reduce stigma associated with epilepsy through education and training. • Increase awareness of seizures/ epilepsy among healthcare professionals. • Increase education efforts among people with epilepsy and their families. • Schools must be alert to potential for social isolation, behavior/ mental health concerns, and developmental/cognitive delays among children with epilepsy. • It is crucial to meet students' learning needs and access to education environment by means of IEP or 504 plan. • Seizure first aid training is crucial among school personnel; available through Epilepsy Foundation, national and local affiliates.	Care Coordination Education/Training Rescue Medication Seizure Action Plan Special Education	I	1	A

OTHER EBP RESOURCES (Non-research articles, electronic sources)								
Reference (Author, Year, Title)	**Purpose**	**Description (literature review, guideline, practice/policy, etc.)**	**Major Strengths (S) and Limitations (L)**	**Summary of Findings and Recommendations**	**Theme(s)**	**Quality/Level/ Strength of Evidence (See tables below**		
29. Kälviäinen, R. (2015). Intranasal therapies for acute seizures.	Summarizes advancement in intranasal treatment of prolonged seizures and seizures clusters	Narrative Review	(S): 7 studies compared (L): Small sample sizes of comparative studies	• Intranasal midazolam effective and faster at aborting seizure activity than rectal diazepam • Intranasal midazolam is efficacious when administered by emergency department personnel, paramedics and caregivers in out-of-hospital and home settings. • Faster rate of elimination of midazolam may expose patients to a higher rate of seizure recurrence compared with diazepam; faster half –life may positively result in quicker return to baseline	Rescue Medication	I	4	B
30. Maglalang, P. D., Rautiola, D., Siegel, R. A., Fine, J. M., Hanson, L. R., Coles, L. D., & Cloyd, J. C. (2018). Rescue therapies for seizure emergencies: New modes of administration.	Describe alternate routes of administration (rectal, buccal, intrapulmonary, subcutaneous, intra-muscular, and intranasal) of seizure rescue therapies used to treat seizure emergencies and seizure clusters	Narrative review describing (1) anatomical, physiologic, and drug physicochemical properties that need to be considered when developing therapies for seizure emergencies and (2) products currently in development.	(S): Overview of alternate routes of rescue therapy administration, including products in use and currently in development (L): None noted	• Rectal, buccal, intramuscular, intranasal, subcutaneous, and intrapulmonary routes are currently used or are under development as rescue therapies • New approaches offer ease of use and convenience, and may lead to faster time of seizure cessation, resulting in fewer emergency department visits and improved quality of life.	Rescue Medication	I	1	A
31. National Institute for Health and Care Excellence. (2016). Epilepsies:	Evidence-based clinical practice guideline related to managing epilepsy and seizures in children, young	Evidence-based clinical practice guideline.	(S): Evidence analyzed by means of meta-analysis of RCTs, review of published meta-analyses,	• Management: a comprehensive care plan should be in place that is agreed upon between the individual, family/caregivers [may include school personnel] and primary/ secondary care providers.	Care Coordination Seizure Action Plan Rescue Medication	I	1	A

OTHER EBP RESOURCES (Non-research articles, electronic sources)								
Reference (Author, Year, Title)	**Purpose**	**Description (literature review, guideline, practice/policy, etc.)**	**Major Strengths (S) and Limitations (L)**	**Summary of Findings and Recommendations**	**Theme(s)**	**Quality/Level/ Strength of Evidence (See tables below**		
diagnosis and management (NICE Quality Guideline No. 137).	people and adults in primary and secondary care settings.		systematic review with evidence tables. (L): No specific recommendations for school-based care or management of seizures.	• HCPs have responsibility to educate others about epilepsy, including the individual (child/young adults) and school staff. • Give immediate emergency care and treatment to children who have prolonged (lasting longer than 5 minutes) or repeated convulsive seizures in the community. • Prescribe/administer buccal midazolam as first-line treatment in children with prolonged seizures in the community. • Treatment should be administered by trained clinical personnel OR family member or caregivers with the appropriate training (as agreed upon between family and HCP). • Depending on response to treatment and emergency action plan, call ambulance when: o Seizure continues 5 minutes after rescue medication has been administered. o There is a history of frequent serial seizures or child has convulsive status epilepticus, and this is the first episode requiring emergency treatment. o Systematic training for all caregivers. o Comprehensive clinical guidelines.	Education/training	I	1	A

OTHER EBP RESOURCES (Non-research articles, electronic sources)								
Reference (Author, Year, Title)	**Purpose**	**Description (literature review, guideline, practice/policy, etc.)**	**Major Strengths (S) and Limitations (L)**	**Summary of Findings and Recommendations**	**Theme(s)**	**Quality/Level/ Strength of Evidence (See tables below**		
32. Rehabilitation of Act of 1973, 29 U.S.C § 504	To prevent discrimination of individuals with disabilities in federally funded programs and activities.	Legal mandate.	NA	• Students must be provided with accommodations or interventions necessary to access their educational environment.	Special Education	IV	1	A
33. Shannon, R. A., & Kubelka, S. (2013). Reducing the risks of delegation: Use of procedure skills checklists for unlicensed assistive personnel in schools, part 1.	To illuminate legal and ethical considerations surrounding nursing delegation to UAP, especially related to children with special healthcare needs.	Professional policy/practice paper.	(S): Overview of critical issues related to delegation to UAP, including references that demonstrate the significance of making rescue medication accessible by training UAP to administer medication in the absence of the school nurse to avoid detrimental student health outcomes. (L): None noted.	• School nurses must adhere to professional principles of nursing delegation according to the stipulations of their state laws, State Nurse Practice Acts, and Board of Nursing Declarative Statements when addressing the needs and rights of students and proceeding with delegation to UAP. • Use of a procedure skills checklist to validate the competency of UAP and reduce risks associated with delegation of nursing procedures.	Rescue Medication Education/training	I	5	C

Grading the QUALITY of Evidence for School Nursing EBP Clinical Guidelines	
Quality	*Descriptor*
I	Acceptable quality: No concerns
II	Limitations in quality: Minor flaws and inconsistencies in the evidence
III*	Major limitations in quality: Many flaws in the evidence
IV*	Not acceptable: Major flaws in the evidence
**Do not include sources of quality levels III and IV in the synthesis*	

Grading the LEVEL of Evidence for School Nursing EBP Clinical Guidelines	
Level	*Descriptor*
1	Evidence from systematic reviews, meta-analysis, evidence guidelines, and evidence summaries (expert panel recommendations)
2	Evidence obtained from well-designed RCTs
3	Evidence from well-designed case-control and cohort studies and systematic reviews of descriptive and qualitative studies
4	Evidence from clinical research critiques, integrative literature reviews, practice guidelines, clinical reference texts, legal mandates
5	Evidence from expert opinion, case reports, professional policy, or position paper

STRENGTH of Recommendations for School Nursing EBP Clinical Guidelines		
	Strength	*Descriptor*
A	**Strong Evidence**	Based on consistent and good quality evidence; has relevance and applicability to school nursing practice
B	**Moderate Evidence**	Based on evidence of moderate rigor or with minor inconsistencies in quality; has relevance and applicability to school nursing practice
C	**Limited Evidence**	Based on evidence that is limited, low level, or has major inconsistencies in quality; has relevance and applicability to school nursing practice
D	**Insufficient Evidence**	Insufficient or no evidence upon which to make a recommendation; based on traditional practice alone
**Do not include sources of Strength Level D in CPG Recommendations*		

Appendix C

Basic Seizure First Aid Recommendations

Basic Seizure First Aid Procedures
For all seizures:
Stay calm and track time
Keep student safe
Do not restrain
Do not put anything in mouth*
Stay with student until fully conscious
Record seizure in log
For generalized tonic-clonic seizure:
Protect head
Keep airway open/watch breathing
Turn student on side
A Seizure Becomes an Emergency (ACTIVATE EMS) When:
Student has a first-time seizure
Convulsive (tonic-clonic) seizure lasts longer than 5 minutes
Student has repeated seizures without regaining consciousness
Student is injured or has diabetes
Student has breathing difficulties
Student has a seizure in water
For students with a known seizure disorder, it is the first episode requiring emergency treatment
Any concerns with airway, breathing, circulation, or other vital signs

*Except for buccal or oral seizure rescue medication, as ordered by HCP

Table created following review of: Centers for Disease Control and Prevention, 2017b; Epilepsy Foundation, 2014; National Institute for Health and Care Excellence, 2016.