School Nursing Evidence-Based

Clinical Practice Guideline: Students with Allergies and Risk for Anaphylaxis

National Association of School Nurses

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Author

Aimee Keller, DNP, FNP-BC
Nurse Practitioner, Massachusetts General Hospital
Boston, MA

NASN Lead

Kimberly J. Stanislo, DNP, APRN-CNP, LSN, CPNP-PC
Research Education and Practice Director
Silver Spring, MD

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Nichole Bobo, MSN, RN
NASN Director of Nursing Education
Silver Spring, MD

Cynthia Samuel, PhD, RN, CSN-NJ
School Health Nurse, Irvington Public Schools
Irvington, NJ

Andrea Tanner, PhD, RN, NCSN
NASN Consulting Research Strategist
Assistant Professor, Indiana University
Bloomington, IN

Julie Wang, MD
Professor of Pediatrics, Icahn School of Medicine at Mount Sinai
New York, NY

NASN would like to thank the following clinical practice guideline expert reviewers for their valuable contributions to the Clinical Practice Guideline:

Anne Fitzpatrick, PhD, MSCR, APRN, FAAN
Professor of Pediatrics and Nursing, Emory University
Director, Asthma Clinical Research Program, Children's Healthcare of Atlanta
Atlanta, GA

Robin A. Shannon, DNP, RN, PEL-CSN, NCSN, FNASN
Clinical Associate Professor, University of Illinois Chicago
Chicago, IL

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SCHOOL NURSING EVIDENCE-BASED CLINICAL PRACTICE GUIDELINE: STUDENTS WITH ALLERGIES AND RISK FOR ANAPHYLAXIS

Rationale

Allergic conditions affect about 50 million children and adults living in the United States (American Academy of Allergy Asthma & Immunology [AAAAI], 2020). This can include allergic rhinitis, asthma, eczema, allergic reactions, and many other allergic disease processes. The focus of the following document will be on the various types of allergic reactions and steps that can be taken to prevent or treat them. It is important to understand the basics of an allergic reaction to be able to do this. An allergic reaction can be IgE- or non-IgE-mediated in nature and can cause immediate or delayed signs and symptoms that can affect the nasal mucosa, eyes, skin, respiratory system, circulatory system, and gastrointestinal tract depending on the type of reaction.

Non-IgE mediated reactions are not fully understood but are thought to involve a cell-mediated response, such as the T-cells of the immune system (Cianferoni, 2020). Non-IgE-mediated reactions tend to be delayed in nature with the onset of signs and symptoms beginning hours to days after exposure to an allergen. Signs and symptoms typically include gastrointestinal related complaints, such as stomach pain, nausea, vomiting, diarrhea, and bloody stools (Cianferoni, 2020). Examples of non-IgE-mediated reactions include eosinophilic esophagitis (EoE), food protein-induced proctocolitis (FPIAP), and food-protein-induced enterocolitis (FPIES), which can present as acute or chronic reactions (Cianferoni, 2020). The diagnosis of a non-IgE-mediated reaction can be difficult as there are no biomarkers that can be used for diagnosis or monitoring. Diagnosis typically involves food challenges or diagnostic testing, such as endoscopies (Cianferoni, 2020). Treatment of non-IgE-mediated food allergies is primarily dependent on dietary restrictions, although medications such as steroids and proton pump inhibitors can be useful in minimizing symptoms of EoE and ondansetron and IV fluids can be helpful in managing FPIES (Cianferoni, 2020).

On the other hand, IgE-mediated reactions cause the immune system to produce IgE antibodies in response to a trigger. IgE antibodies stimulate mast cells and basophils to produce chemical mediators, such as histamine (AAAAI, 2023a). These chemical mediators cause an abrupt increase in vascular permeability, vascular smooth muscle relaxation, and bronchial smooth muscle constriction resulting in the signs and symptoms one experiences during an IgE-mediated allergic reaction. Most IgE-mediated reactions occur within minutes to 2 hours of exposure to a trigger (Watts & Marie Ditto, 2019). An IgE-mediated reaction can be unpredictable in occurrence and severity (AAAAI, 2023a).

Some IgE-mediated allergic reactions can be mild resulting in mild symptoms in only one body system. Mild allergic reactions may be self-limiting or can be treated with oral medications such as antihistamines (Cosme-Blanco et al., 2020; Davis & Kelso, 2018; Golden et al., 2017; Wang et al., 2017). Signs and symptoms of a mild allergic reaction can include the following (Food Allergy Research & Education [FARE], 2023):

- itchy/runny nose or sneezing
- itchy mouth
- a few hives or mild itch
- mild nausea or stomachache

IgE-mediated reactions can also be severe and life-threatening in nature. These types of reactions are known as anaphylaxis. According to the National Institute of Allergy and Infectious Diseases and Food Allergy and Anaphylaxis Network (NIAID/FAAN), "Anaphylaxis is highly likely when any **one** of the following three criteria are met:

1. Acute onset of an illness (minutes to several hours) with involvement of the skin, mucosal tissue, or both (e.g., generalized hives, pruritus, or flushing, swollen lips-tongue-uvula) *and at least one of the following:*
   - **a.** Respiratory compromise (e.g., dyspnea, wheeze-bronchospasm, stridor, reduced peak expiratory flow, hypoxemia)
   - **b.** Reduced blood pressure or associated symptoms of end-organ dysfunction (e.g., hypotonia [collapse], syncope, incontinence)
2. Two or more of the following that occur rapidly after exposure *to a likely allergen for the patient* (minutes to several hours):
   - **a.** Involvement of skin-mucosal tissue (e.g., generalized hives, itch-flush, swollen lips-tongue-uvula)
   - **b.** Respiratory compromise (e.g., dyspnea, wheeze-bronchospasm, stridor, reduced peak expiratory flow, hypoxemia)
   - **c.** Reduced blood pressure or associated symptoms (e.g., hypotonia [collapse], syncope, incontinence)
   - **d.** Persistent gastrointestinal symptoms (e.g., crampy abdominal pain, vomiting)
3. Reduced blood pressure after exposure to *known allergen for the patient* (minutes to several hours):
   - **a.** Infants and children: low systolic blood pressure (age specific) or greater than 30% decrease in systolic blood pressure
   - **b.** Adults: systolic blood pressure of less than 90 mm Hg or greater than 30% decrease from that person's baseline" (Sampson et al., 2006, p. 393).

To simplify the above, a reaction is considered severe or anaphylaxis if mild symptoms are present in more than one body system or if any of the following severe signs or symptoms are present (FARE, 2023):

- shortness of breath
- wheezing
- repetitive cough
- cyanosis
- pallor
- dizziness
- weak pulse
- fainting
- throat tightness
- throat hoarseness
- trouble swallowing
- trouble breathing
- swelling of tongue or lips
- many hives all over the body or widespread flushing
- repetitive vomiting
- severe diarrhea
- feeling something bad is about to happen, anxiety, or confusion

There are several types of anaphylactic reactions including: uniphasic, protracted, refractory, and biphasic. Uniphasic reactions are the most common and account for 80%-94% of anaphylactic reactions (Lieberman, 2023). Uniphasic reactions involve the peak of symptoms within hours of exposure to the allergen with resolution of symptoms within hours (Lieberman, 2023). Protracted anaphylaxis lasts hours to days without full resolution of symptoms (Lieberman, 2023). Refractory anaphylaxis is rare and often fatal as symptoms persist despite the administration of at least two doses of epinephrine (Francuzik et al., 2019). A biphasic reaction presents as a uniphasic reaction followed by a period of symptom resolution and subsequent recurrence of symptoms without re-exposure to the allergen. Biphasic reactions occur in up to 20% of patients (Sampson et al., 2006) and will typically occur within 8 hours of the initial allergic reaction but can be up to 72 hours later (Pourmand et al., 2018). The occurrence of biphasic reactions has been associated with delayed administration of epinephrine and anaphylaxis requiring more than one dose of epinephrine (Pourmand et al., 2018). There has not been an association made between biphasic reactions and the number of body systems involved in a reaction (Nomura et al., 2020). Biphasic reactions often require intensive therapy and hospitalization (Nomura et al., 2020). This highlights the importance of administering epinephrine early and activating emergency medical services to transfer individuals experiencing an allergic reaction to a local hospital for further monitoring.

Anaphylaxis can be fatal if not identified and treated quickly. Risk factors for anaphylaxis include allergies, asthma, previous anaphylactic reactions, and a family history of anaphylaxis (AAAAI, 2023b). Anaphylactic reactions are typically caused by foods, medications, and insect stings (Pflipsen & Vega Colon, 2020). In the United States food allergies can affect about 32 million people (FARE, 2023), medication allergies affect about 7% of the general population (Tanno et al., 2017), and stinging insect allergies can result in potentially life-threatening allergic reactions in 0.4%–0.8% of children and 3% of adults (American College of Allergy, Asthma & Immunology [ACAAI], 2023). In the pediatric population latex allergy can also be problematic, specifically in children with spina bifida. Latex allergy affects 40%-65% of children with this condition (Nucera et al., 2020). Regardless of the allergen, identification of symptoms consistent with an allergic reaction and anaphylaxis are critical to ensure timely treatment and care of the individual experiencing the reaction.

The disease burden associated with severe allergies, especially food allergies, includes personal, social, emotional, and financial factors (Cosme-Blanco et al., 2020; Waserman et al., 2021) and has become a key safety concern in homes, schools, and other settings. The educational burdens of allergies include (Patel et al., 2017):

- student's sense of safety, which can limit social interactions and participation in school-sponsored activities
- limited self-advocacy and communication skills, which can impact a student's sharing of needs and safety concerns
- parent's sense of safety, which can increase parental stress and anxiety and have a negative impact on the student's sense of safety and mental health
- increased risk-taking behaviors in adolescents, which can impact student safety, self-management skills, and access to self-carry epinephrine auto injector (EAI)
- increased reported sense of responsibility and empathy for others with special needs
- twice the likelihood of experiencing bullying, including verbal teasing and being threatened with food allergens for students with food allergies.

A safe and supportive school environment for students with allergies is critical for their safety and learning. This includes preparedness of the student, family, classroom, and school staff to proactively plan and implement risk reduction strategies to minimize actual or potential allergen exposures. An estimated one third of school nurses in the United States have provided emergency care to students with an allergic reaction during a school day (Kao et al., 2018). Morbidity and mortality associated with anaphylaxis can be greatly minimized through appropriate education and the use of preventative and protective measures (Kelso, 2023). School nurses are essential in promoting preventative measures, including care coordination related to student healthcare plans and educational training of school staff. All students at risk for anaphylaxis should have an allergy action plan (AAP) on file at school outlining student-specific triggers and management. In particular, the AAP should include the student's name, date of birth,

updated weight, and allergens. The plan should also include the medications and dosages to be used if a student has an allergic reaction, as well as the symptoms the medication should be used to treat (FARE, 2020).

Epinephrine is the first-line treatment for symptoms of allergic reactions; early use of epinephrine can improve outcomes and reduce hospitalizations (Campbell & Kelso, 2022). About 16-18% of students will experience their first food allergic reaction at school (Tsuang & Wang, 2016) and 24% of epinephrine administered in the school setting is for students or staff with an unknown allergy (FARE, 2016). The School Access to Emergency Epinephrine Act (2013) was signed into law, to encourage states to adopt laws requiring K-12 schools to have access to undesignated EAI or stock (non-student specific) EAI. The laws regarding stock epinephrine vary among states. Some states require schools to stock undesignated EAIs, while other states allow schools to stock EAIs and leave the decision to stock EAIs up to each district (FARE, 2016). Another difference is whether the law pertains to all K-12 schools in a specific state or just the public schools. It is important for school nurses to identify the state-specific laws and district policies related to allergies and EAIs where they practice. Stock EAIs in schools can be supported by programs offering free or reduced cost EAIs for qualifying schools and guidelines for setting up programs. Individual schools are responsible for identifying a licensed healthcare provider to prescribe the EAIs and procuring and maintaining the stock EAI supply. These can often be barriers for school districts to implement a stock EAI program.

School nurses provide leadership in the school setting to promote resilience, self-management, and health outcomes for students with chronic conditions, including allergies and anaphylaxis. Clinical Practice Guidelines (CPGs) support the school nurse in providing and coordinating high quality, standardized care that is safe and effective. This CPG will provide evidence-based practice (EBP) recommendations and resources for school nurses; contribute to improving and implementing allergy and anaphylaxis-related school policies; and ensure that children with allergies have the same opportunities for academic success and full participation in school activities as their peers without allergies. Preparedness efforts, including prevention and education, improve health outcomes of those at risk for allergic reactions (Canon et al., 2019; Wang et al., 2017). This CPG focuses on preparedness and response in schools for students (pre-kindergarten through 12th grade) with allergies and risk for anaphylaxis.

Purpose

The purpose of this CPG is to provide best practice recommendations for implementation by school nurses to improve outcomes and provide quality care to students at risk for allergic reactions and anaphylaxis. The focus of this CPG is to provide safe and supportive school and classroom settings for the student to learn in a low-risk environment. Students at risk for an allergic reaction should be able to participate fully in all academic, physical education, and extracurricular activities as outlined in the Office of Civil Rights (OCR) designation of a free and appropriate public education (FAPE) (U.S. Office of Civil Rights [OCR], 2020). This CPG includes practice recommendations and strategies to assist school nurses in their role of improving the health and safety of the school-aged child at risk for an allergic reaction and anaphylaxis. Student goals resulting from successfully implementing the guidelines include:

- improved management of allergen exposure and minimizing the risk for allergen exposure in school settings
- decreased time spent out of the classroom
- improved student academic success
- full participation in all school activities
- decreased allergic reactions and episodes of anaphylaxis
- improved quality of life
- improved mental well-being
- decreased social isolation

The care of students with allergies and risk for anaphylaxis is multifaceted and is done in collaboration with the student, family, medical healthcare team members, and the school healthcare team. Specific treatment

regimens established by the medical or school healthcare teams will not be discussed in detail within this CPG. Recommendations, therefore, are not given for monitoring of adherence, frequency of measurement, or assessment of impact. This CPG is intended as an overview to guide school nurses in implementing provider-developed treatment regimens, as well as applying nursing judgment, based on students' individual needs. Implications specific to complex treatment regimens are beyond the scope of this CPG. In addition, this CPG outlines steps specific to allergies and anaphylaxis. Other activities carried out by the school nurse for students with chronic conditions are expectations of evidence-based care for all students but are not specifically outlined in the CPG. These activities may include assessing and addressing student cultural practices, social drivers of health, developing student and family goals, and providing student-specific education and empowerment (Braveman et al., 2017; NASN, 2021; Ratterman et al., 2021; Schroeder et al., 2018).

Methodology

School Nursing Evidence-Based Clinical Practice Guideline: Students with Allergies and Risk for Anaphylaxis was developed according to the NASN Model for Developing School Nursing Evidence-Based Clinical Practice Guidelines (Shannon & Maughan, 2020).

This Guideline is intended as a decision-making tool to guide school nurses in implementing the most recent, evidence-based practice recommendations as of the date of publication. The results of future studies may require revisions to this Guideline to reflect new scientific data. The advancement in knowledge may be faster than the guidelines can be updated. This Guideline is not intended to create a rule or legal standard of care, nor should it be interpreted as encouraging, advocating, requiring, or discouraging any particular treatment. All decisions regarding care of students should be made by the healthcare team, family, and student in consideration of the student's particular health and circumstances, clinical presentation, and authorized policies. Clinical decisions involve the application of nursing judgment to the student's condition and available courses of action. Neither NASN nor its officers, directors, members, employees, or agents will be liable for any loss, damage, or claim with respect to any liabilities — including direct, special, indirect, or consequential damages — incurred in connection with this Guideline or reliance on the information presented in it.

Definitions and Abbreviations of Terms

504 Plan: Plan developed under Section 504 of the Rehabilitation Act of 1973. This federal legislation guarantees certain rights to people with disabilities. This was one of the first federal rights laws offering protection for individuals with disabilities. It set precedent for the Americans with Disabilities Act (ADA) of 1990. A 504 plan is a plan developed to ensure that a child who has a disability identified under the law receives accommodations to ensure their academic success and access to the learning environment. A 504 plan specifies the actions the school will take to keep the student with allergies and at-risk for anaphylaxis medically safe and ensure the student has the same access to education as other children and is treated fairly (ADA, 1990).

AAP: Allergy action plan. Allergy-specific treatment plan signed by the healthcare provider and outlining student-specific allergens and symptoms, treatment, and emergency contact information.

Appropriate Treatment or Care: According to evidence-based best practice (EBP) and/or current standards of care.

Caregiver: Members of a child's support system, including school staff, that may be involved in direct care of a student's health needs, other than parent/guardian and immediate family members.

CPG: Clinical practice guideline.

EAI: Epinephrine auto-injector.

EAP/ECP: Emergency action or care plan. A child-specific guide/plan for school staff to facilitate quick and appropriate response for an individual student emergency (NASN, 2022).

EBP: Evidence-based practice. EBP utilizes the most current, scientific research available. Research demonstrates that EBP improves the triple aim of improving the delivery of health care, improving patient outcomes, and decreasing costs.

EMS: Emergency medical services. A system of coordinated emergency medical response and care. Per the AAP and EAP/ECP, emergency medical services (often 911) are activated for circumstances including first-time reactions and after administration of EAI.

ED: Emergency department.

FALCPA: Food Allergen Labeling and Consumer Protection Act of 2004 (PL 108-282, Title II) requires food companies to specifically label major food allergens on packaging.

FAPE: Free and appropriate public education. The U. S. Office for Civil Rights (OCR) ensures schools provide a free appropriate public education (FAPE) to all qualified students with disabilities (generally, students with disabilities who are of school age), regardless of the nature or severity of their disabilities. Outlined in Section 504 of the Rehabilitation Act of 1973 and Title II of the Americans with Disabilities Act of 1990 (ADA, 1990).

HCP: Healthcare provider. Examples include allergists/immunologists, primary care provider, physician (MD/DO), physician assistant (PA), or nurse practitioner (NP/CNS) responsible for medical diagnosis and treatment and writing the medical orders.

IEP: Individualized Education Program. Developed under the Individuals with Disabilities Education Act, an IEP is created for students with a disability that impacts learning and requires special education services. Students who are eligible have a plan developed in collaboration with the student, family, and educational facility that is a road map of services and supports to ensure academic success for all students in the least restrictive environment. The IEP specifies what the school is going to do to meet the child's individual educational needs (IDEA, 2004; ESSA, 2015).

IgE-mediated reaction: An Immunoglobulin E-mediated reaction is when the immune system produces IgE antibodies in response to a trigger. IgE antibodies result in the production of chemical mediators that can cause an individual to experience hives, vomiting, difficulty breathing, hypotension, throat tightness, swelling, and other signs and symptoms. This type of reaction tends to occur minutes to 2 hours after an exposure to a trigger (Watts & Marie Ditto, 2019).

IHP: Individualized Healthcare Plan, called a nursing care plan in other settings. School nurses develop individualized healthcare plans to meet the needs of students. IHPs are written by nurses to guide nursing care. The plan is developed in partnership with the student and family and incorporates synthesis of the nursing assessment and the HCP medical orders. The plan focuses on meeting a student's health and academic goals (NASN, 2020b).

LPN/LVN: Licensed Practical Nurse or Licensed Vocational Nurse. Scope of practice requires supervision of RN. LPN/LVNs may not practice independently.

Medical Healthcare Team: The HCP, along with social workers, allergy specialists, and others who provide support for youth with allergies and anaphylaxis.

Non-IgE-mediated reaction: A non-Immunoglobulin E-mediated reaction is not fully understood but tends to be delayed in nature. Signs and symptoms of this type of reaction can occur hours to days after an exposure and are usually gastrointestinal related complaints, such as stomach pain, nausea, vomiting, diarrhea, and bloody stools (Cianferoni, 2020).

RN: Registered Nurse licensed by a state Board of Nursing. Scope of practice allows for independent practice based upon the nursing process, including care coordination.

School Healthcare Team: The school nurse (RN), school psychologist, school dietician, teacher, other school health services staff (LPN/LVN and UAP), and school personnel who provide support for youth with allergies and anaphylaxis.

School Nurse (SN): A registered nurse (RN) who works in a school setting. School Nurse may be a protected title in some states that requires an additional license, certification, or educational requirements.

Special Education Services: Free and appropriate education (FAPE) for children with disabilities that is designed to meet their unique needs and is administered by means of an IEP. Children ages 3 to 21 receive special education and related services under Part B of the Individuals with Disability Act (IDEA) of 2004 and amended through the Every Student Succeeds Act (ESSA) in 2015.

S/S: Signs and symptoms. A sign is a health issue that can be observed. A symptom is subjective – something the individual describes but that cannot be observed.

UAP: Unlicensed assistive personnel. Other similar terms used include but are not limited to assistive personnel, nursing assistive personnel, trained school personnel, unlicensed personnel, and unlicensed school personnel. In a school setting, this includes but is not limited to teachers, coaches, bus drivers, cafeteria staff, paraprofessional aides, and administrative building personnel. School nurses may delegate allergy and anaphylaxis care tasks that do not require nursing judgment to a UAP, in accordance with the principles of nursing delegation and state nurse practice acts. The school nurse facilitates the UAP training and provides ongoing supervision (NASN, 2020a; National Council of State Boards of Nursing [NCSBN] & American Nurses Association [ANA], 2019).

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, 2020). Once a body of literature was located, the Clinical 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.

The search inclusion criteria included English language, peer-reviewed, academic journals published between 2017 and 2023 (dates chosen to capture the current body of evidence when the literature review was conducted starting with five years at the beginning of the process in 2022). Studies focusing on children outside school environments such as camps and daycare were retained as relevant information, as management in non-acute community settings is applicable to the school environment. Systematic or scoping reviews were included. Evidence-based internet sources were included. Additionally, the websites of the Centers for Disease Control and Prevention, NASN, FARE, AAAAI, ACAAI, and American Academy of Pediatrics were searched to locate toolkits, guidelines, EBP resources, training resources, and expert panel recommendations specific to the care and management of students with allergies and those at risk for anaphylaxis. The following criteria were used to determine the appropriateness of inclusion into the literature review: high quality EBP evidence; relevant to school nursing coordination of care with allergies; school-based and community interventions for students with allergies; international studies of the pediatric and adolescent population with allergies that have relevance to U.S. school nursing; studies including students, parents, guardians, or caregivers to represent their view; and systematic reviews that included the adult and pediatric populations. Studies were excluded based on relevance to population (school-age children and school nursing) and quality of evidence.

Using multiple electronic databases (i.e., CINAHL, PubMed, Educational Resources Information Center [ERIC]) a search strategy combined the following key word terminologies in multiple combinations: allergies, food, food allergy, food allergies, latex allergy, sting allergy, allergic reaction, allergic reactions, anaphylaxis, children, children NOT adults, anaphylaxis treatment, treatment, anaphylaxis AND treatment, management, schools, patient care plan, school, patient care plan, care plan, emergency care plan, model school policy for allergy and anaphylaxis, food allergy policy, school safety, school nurse, training, training program, community, epinephrine, latex allergy, latex AND allergy, venom allergy, and venom AND allergy. Quick Filter Criteria were applied to the articles and EBP resources. All duplicate articles were also removed prior to analysis. See Figure 1 for PRISMA flow diagram that reports out the results of the literature review (Page et al., 2021).

Critical Appraisal of Evidence

The CPG author and NASN lead conducted initial and subsequent appraisals of the evidence. Sources of evidence were appraised and evaluated according to the level, quality, and strength of practice recommendations (see Appendix B for appraisal rating tools). Only sources meeting the specified criteria were included in the final appraisal. Each reviewer added domains of care to each source, which were then compared for accuracy and agreement. Differences of opinion between the reviewers regarding select references were resolved with discussion and a more critical appraisal of the relevant sources until consensus was achieved. The final body of evidence was critically appraised to establish level, quality, and subsequent strength of practice recommendations (Appendix C). A group of subject matter experts in allergy and anaphylaxis, including practicing school nurses and healthcare providers, reviewed and contributed to the evidence appraisal and practice recommendations. An additional panel of experts in clinical guidelines used the AGREE II Instrument to assess the quality of the Guideline and recommendations for use. All panelists and reviewers provided a declaration of their conflict of interest and the reviews were double-blind. Selected modifications based on expert panel and reviewer critical appraisal were incorporated into the Guideline and practice recommendations. NASN also completed an independent review. Reduction of bias and increase in

validity were achieved through the aforementioned multiple rounds of reviews conducted by stakeholders with expertise in allergy and anaphylaxis, school nursing practice, and CPGs.

Translation into Practice Recommendations

The following practice recommendations are based on the most recent, high-quality evidence to inform professional school nursing care of students with allergies and anaphylaxis. According to the procedures in the *Model for Developing School Nursing Evidence-Based Clinical Practice Guidelines* (Shannon & Maughan, 2020), recommendations are organized by the following domains of care: care coordination, care planning, education/training, leadership/advocacy, mental health, stock epinephrine, policies, and emergency medication. Recommendations are specific to allergy and anaphylaxis and so do not outline cultural, specific developmental stage, and other contextual factors that must be addressed in each step of the nursing process. Nursing diagnoses examples, both actual and potential, relate to the focus of care identified by the school nurse after critical synthesis of the nursing assessment data and related HCP medical orders. This list is not meant to be all inclusive; nursing diagnoses should be individualized to meet student and family specific healthcare needs and goals. Practice recommendations are intended to support, not replace, nursing judgement (see disclaimer).

Although there is strong evidence surrounding the treatment and management of allergies and anaphylaxis, research specific to the school setting is limited. After reviewing the available evidence, the panelists and reviewers believe the students will benefit from the support and safety outlined in these guidelines. It is therefore recommended that the *School Nursing Evidence-Based Clinical Practice Guideline: Students with Allergy and Anaphylaxis* be adopted into practice. School nurse experience, workload, resources, and organizational/leadership support vary and may influence how quickly these guidelines may be fully implemented and adopted. NASN will facilitate the implementation and adoption of *School Nursing Evidence-Based Clinical Practice Guideline: Students with Allergies and Risk for Anaphylaxis* to professional school nursing practice through education and ongoing support. Further research that tracks the implementation and outcomes for using guidelines should also be conducted. The Guideline and implementation toolkit will be available on the NASN Learning Center website free and accessible to all and will be disseminated via NASN education programs and communications. Guidance on implementing this CPG (utilizing the 3S Model) into practice can be accessed in Appendix D.

School Nursing Evidence-Based Clinical Practice Guideline:
Students with Allergies and Risk for Anaphylaxis Translation into Practice Recommendations

Allergy and Anaphylaxis Guidelines	Domains of Care (Themes)	References by Strength* (ABC) See Appendix B & C
ASSESSMENT The school nurse will assess: ■ Student health history. ○ Student allergies: • IgE-mediated. - Type of food allergy. - Type of venom allergy. - Type of drug allergy. - Type of vaccine allergy. - Latex allergy. • Non-IgE-mediated. - Eosinophilic Esophagitis (EoE). - Food Protein Induced Enterocolitis (FPIEs). ○ Other medical conditions of the student, including: • Asthma. ■ Updated Allergy Action Plan (AAP) and Emergency Action Plan (EAP)/Emergency Care Plan (ECP) in place. ○ Completed within past year. ○ Updated as needed throughout the year if change in condition. ■ Barriers to using epinephrine auto-injector (EAI). ■ Student's ability to self-carry and self-administer epinephrine auto-injector (EAI). ○ Developmentally appropriate. ○ Student's ability to self-administer medication correctly. ○ Periodic spot checks for medication access, expiration date, and verification of skills check. ■ Communication system. ○ Meet with everyone caring for students during the day to review allergen avoidance plan, how to recognize allergic reactions, and how to respond to allergic reactions. ○ Communicate with healthcare team if AAP or EAP/ECP is not clear or lists special circumstances. ■ School and district policies, protocols, and procedures related to: ○ Training of staff. • Current content. • Frequency. • Who is required to undergo training? • Assessing knowledge retention.	Care Planning	A: B: 6, 18, 40 C: 1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 13, 14, 17, 21, 22, 24, 27, 29, 32, 33, 34, 36, 39, 44, 46, 47
	Care Coordination	A: B: 6, 40 C: 1, 2, 3, 5, 7, 8, 9, 11, 13, 14, 17, 22, 24, 27, 29, 32, 33, 34, 39, 44, 46, 47
	Stock epinephrine	A: B: 16, 48 C: 20, 27, 35, 42, 43, 47
	Education/Training	A: B: 40 C: 1, 2, 3, 4, 5, 7, 8, 9, 11, 12, 13, 14, 15, 17, 19, 20, 22, 23, 26, 27, 32, 33, 34, 35, 37, 38, 43, 44, 45, 46, 47
	Emergency Medication	A: B: 40, 48 C: 1, 2, 3, 4, 8, 9, 10, 11, 13, 17, 22, 27, 28, 32, 35, 36, 42, 43, 47

○ Stock epinephrine
  • Storage location.
  - Is a key needed to access?
  - Temperature controlled?
  • Who orders the stock epinephrine (i.e., MD, PA, NP)?
  • Who supplies/funds the stock epinephrine?
  • Who can administer stock epinephrine?
  - Dependent on state and local guidelines.
  » Clarify if student needs diagnosis of allergy condition that could result in anaphylaxis for UAP to administer, especially in setting of first-time anaphylaxis.
○ EAI self-carry policy.
  • Self-carry specific paperwork/procedure.
○ Delegation of UAP that can administer emergency/rescue medications if:
  • School nurse is unavailable at school.
  • Student is on a field trip.
  • First time reaction.
○ Documentation of allergic reactions and treatment.
○ Anti-bullying policy.
	Policies	A:

		B: 40, 48
		C: 1, 2, 3, 4, 5, 8, 9, 11, 13, 14, 17, 19, 20, 22, 23, 27, 28, 32, 33, 34, 37, 38, 43, 44, 47
	Mental Health	A:
		B: 40
		C: 5, 13, 19, 20, 22, 26, 32, 33
NURSING DIAGNOSES ■ Risk for social isolation ■ Ineffective therapeutic regimen management ■ Ineffective breathing pattern ■ Impaired gas exchange ■ Decreased cardiac output ■ Risk for injury ■ Altered tissue perfusion ■ Acute pain ■ Risk for fluid imbalance ■ Effective self-management of anaphylaxis ■ Risk for anxiety ■ Deficient knowledge ■ Fear ■ Health awareness ■ Risk for environmental hazards	Care Planning	A:
		B: 6, 18
		C: 3, 4, 7, 9, 11, 13, 14, 17, 19, 20, 22, 23, 24, 26, 27, 28, 29, 30, 31, 32, 33, 34, 36, 42, 43, 44, 46, 47
	Care Coordination	A:
		B: 6, 18
		C: 4, 7, 9, 11, 13, 14, 17, 19, 22, 23, 24, 26, 27, 28, 32, 33, 34, 36, 44, 46, 47
	Education/Training	A:
		B: 6, 18, 40, 41
		C: 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 17, 19, 20, 21, 22, 23, 25, 26, 27, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 42, 43, 44, 45, 47

	Emergency Medication	A:
		B: 6, 18, 40, 41, 48
		C: 2, 3, 4, 5, 8, 9, 10, 11, 21, 22, 27, 28, 29, 31, 33, 35, 36, 39, 42, 43, 44, 46, 47
	Leadership/Advocacy	A:
		B: 6, 16, 40, 48
		C: 5, 9, 13, 14, 17, 19, 20, 22, 23, 24, 26, 27, 28, 32, 33, 34, 35, 38, 43, 44, 45, 47
OUTCOMES IDENTIFICATION The student will: ■ Receive health and educational support through use of AAP, EAP/ECP, IHP, 504 Plan, and/or IEP. ■ Receive support to safely participate in school activities such as birthday parties and lunch. ○ Avoid bringing food for parties or rewards. ○ Proper cleaning protocols are followed. ○ Proper handwashing protocols are followed. ■ Receive support to safely participate in school sponsored activities such as field trips and sports. ○ Chaperone/teacher/staff/coach is trained in recognizing and treating allergic reactions. ■ Experience reduced risk of bullying in the school setting. ■ Receive support and guidance to effectively self-carry and self-administer emergency medications and manage allergic reactions. ■ Receive appropriate emergency treatment, as ordered by HCP and written in AAP and EAP/ECP, in the school setting if experiencing an allergic reaction. ■ Be transported to the ED by EMS for further assessment and treatment if: ○ Epinephrine has been administered for the allergic reaction. ○ The student does not have a history of allergies and is experiencing symptoms of an allergic reaction for the first time. ■ Receive appropriate emergency treatment if experiencing an allergic reaction for the first time in the school setting.	Care Planning	A:
		B: 6, 40
		C:1, 2, 3, 4, 5, 7, 8, 9, 11, 13, 14, 17, 18, 19, 20, 21, 22, 24, 26, 29, 30, 32, 33, 34, 36, 39, 44, 46, 47
	Care Coordination	A:
		B: 6, 18, 40
		C: 1, 2, 3, 4, 5, 7, 9, 11, 13, 14, 17, 19, 20, 22, 24, 26, 29, 30, 32, 33, 34, 36, 39, 44, 46, 47
	Education/Training	A:
		B: 6, 18, 40, 41, 48
		C: 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 42, 43, 44, 45, 46, 47
	Emergency Medication	A:
		B: 6, 16, 18, 40, 41, 48
		C: 1, 2, 3, 4, 8, 9, 10, 11, 13, 14, 17, 20, 21, 22, 26, 27, 28, 29, 31, 35, 36, 42, 43, 46, 47

	Policies	A:
		B: 6, 16, 40, 41, 48
		C: 5, 9, 11, 13, 14, 17, 19, 20, 21, 22, 23, 26, 27, 28, 32, 33, 34, 35, 42, 43, 44, 45, 46, 47
	Mental Health	A:
		B: 39
		C: 5, 9, 13, 19, 20, 21, 22, 26, 32
	Advocacy	A:
		B: 6, 40, 48
		C: 6, 8, 9, 11, 13, 14, 17, 19, 20, 21, 22, 23, 24, 26, 28, 32, 33, 34, 43, 44, 47
PLANNING The school nurse will: ■ Collaborate with the child's HCP to obtain an up-to-date AAP, EAP/ECP, and orders to be used in the school setting. ■ Collaborate with students, families, school administrators, and HCP to identify and train school personnel to administer emergency medications in the absence of the school nurse, in accordance with district policies, competency training and criteria, and state Nurse Practice Act regulations. ■ Review anti-bullying policy with all school staff. ○ Prevention of bullying. ○ Bullying risk associated with allergies. ○ Identifying behavior that could be indicative of bullying. ○ Steps that need to be taken if bullying or teasing is witnessed. ○ How to support a student that is being bullied or teased. ■ Train all school staff ○ Prevention of food allergic reactions • Labeling foods prepared in school café per FALCPA Guidelines. • Instituting cleaning protocols. • Communicating "food allergen" aware spaces not "allergen free." • Consider restricting/banning foods in individual classrooms/cafeteria if developmentally indicated for the child; universal bans are not evidence-based. ○ Prevention of insect sting reactions • Remove nests. • Keep insecticides available. • Measures to limit exposure while eating and drinking outside, especially near trash cans. • Measures to prevent stinging insects from entering school (intact window screen, closed doors).	Care Planning	A:
		B: 6,18, 40
		C: 1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 19, 20, 21, 22, 24, 26, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 39, 42, 43, 44, 46, 47
	Care Coordination	A:
		B: 6, 18
		C: 2, 3, 4, 7, 8, 9, 11, 13, 17, 19, 24, 26, 27, 32, 33, 34, 36, 43, 46, 47
	Stock Epinephrine	A:
		B: 16, 48
		C: 5, 20, 27, 28, 35, 42, 43, 47
	Education/Training	A:
		B: 6, 18, 40, 41, 48
		C: 1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 19, 20, 21, 22, 23, 25, 26, 27, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 42, 43, 44, 45, 46, 47

- Prevention of latex exposure
  - Identify possible sources and opportunities for exposure, eliminate if possible.
  - Use nonlatex gloves for healthcare delivery, food prep, housekeeping, etc.
  - Remove healthcare supplies containing latex (bandages, gloves, medical tape, catheters, etc.).
  - Check BP cuff and stethoscope for latex materials.
  - Remove supplies with latex from classroom such as erasers, rubber bands, art supplies, balloons, etc.
  - Remove playground/gym equipment with latex such as rubber mats, balls, etc.
  - Avoid foods that are cross-reactive with latex such as banana, kiwi, avocado, chestnut, white potato, and tomato.
  - Post signage for latex-free spaces.
- Recognizing types of allergic reaction
  - IgE-mediated
    - Food
    - Venom
    - Drug
    - Vaccine
    - Latex
  - Non IgE-mediated
    - Eosinophilic Esophagitis
    - Food Protein Induced Enterocolitis
- Identifying severity of an IgE-mediated allergic reaction.
  - Mild
    - 1 mild symptom
      - » Itchy or runny nose, sneezing
      - » Itchy mouth
      - » A few hives or mild itch
      - » Mild nausea or discomfort
  - Severe
    - More than 1 mild symptom in multiple body systems (see above)
    - 1 severe symptom
      - » Shortness of breath, wheezing, or repetitive cough
      - » Pale or bluish skin, faintness, weak pulse, or dizziness
      - » Tight or hoarse throat, trouble breathing, or trouble swallowing
      - » Significant swelling of tongue or lips
      - » Many hives over body
      - » Repetitive vomiting, severe diarrhea
      - » Feeling something bad is about to happen, anxiety, or confusion.
- Managing IgE-allergic reactions
  - Mild reactions
    - 1st or 2nd generation antihistamines
      - » Consider replacing Diphenhydramine with Cetirizine as it is longer lasting, not as sedating/non-sedating in most, and takes effect in same amount of time.
      - » Continue to monitor the student for worsening symptoms and escalate therapy according to the AAP if necessary.

Emergency Medication	A:
	B: 6, 16, 40, 41, 48
	C: 1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 13, 14, 17, 19, 20, 21, 22, 23, 27, 28, 29, 31, 32, 33, 35, 36, 42, 43, 46, 47
Policies	A:
	B: 6, 16, 18, 40, 48
	C: 3, 4, 5, 7, 8, 9, 11, 12, 13, 14, 15, 17, 19, 20, 22, 23, 24, 26, 27, 28, 32, 33, 34, 35, 37, 38, 42, 43, 44, 45, 46, 47
Mental Health	A:
	B: 40
	C: 5, 9, 13, 20, 21, 22, 26, 44

- Severe reactions
  - Epinephrine
  - Call 911 after epinephrine is given.
  - Consider giving a second dose of epinephrine if there is no improvement in symptoms in accordance with AAP.
- Managing non-IgE-mediated allergic reactions
  - Symptom identification/management
  - FPIES
    - Ondansetron (Zofran)
    - Hydration status
    - Notifying parents
  - Eosinophilic Esophagitis
    - Notifying family
    - Support dietary restrictions
    - Psychosocial support
- Epinephrine auto-injector training
  - Review various types of EAIs students at the school have
    - Auvi-Q, EpiPen, Adrenaclick, etc.
  - Site of injection
  - Expiration date
  - Storage of EAI
  - How long to hold EAI in place
  - Position of patient when giving EAI
  - Who can administer
  - Monitoring/follow up care
  - School communication protocol

- Offer education to students and family on recognition and management of allergic reactions.
- Advocate for the most effective/appropriate medication based on presenting symptoms of an allergic reaction.
  - Mild vs severe symptom treatment of IgE- mediated reaction
  - IgE vs non-IgE allergic reactions
- Ensure stock EAI is available on school grounds (if applicable).
- Consult with student to determine readiness and appropriateness to self-carry EAI.
- Develop IHP to address student's individual's needs related to allergies and anaphylaxis, including (but not limited to):
  - Food
    - Avoidance of food allergen(s).
      - Prevent food being brought in for parties.
      - Prevent food being used for rewards in classroom.
      - Allergen-free classroom if student with food allergies is not developmentally capable of avoiding food.
      - Avoid offering unlabeled food in school settings.

○ Latex • Avoidance of latex in school settings. ○ Stinging Insect • Avoidance of stinging insects. • Removal of visible stinging insect nests on school grounds. • Frequent emptying of trash cans in outdoor eating and play spaces. ○ Enforcing cleaning policies/protocols in classrooms, cafeterias, and outdoor spaces (i.e., trash cans). ○ Maintain a copy of AAP and EAP/ECP in the classroom. ○ Ensure teacher/staff in classroom are aware of allergens and comfortable recognizing and treating an allergic reaction. ○ Development and enhancement of student self-management skills. ○ Development and enhancement of social and emotional support skills. ○ Collaborate with teachers and family to plan for field trips.		
IMPLEMENTATION The school nurse will: ■ Identify or develop policies, protocols, and procedures related to: ○ Allergic reaction recognition and management training. ○ Epinephrine auto-injector training. ○ Medication administration to allow for delegation of rescue medication administration (if allowed by state/local policies) or plan for medication administration if school nurse is absent. ○ Develop/maintain a policy to obtain and use stock epinephrine auto-injectors. • Who orders the stock epinephrine (i.e., MD, PA, NP). • Who supplies/funds the stock epinephrine. • Storage location and access. • Who can administer stock epinephrine. - Dependent on state and local guidelines. » Clarify if student needs diagnosis of allergy condition that could result in anaphylaxis for UAP to administer, especially in setting of first-time anaphylaxis. ○ Resources and support to ensure proper labeling of food offered at school per FALCPA Guidelines. ○ Resources and support to ensure adherence to special diets. ○ Resources and support to ensure latex free settings in schools. ○ Medical emergency preparedness and response plan for allergic emergencies. ○ Anti-bullying policy ■ Implement AAP, IHP, EAP/ECP, 504 plan, and IEP as appropriate and communicate with student, family, school personnel, and HCP to improve and revise as needed. ■ Provide evidence-based allergic reaction education and training, including prevention, food policies, food label reading, stinging insect avoidance measures, latex avoidance measures, reviewing AAP, epinephrine auto-injector training, medication management, and first aid to schoolteachers, staff, and students (when appropriate). ○ Review student specific considerations with personnel that work directly with a student, per EAP/ECP and IHP. ○ Consider age-appropriate educational programming for students to promote community support and increased awareness of allergens/risks among classmates.	Care Planning	A: B: 6, 18, 40 C: 1, 3, 4, 5, 7, 8, 9, 10, 11, 13, 14, 17, 19, 20, 21, 22, 23, 24, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 38, 39, 43, 44, 46, 47
	Care Coordination	A: B: 6, 40 C: 1, 3, 4, 7, 8, 9, 11, 13, 14, 17, 19, 20, 22, 23, 24, 26, 27, 28, 33, 34, 36, 43, 44, 46, 47
	Stock Epinephrine	A: B: 16, 48 C: 5, 20, 27, 28, 35, 42, 43, 47
	Education/Training	A: B: 6, 18, 40, 41 C: 1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 19, 20, 21, 22, 23, 24, 25, 27, 28, 29, 30, 31, 32, 33, 34, 36, 37, 38, 42, 43, 44, 45, 47

- Establish collaboration between school nurses, families/caregivers, and HCP to ensure consistent communication.
  - School nurses will communicate allergic reactions and medication administration to families and HCP as soon as possible.
  - Communication from family of exposures, reactions, and outcomes outside of school to the school nurse.
- Document according to school policy, protocols, and procedures.
  - Student/school nurse visits and disposition.
  - Treatment and student response.
  - Medications administered.
  - Follow-up and updates to procedure for improvement.

Emergency Medication	A:
	B: 6, 16, 18, 40, 41, 48
	C: 1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 19, 20, 21, 22, 27, 28, 31, 35, 36, 39, 42, 43, 46, 47
Policies	A:
	B: 6, 16, 18, 40, 41, 48
	C: 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 19, 20, 21, 22, 23, 24, 26, 27, 28, 31, 32, 33, 34, 35, 37, 42, 43, 44, 45, 46, 47
Advocacy	A:
	B: 16
	C: 4, 5, 8, 9, 11, 13, 14, 17, 19, 20, 22, 26, 27, 28, 33, 34, 35, 44
Mental Health	A:
	B: 40
	C: 5, 9, 13, 19, 20, 21, 22, 26, 32, 44

EVALUATION

The school nurse will evaluate:

- The number of students diagnosed with a food allergy.
- The number of students diagnosed with stinging insect allergy.
- The number of students diagnosed with latex allergy.
- The number of students diagnosed with other allergies at risk for anaphylaxis.
- The number of students that experience allergic reaction symptoms for the first time in school.
- The number of students that have an AAP and EAP/ECP in place.
- The number of students that have an IHP, 504 plan, and/or IEP to address allergy needs at school.
- Student and caregiver satisfaction with care coordination efforts of the school.
- Number of students that self-carry epinephrine auto-injectors.
- Number of students that have been bullied or teased about their allergies.
- Number of self-carry spot checks completed by school nurse and results.
  - EAI present
  - EAI expiration date
  - Student skills check for self-administration

Care Planning	A:
	B: 6, 40
	C: 2, 3, 4, 7, 8, 9, 11, 13, 14, 17, 19, 20, 22, 24, 26, 27, 31, 32, 33, 34, 36, 37, 43, 44, 46, 47
Care Coordination	A:
	B: 6, 40, 41
	C: 3, 4, 7, 8, 9, 11, 13, 17, 19, 20, 22, 24, 26, 27, 32, 33, 34, 36, 43, 44, 46, 47
Stock Epinephrine	A:
	B: 16, 48
	C: 2, 5, 20, 27, 28, 35, 42, 43, 47

▪ Number and effectiveness of current training in place.
▪ Frequency of allergic reaction training among school personnel.
▪ The number of students who have an allergic reaction in school.
▪ The treatment received by a student having an allergic reaction.
  ○ Administered by a school nurse?
  ○ Administered by an UAP?
▪ The number of times stock epinephrine was administered.
  ○ Known allergy at time of administration?
  ○ Who administered it?
▪ The disposition and outcome of students who have an allergic reaction in school: EMS and ED, home, or return to class.
▪ Emergency response of school personnel in the event of an allergic reaction.
▪ Barriers to appropriate use of epinephrine by school personnel.
	Education/Training	A:

		B: 6, 40
		C: 2, 3, 4, 5, 9, 10, 11, 12, 13, 14, 15, 17, 20, 23, 26, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, 42, 43, 44, 45, 46
	Emergency Medication	A:
		B: 6, 16, 18, 40, 41, 48
		C: 2, 3, 4, 5, 8, 9, 10, 11, 14, 17, 19, 20, 27, 28, 29, 31, 33, 35, 36, 42, 43, 46, 47
	Policies	A:
		B: 6, 16, 18, 40, 41, 48
		C: 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 17, 19, 20, 22, 23, 26, 27, 28, 30, 31, 32, 33, 34, 35, 37, 38, 42, 43, 44, 45, 46, 47
	Advocacy	A:
		B: 6, 40
		C: 4, 13, 17, 19, 20, 33, 34, 35, 43, 46
	Mental Health	A:
		B: 40
		C: 5, 9, 13, 21, 22, 26, 44

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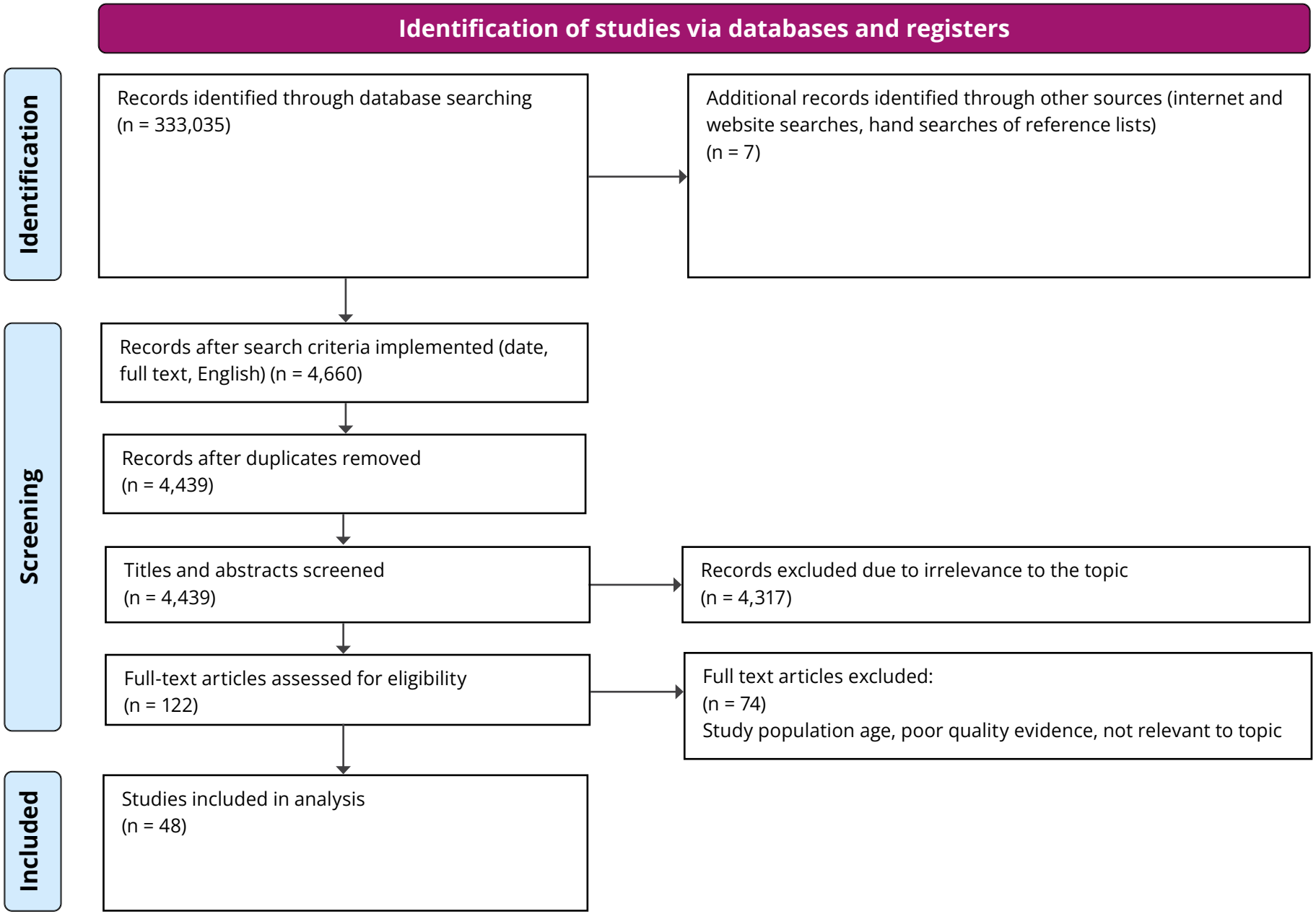
FIGURE 1

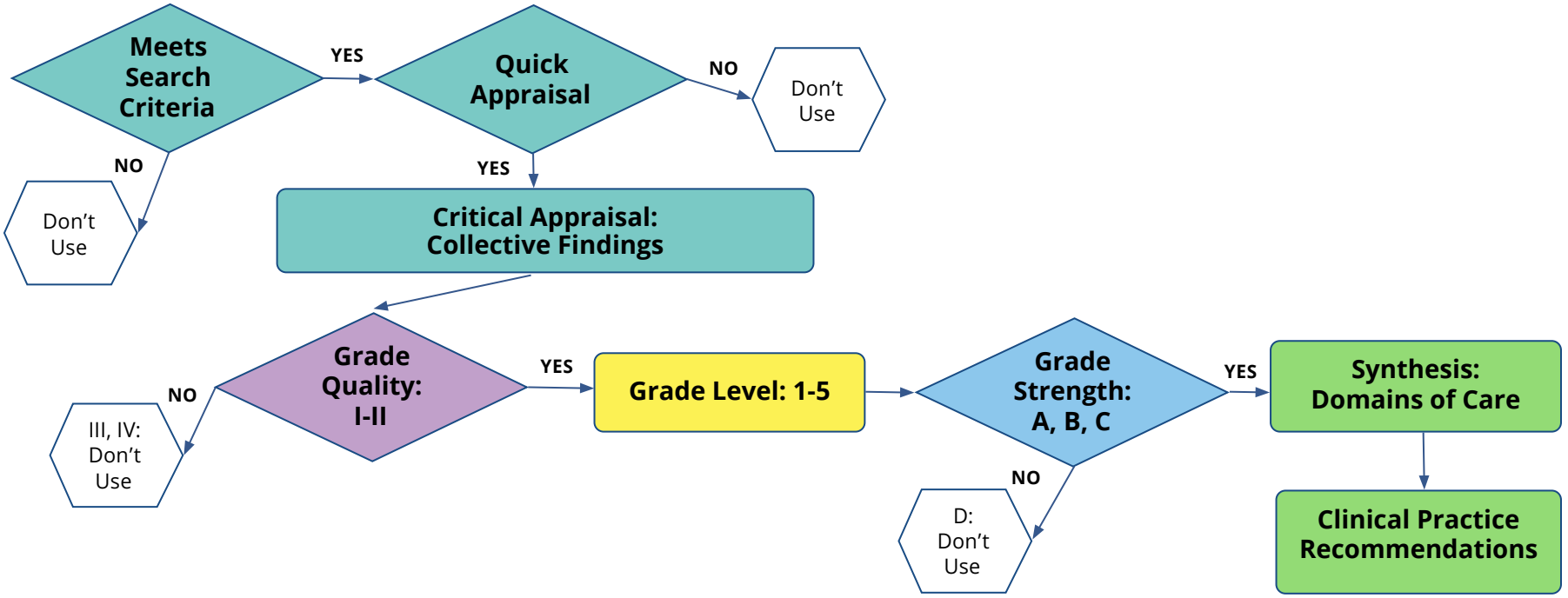
PRISMA Flowchart of Studies Included in the Literature Review



Page et al. (2021) The PRISMA 2020 statement: An updated guideline for reporting systematic reviews.

APPENDIX A

Clinical Practice Guideline Evidence Decision Tree



APPENDIX B

Grading of Quality, Level, and Strength of Evidence

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 D in CPG Recommendations.*		

APPENDIX C

Collective Findings Table: Critical Appraisal of Evidence

Table 1: *Collective Findings Tables: Critical Appraisal of Evidence*

Reference (Author, Year, Title)	Purpose/ Research Question	Study Design, Sample Size, & Characteristics	Major Strengths (S) and Limitations (L)	Summary of Findings and Recommendations	Domains of Care (Themes)	Quality/Level/ Strength of Evidence (See Appendix B)		
1. Agyemang, A., & Nowak-Wegrzyn, A. (2019). Food protein-induced enterocolitis syndrome: A comprehensive review. *Clinical Reviews in Allergy & Immunology, 57*, 261-271. https://doi.org/10.1007/s12016-018-8722-z	Summary of pathology, clinical course and prognosis of disease, and management guidelines of FPIES	Qualitative systematic review	(S)- Review of articles on a condition that is not well understood (L)- Studies were focused on infants	• Recurrent vomiting that occurs 1-4 hours after ingesting the offending agent; can also have watery diarrhea 5-10 hours after eating the food • Management of a reaction: stop eating the offending agent; rehydration; ondansetron; steroids	Diagnosis and management of FPIES	II	3	C
2. Aktas, O. N., Kao, L. M., Hoyt, A., Siracusa, M., Maloney, R., & Gupta, R. S. (2019). Implementation of an allergic reaction reporting tool for school health personnel: A pilot study of three Chicago schools. *The Journal of School Nursing, 35*(5), 316-324. https://doi.org/10.1177/1059840518777303	Develop a user-friendly, online food allergy (FA) registry that would allow school health professionals to track students' food-related allergic reactions Test the utility of the reporting system to help identify the prevalence, location, and characteristics of allergic reactions, then using the data to improve FA management	Descriptive n = 6 Six school nurses from three schools Data analyzed over 12-month period	(S)- Easy-to-use tool (OScARR) helps improve the documentation of reactions (L)- Implemented in three private schools that have full-time nursing coverage and extensive food allergy policies, which could have impacted the likelihood of occurrence and treatment of allergic reactions (L)- Not generalizable	• There were 4,244 students enrolled. • All three schools had policies regarding stock epinephrine on campus; all staff had training on food allergies/reaction management/epinephrine use, restrictions of food that could be brought into school, and asthma/ anaphylaxis action plans. • No food allergy education and training for students was offered. • Twenty allergic reactions were reported in the tool. Seventeen of the reactions occurred in students with a history of food allergy, and three of the reactions occurred	Documenta-tion Policies Allergy action plan Treatment training (surrounding food allergy prevention, recognition, and treat-ment) Storage of epinephrine	II	3	C

				in students with no history of food allergy. Five of the reactions were anaphylaxis. • The majority of the reactions occurred in the classroom, followed by the cafeteria. • All 20 reactions got antihistamines and five of the reactions received epinephrine administered by a school nurse. • In three cases, the epinephrine was on the person. In two cases, the epinephrine was in the nurse's office.				
3. Alvarez-Perea, A., Tanno, L. K., & Baeza, M. (2017). How to manage anaphylaxis in primary care. *BioMed Central, 7*(45), 1-10. https://doi.org/10.1186/s13601-017-0182-7	Management of anaphylaxis in primary care setting Identify gaps of anaphylaxis management in primary care	Qualitative systematic review	(S)- Identifies gaps in proper use of epinephrine (L)- Does not identify types of articles analyzed	• Rapid diagnosis ensures optimal management. • S/S: respiratory distress, hypotension, tachycardia, cyanosis, urticaria, angioedema, nausea, vomiting, diarrhea, and abdominal pain • A key challenge in recognizing anaphylaxis is that S/S are not always the same and reactions that are mild/moderate may not be recognized as anaphylaxis. • First-line drug is epinephrine • Second-line drugs are antihistamines and corticosteroids • The trigger must be avoided to prevent future anaphylactic reactions. • An anaphylaxis action plan is a written document that can guide a patient or caregiver during an allergic reaction.	Assessment Treatment Prevention Allergy Action Plan	II	3	C

				• Teenagers might be at higher risk of anaphylaxis, as they may disregard triggers of anaphylaxis and may try to hide their allergy problems.				
4. Anagnostou, K. (2018). Anaphylaxis in children: Epidemiology, risk factors and management. *Current Pediatric Reviews, 14*, 180-186. https://doi.org/10.2174/1573396314666180507115115	Review epidemiology, risk factors, and management of anaphylaxis in children	Qualitative systematic review	(L)- Review includes articles that were case studies based in various countries	• A common cause of anaphylaxis is food. • Severe, unstable asthma can be a risk factor for severe anaphylaxis. • Anaphylaxis criteria listed in management: (a) treatment with epinephrine and (b) remove trigger, correct positioning of patient, administer high-flow oxygen, IV fluids, short-acting bronchodilators, antihistamines, and steroids • Elevate lower extremities during anaphylaxis to prevent empty heart syndrome. • Individualized emergency action plan with presenting symptoms and how to manage, as well as avoidance advice and contact details; action plans might decrease the number of accidental reactions • Epinephrine may be underused, as caregivers may not recognize the severity of reaction, may be too afraid to inject, may be waiting for additional symptoms, unsure if needed, and may not have the device with them.	Higher-risk patients Assessment/ diagnosing anaphylaxis Management Positioning of patient for epinephrine Allergy Action Plan Barriers	II	3	C

5. Bartnikas, L. M., Dupuis, R., Wang, J., & Phipatanakul, W. (2022). Food allergies in inner-city schools: Addressing disparities and improving management. *Annals of Allergy, Asthma & Immunology, 129*, 430-439. https://doi.org/10.1016/j.anai.2022.04.035	Review epidemiology, risk factors, and comorbidities of food allergy in inner-city schoolchildren Evaluate food allergy reactions and management in schools Discuss unmet needs and opportunities for partnership among healthcare providers, schools, and communities to address food allergy management and disparities in the inner-city population	Qualitative literature review	(S)- Focuses on a population that has not been well studied (L)- Focuses on racial and ethnic minorities of lower SES; not encompassing of all children with food allergies (L)- Not much literature is available on inner-city school children, so it assumes that inner-city children are of racial and ethnic minority and lower SES; may not be fully representative of inner-city children	• Food allergy is the most common cause of anaphylaxis in schools. • Food allergy prevalence is higher in Asian, Black, and Pacific Islander children and lower in Hispanic and Native American children as compared to white children. • Rates of food allergy in Black children have risen over the years. • Urban minority food allergy patients might not have EAP on file. Only an estimated 38.2% have EAP on file. • Many healthcare providers are inadequately trained on recognizing skin conditions in darker skin patients which can delay the recognition of anaphylaxis/allergic reactions. • Current guidelines for school-based FA management developed by CDC are voluntary in nature and can be hard to implement in under-resourced areas. • A common way to prevent food allergies is by restricting allergens. Banning food doesn't always consistently reduce environmental exposure. • Stock epinephrine with passage of 2013 School Access to Emergency Epinephrine Act	Emergency Action Plan may not be available in low-income populations Stock epinephrine (funding, ordering, storage, policy) Training (recognizing anaphylaxis in different populations) Prevention Policies (not much evidence around banning foods) Bullying recognition	II	3	C

				• Stock epinephrine could be lifesaving for inner-city children that cannot afford multiple twin packs of epinephrine. • Staff training might improve knowledge of food allergy reaction treatment, especially in a school setting without a full-time nurse. • Bullying poses a problem as students with food allergies are viewed as receiving special treatment. • Food insecurity (inadequate access to affordable and nutritious food) can increase stress on caregivers and decrease quality of life.				
6. Beierwaltes, P., & Schoessler. (2017, November). Latex safe at school: A student-centered approach. *NASN School Nurse, 32*(6), 343-345. https://doi.org/10.1177/1942602X17715495	Provide a safe environment for students at risk for anaphylaxis from a latex allergy by improving care coordination and collaboration among school nurses • Educate the school community • Identify potential exposure to latex • Prepare to respond to an emergency • Create a plan for the future	Clinical narrative	(S)- Identifies the importance of educating the school community of latex allergy (S)- Identifies how to limit/decrease latex exposures (S)- Identifies the need for emergency care plans for children with latex allergies (L)- Clinical narrative	• Affects 1%-6% of the general population; children with spina bifida are more likely to have latex allergy because of the frequent surgeries and need for bowel and bladder management on a daily basis • Key to preventing reaction is to avoid latex and prevent exposure to latex • Latex-safe environment needs to avoid common latex products like balloons, bandages, rubber bands, erasers, sports equipment, and some foods (banana, kiwi, avocado, chestnut, white potato, and tomato)	Training Policies Prevention Emergency Action Plan Assessment	II	5	B

				• Four components to effectively manage latex allergy: educating the school community; identifying potential exposure to latex; preparing to respond to an emergency; and creating a plan for the future. • Need to know child's history to know the child's specific triggers • Create a list of products that may contain latex. • Identify high-risk areas and activities for latex: use of gloves, use of latex balloons, in the classroom (rubber bands, erasers, art supplies, science and lab equipment), cafeteria (gloves and foods served), gym and playground (rubber mats, balls, etc.), housekeeping supplies, school bus, nurse's office, field trips • Be prepared to respond to anaphylactic emergency • Child should have emergency care plan • Train staff to give epinephrine • School nurses should create individualized healthcare plans that include latex allergy knowledge; identification of allergens; avoidance strategies and how to get help in school setting; self-medication and emergency response; and self-advocacy skills.				

7. Bogale, K., Stern, H., Jhaveri, P., & Jhaveri, P. (2022). Needs assessment for eosinophilic esophagitis education in school nurses. *The Journal of School Nursing, 38*(5), 478-485. https://doi.org/10.1177/1059840520986746	Identify school nurses' familiarity with EoE as compared with food-induced anaphylaxis Hypothesis: School nurses have limited exposure to EoE and its management compared to food-induced anaphylaxis.	Out of 100 school nurses from three counties in Pennsylvania, 60 were recruited by purposive sampling. n = 60 Nineteen-question survey developed by research team	(S)- IRB approval was obtained. (S)- Focuses on topics that have not been well studied (L)- Validity of tool was not assessed. (L)- Findings are not generalizable, as study sample was not representative.	• Students may be managed by elimination diet or elemental diet. • Only 52% (13/25) of respondents who cared for children with EoE had an action plan in place for EoE management. • Only 22% of school nurses felt comfortable distinguishing between symptoms of EoE and anaphylaxis to a specific food. • Action plan should indicate dietary restrictions and that no acute intervention is needed.	Management of EoE EoE Action Plan Training to differentiate EoE versus anaphylaxis	II	3	C
8. Boswell, B., Rudders, S. A., & Brown, J. C. (2021). Emerging therapies in anaphylaxis: Alternatives to intramuscular administration of epinephrine. *Current Allergy and Asthma Reports, 21*(18), 1-9. https://doi.org/10.1007/s11882-021-00994-0	Barriers in the recognition and treatment of anaphylaxis	Systematic qualitative review	(S)- Reviews current data regarding EAIs and identifies barriers to their proper use (L)- Discusses investigational delivery methods of epinephrine that have not been approved for use in anaphylaxis	• Epinephrine can be given every 5 minutes as needed. • No absolute contraindications to using epinephrine • Early use of epinephrine decreases the need for subsequent doses of epi, decreases hospitalization, and can help decrease risk of fatality. • Emergency action plans can help with treatment choices during a reaction. • Barriers to using epinephrine: dose and needle length in EAIs; low prescription rate of EAIs; underutilizing EAIs (do not understand how to use it, when to use it, or have it available during anaphylaxis); may not carry EAIs as they are cumbersome; inadequate training leading to	Allergic reaction management (medications to be used) Emergency Action Plan Barriers to using epinephrine Training	II	3	C

				needle injury and needle phobia; and high cost and difficulty maintaining supplies • Need frequent, adequate training to ensure proper use of epinephrine • IM epinephrine is the only first-line treatment in acute management of anaphylaxis.				
9. Centers for Disease Control and Prevention (CDC). (2013). *Voluntary guidelines for managing food allergies in schools and early care and education programs*. U.S. Department of Health and Human Services. https://www.cdc.gov/healthyschools/foodallergies/pdf/20_316712-A_FA_guide_508tag.pdf	Voluntary national guidelines to help schools and early childhood education (ECE) programs address food allergies Intended to support implementation of food allergy management and prevention plans and practices in schools and ECE programs Provide info, planning steps, and strategies for reducing allergic reactions and responding to life-threatening reactions for parents, district administrators, school administrators and staff, and ECE program administrators and staff Help improve existing food allergy management plans and practices, or help create plans if none exist	Clinical practice guidelines	(S)- Helps create guidelines for schools/ECEs that did not have anything in place (L)- Not all recommendations are evidence-based (L)- Voluntary guidelines, so schools/ECEs do not have to enforce these guidelines	• Parental obligation to provide school or early childhood center with documentation of child's food allergy and risk of anaphylaxis; should describe food they are allergic to, prior history of anaphylaxis, emergency treatment procedures in the event of a reaction, S/S of a reaction, assessment of child's readiness to self-administer, and substitute meals • Creation and maintenance of individual plan for food allergy management, including self-administration of medication • Strategies to reduce risk of exposure • Food allergy management training • Authorization and training of school or ECE personnel to administer epinephrine when nurse is not available • Timely accessibility of epinephrine by school or ECE when nurse is not immediately available	Training Self-carry (determine who can and evaluating/re-evaluating ability) Emergency Care Plans/documentation/communication Prevention Storage of medication stock or individual meds is dependent on local laws Assessment and treatment	II	4	C

				• Creation of plan contained in each individual plan for food allergy management if anaphylaxis occurs during EC activity • Maintenance of info for each administration of epinephrine to a child at risk for anaphylaxis and prompt notification to parents • Strict avoidance is the only way to prevent a reaction. • Early and quick recognition and treatment of allergic reactions may prevent serious health problems or death. • Epinephrine is the first line of treatment. • Comprehensive strategy to manage risk of food allergy reactions in children: (a) coordinated approach, (b) strong leadership, (c) specific and comprehensive plan for managing food allergies • Priorities for managing food allergies: **1.** Ensure daily management of food allergies for the individual child. Identify child with food allergies, develop a plan to manage and reduce risk of food allergy reaction such as an emergency care plan, help students manage their own food allergies. If self-carrying, school staff needs to assess student's knowledge, attitudes,				

				behaviors, and skills to determine if they can handle the responsibility and need to reassess the decision periodically (consider random checks). **2.** Prepare for food allergy emergencies (prevention, preparedness, response, and recovery). Set up communication systems that are easy to use, make sure staff can get to EAI quickly and easily, make sure epinephrine is used when needed and EMS is contacted immediately, identify the role of each staff member in an emergency, prepare for food allergy reactions in children without a prior history of food allergies, document the response to a food allergy emergency. **3.** Provide professional development on food allergies for staff. Provide general training on food allergies for all staff, provide in-depth training for staff who have frequent contact with children with food allergies, provide specialized training for staff who are responsible for managing the health of children with food allergies on a daily basis. **4.** Educate children and family members about food allergies. Teach all children about food allergies, teach all parents and families about food allergies.				

				5. Create and maintain a healthy and safe educational environment. Create an environment that is as safe as possible from exposure to food allergens (banning specific foods in classroom/café, allergen-safe zones); develop food-handling policies and procedures to prevent food allergens from unintentionally contacting another food (clean and sanitize with soap and water or all-purpose cleaning agents, hand washing, label reading); make outside groups aware of food allergy policies and rules; create a positive psychosocial climate.				
10. Cosme-Blanco, W., Arroyo-Flores, E., & Ale, H. (2020). Food allergies. *Pediatrics in Review, 41*(8), 403-415. https://doi.org/10.1542/pir.2019-0037	Recognize different clinical presentations of food allergies Understand the role of different diagnostic tools for food allergies Recognize the correct management based on disease pathogenesis Review the available evidence about the efficacy of different food allergy prevention strategies	Literature review	(S)- Reviews current data on causes of allergic reactions and clinical manifestations	• Clinical presentations • IM epinephrine is the first-line treatment for anaphylaxis. Mortality increases when it is delayed. • EAI needs to be prescribed for those with IgE-mediated food allergies and patients need to receive the proper training. • EAIs come in 0.1mg, 0.15mg, and 0.3mg doses. • Antihistamines, glucocorticoids, and beta-agonists are adjuvants for anaphylaxis treatment. • Antihistamines should not be used as first-line therapy for severe allergic reactions but could be helpful for mild symptoms.	Assessment Treatment of allergic reaction Training Treatment of FPIES Prevention (avoidance)	II	4	C

				• FPIES may require IV fluids if repetitive vomiting or diarrhea • Strict avoidance is needed for IgE- and non-IgE-mediated reactions.				
11. Davis, C. M., & Kelso, J. M. (2018). Food allergy management. *Immunology and Allergy Clinics of North America, 38*, 53-64. https://doi.org/10.1016/j.iac.2017.09.005	Allergen avoidance strategies for patients with IgE- and non-IgE-mediated food allergies Medications necessary for treatment of allergic reactions School safety laws and factors that impact the quality of life	Qualitative systematic review	(S)- Discusses food allergy management in schools	• Food avoidance is needed for IgE and non-IgE reactions. • FALCPA requires that if a food contains an ingredient that is or contains protein from a major food allergen, it must be declared on the label. Loopholes in labeling exist, and individuals need to be educated about obscure wording that might identify possible allergens. • IgE-mediated reactions occur within minutes to a few hours after eating the food, and usually involve flushing, urticaria, angioedema, respiratory symptoms, GI symptoms, and cardiovascular collapse. • Mild allergic reactions can usually be treated with antihistamines (mild abdominal pain, mild nausea, or hives), but if it progresses (two or more body systems) epinephrine should be given. • Those with history of systemic allergic reaction should be prescribed epinephrine and a written plan outlining the symptoms requiring epinephrine.	Prevention of allergic reactions Assessment of anaphylaxis Pathology of allergic reaction Treatment of allergic reaction Emergency Action Plan Storage of epinephrine Communica-tion among all members of the student's team 504 plans	II	4	C

				• Two doses should be carried at all times, as a severe allergic reaction may require two doses, or in case of a biphasic reaction.
				• Epinephrine can be given in the mid-outer thigh muscle.
				• Epinephrine should be kept at room temperature.
				• Mild allergic reactions can be treated with antihistamines.
				• B2 agonists and glucocorticoids can be used as second-line therapy.
				• Criteria for anaphylaxis:
				  • One in four administrations of epinephrine in a school setting is in a child that has not previously been diagnosed with a food allergy.
				  • Management of anaphylaxis in the school requires a comprehensive approach (need to have a meeting of all individuals involved in the student's care during the school day to discuss the food avoidance plan, how to recognize allergic reactions, and how to treat a reaction if there is an accidental exposure).
				  • Need written, personalized anaphylaxis emergency action plan with the trigger allergens listed				

				• A food allergy that could result in anaphylaxis is considered a disability and a 504 plan should be in place to have the school provide reasonable accommodations for the student. • Under law, schools must make substitutions in lunches and after-school snacks for students considered to have a disability.				
12. Dumeier, H. K., Richter, L. A., Neininger, M. P., Prenzel, F., Kiess, W., Bertsche, A., & Bertsche, T. (2018). Knowledge of allergies and performance in epinephrine auto-injector use: A controlled intervention in preschool teachers. European Journal *of Pediatrics, 177*, 575-581. https://doi.org/10.1007/s00431-017-3073-y	Evaluate the long-lasting effect of an education program for preschool teachers on attitudes and knowledge of food allergies, anaphylaxis management, and administered epinephrine	Correlational study n = 75	(S)- Training programs are helpful in improving knowledge and comfort level in treating anaphylaxis. (L)- Results not generalizable beyond the group studied	• One-hundred and fifty-four teachers from preschools participated in the education session. Of these, 75 teachers participated in the questionnaire survey and assessment of their practical performance. • Forty-seven of the 75 teachers had familiarized themselves with allergies. • Before the session, eight of the 75 teachers felt well-prepared for an anaphylactic emergency. This increased to 66 of the 75 directly after the education. • Preschool teachers' knowledge of allergy prevalence, triggers, and administration of epinephrine was low pre-intervention. • After a single education session, teachers that felt well-prepared to treat anaphylaxis rose from 11% to 88%.	Training Assessing training effectiveness	II	3	C

13. Dupuis, R., Kinsey, E. W., Spergel, J. M., Brown-Whitehorn, T., Graves, A., Samuelson, K., Epstein, C., Mollen, C., & Cannuscio, C. C. (2020). Food allergy management at school. *Journal of School Health, 90*(5), 395-406. https://doi.org/10.1111/josh.12885	Help understand the various experiences and challenges students and families face in managing food allergies at school; discuss how they perceive school policies to help highlight the need for evidence-based public health approaches for food allergy management; and improved communication Address experiences managing food allergies outside the home, including in schools, restaurants, and social settings	n = 178 Interviewed 178 participants at six food allergy community events in 2014-2015 Descriptive study Convenience sampling Used ecological model, a public health framework that emphasizes social, behavioral, and environmental determinants of health IRB approval	(S)- Largest qualitative study to date to report school-related food allergy management challenges among students and families (S)- Describes the impact of food allergy policies on affected students (L)- Risk of bias from those interviewed; might be more anxious or could be unhappy with policies (selection bias) (L)- Not representative of the population (L)- Descriptive study (L)- Does not have teacher, nurse, or administrator views	• Need avoidance measures • Always have epinephrine available for food allergy children in school settings. • Twenty-five percent of food allergy reactions are first-time reactions. • Few, if any, evidence-based school policies have been tested to evaluate effectiveness in keeping children safe. • Students and families felt school policies were often ambiguous, which led to stress, resulting in advocacy for stronger protections and inclusion at school. • Students had to educate peers about prevention and emergency response. • Students often had to remind teachers in the classroom of their allergies and not to serve food. • Students faced bullying, teasing, and discomfort with the attention they received. They also experienced isolation due to feeling different and because school policies made them sit at different tables. • Parents had high levels of anxiety having to trust school administrators/ teachers with food allergy management. • The school nurse and health technician evaluated student's ability to use epinephrine every other month.	Stock epinephrine Location of stock epinephrine Self-carry Policies Education/ training regarding prevention and treatment Availability of school nurse Barriers to using epinephrine Bullying Assessing student's ability to properly use epinephrine Training on labeling Communica-tion of changes in recipes/use of food	II	3	C

				• Teachers would invite students with allergies and their friends to eat lunch in a classroom to offer a more controlled environment. • Peers were allies of children with food allergies, defending them from bullying, providing support and reminding teachers/staff about allergies, and offering emotional support. • Students reported that eating at school, specifically the café, was a significant challenge. A minority of students reported positive experiences, citing good relationships with kitchen staff and detailed menus with ingredient info; the majority of participants stated frustration with school food and surrounding policies. They reported mislabeling or lack of labeling, recipe changes without notification, uninformed or indifferent café staff, and concerns about cross-contamination. • Many students stressed the importance of closely reading labels or exercising skepticism. Many felt the only safe option was packing their own lunch. • Many participants reported a desire for improved food allergy knowledge in school communities.				

				• Many felt that bullying, teasing, and exclusion in school stemmed from lack of awareness about seriousness and severity of food allergies, with knowledge gaps among staff, classmates, and other parents. Many want an increase in community awareness regarding prevention and treatment. • School policies ranged from non-existent to overprotective. In many instances, school policies were unclearly defined and communicated. • The most common policies were those designed to exclude children (e.g., separate lunch tables). • Policies are not often upheld, like classmates bringing in nuts to a "nut-free" school. • Some felt epinephrine policies were not safe, such as not being allowed to carry their medication despite allergist recommendation to allow them to self-carry. Some had close calls related to inaccessibility of epinephrine or the school nurse during school hours. Oftentimes, epinephrine is kept in the school nurse's office and the door is locked. • Preschools and elementary schools tended to establish more explicit guidelines than middle and high schools.				

				• School policies are more ambiguous for middle and high school. More structure for food allergy policies is needed, especially since this age group can be more at risk. • Data from the School Health Policies and Practices Survey, completed by school nurses and administrators, indicates a high level of school engagement in safe food allergy management.				
14. Eldredge, C., Patterson, L., White, B., & Schellhase, K. (2014). Assessing the readiness of a school system to adopt food allergy management guidelines. *Wisconsin Medical Journal, 113*(4), 155-161. PMID: 25211803.	Study if a school had a guideline or policy to address the management of student food allergies Learn if the school required that all students with food allergies have individual food allergy action plans School nursing support School's interest in food allergy education and training	n = 78 Archdiocese of Milwaukee System of Schools (second largest in Wisconsin; relies mostly on nonmedically trained staff and volunteers to staff school health rooms) One-hundred twenty-five schools (3-year-old kindergarten to 12th grade) with 2,699 school staff and 32,000 students; 20% of students are underrepresented minorities and 30% of students receive free/reduced lunch Only 78 schools responded. IRB approved	(S)- Reviews current food allergy policies in a system of schools; establishes associations (L)- Limited access to school nurses, so unable to test associations between presence of school nurse and adoption of food allergy guidelines (L)- Only studying subset of schools in Wisconsin, so not representative of the population	• Food allergy reactions can be unpredictable but require prompt recognition and treatment with epinephrine. • Several states have published school food allergy management guidelines. • The Food Allergy and Anaphylaxis Management Act, signed into federal law in January 2011, required the CDC to collaborate with stakeholders in the development of national guidelines. School food allergy policies are often insufficiently implemented. • Seventy-two of 78 schools did not have a school nurse; 80% of those that did report the school nurse being present at school for <10 hours/week.	Training Policies Prevention strategies If no school nurses, how to determine who is in charge of policies, documentation, training.	II	3	C

		Twenty-four-item questionnaire based on current guidelines from the literature and recommendations for school management of student's food allergies based on national organizations Anonymous and voluntary, and sent to principals and school administrators to fill out		• Fifty-three schools had some type of guideline or policy in place to address student food allergies. • Food allergy emergency action plans were required in 41 schools. • Fifty-six schools had students that needed special arrangements due to food allergies (e.g., allergen-free classroom). • Prevention guidelines were used inconsistently. • Forty-nine schools had some sort of anaphylaxis and epinephrine training. All provided training to all school staff, but only nine provided training for school volunteers and one provided parent training. • Schools that had students with food allergies were six times more likely to have a food allergy policy. • Schools with a food allergy policy are 3.5 times more likely to require action plans. • Without the aid of a school nurse, it may be more difficult to implement and adhere to food allergy policies. • Training on epinephrine was inconsistent among schools. • Preventative management strategies were not used consistently.				

15. Fernandez-Mendez, F., Saez-Gallego, N. M., Barcala-Furelos, R., Abelairas-Gomez, C., Padron-Cabo, A., Perez-Ferreiros, A., Garcia-Magan, C., Moure-Gonzalez, J., Contreras-Jordan, O., & Rodriguez-Nuñez, A. (2017). Learning and treatment of anaphylaxis by laypeople: A simulation study using pupilar technology. *BioMed Research International, 2017*, 1-9. https://doi.org/10.1155/2017/9837508	Evaluate two training models (video vs. face-to-face) for the recognition and treatment of anaphylaxis by teachers	n = 50 Convenience sampling: 26 men and 24 women; those with previous training on EAIs were excluded Cross-sectional quasi-experimental design Participants were randomly assigned to one of four groups. T1- Fictional video T2- Instructional video for people with allergies T3- Amateur video with educational purpose recorded by pediatricians PT- Face-to-face training	(S)- Evaluates face-to-face and video training in anaphylaxis (L)- Takes place in Europe, so it is not generalizable (L)- Simulation experience and results were not measured using real patients, which limits generalizability (L)- Efficacy of administration of the EAIs is dependent on the EAI used; different types of EAIs mean it cannot be generalizable.	• Identification of symptoms: the face-to-face group made fewer visual fixations on the victim's symptoms, whereas those in video training made more visual fixations. • The face-to-face group had a higher probability of correct use of EAI and administered the injection more efficiently than in other groups. • Injection time did not differ significantly between groups. • Face-to-face training provides better results than video training. • Face-to-face recognized anaphylaxis faster. • Incorrect use of EAIs was more likely in those that received the video training.	Training Assessing training effectiveness (face-to-face more effective)	II	3	C
16. Food Allergy Research & Education. (2022, June 30). *Know your rights: School access to epinephrine*. https://www.foodallergy.org/our-initiatives/advocacy/food-allergy-issues/school-access-epinephrine	Review legislation and guidelines regarding stock epinephrine in United States	Reference (non-EBP)	(S)- Clearly identifies states' current laws regarding stock epinephrine	• State with pending legislation regarding stock epinephrine is Hawaii • States requiring stock epinephrine: California, Nevada, Utah, Arizona, Nebraska, Michigan, North Carolina, Virginia, Maryland, Delaware, New Jersey, and Connecticut	Stock epinephrine	I	5	B

17. Gereige, R. S., Gross, T., Jastaniah, E. & Council on School Health and Committee on Pediatric Emergency Medicine. (2022). Individual medical emergencies occurring at school. *Pediatrics, 150*(1), 1-16. https://doi.org/10.1542/peds.2022-057987	Serve as an update of the statement published in 2008 and reaffirmed in 2017 The purpose of the policy statement is to increase pediatricians' awareness of schools' roles in preparing for individual student emergencies, and to provide recommendations for the medical home and school physicians on how to assist and support school personnel.	Policy statement	(S)- Highlights the role of school personnel, the school health and safety team, school physician, PCP, and specialty physician (L)- Not specifically focused on allergic reactions; also focuses on other medical conditions	• Schools with policies or guidelines for food allergies were found to be associated with 3.5 times greater likelihood of requiring individual student food allergy action plans. • Develop emergency policies with input from the medical community, EMS personnel, and community clinicians • Establish emergency response plans to deal with individual student emergencies • Emergency information is to be collected on all children and includes parental contact, healthcare provider contact, medical conditions, medications, allergies, and insurance. Electronic records could facilitate storage of this info. • Ongoing communication, review, drills, and practice of procedures ensure achievement of this level of integration. Drill should include applicable school personnel. • Clarify role of all school staff. • School nurses should be the key people to develop and implement emergency plans. • Ensure sufficient supplies to address an emergency; have a complete medical kit that is secure and carefully organized.		II	5	C

				• Staff development and training on how to respond to a medical emergency; level of response may be based on human resources policies and regulations. • School will determine if a staff member should accompany the student to ER. • Students with chronic medical conditions need an individualized health plan. This is prepared by school nurses with input from family and PCP. It contains info on medications, activity levels, dietary needs, equipment, transportation, and other accommodations; helps plan for accommodations for daily classroom activity, field trips, and emergency needs. • IHP and emergency response plans can serve as resources to assist school teams in developing IEP or 504 plan. IEP is a blueprint that provides individualized special education and related services to meet the child's needs. The 504 plan is an agreement between the student's legal guardian and school district that the student will have full access to all school activities and receive necessary accommodations to the learning environment to ensure academic success.				

				• Staff caring for students with special needs need to have an awareness of illnesses and be trained to respond to emergencies. • First-time anaphylaxis can occur in the school setting, so staff should be able to identify and treat it. • Most states have no clear implementation guidelines or direction to school nurses for comprehensive epinephrine programs in schools. • School policies must cover epinephrine auto-injector stocking, disposal, and replacement procedures. Stock epinephrine is typically prescribed by the school medical advisor. • Policies in schools should address who must receive education and training, who must be trained to administer epinephrine, and who must document and report events per state-specific requirements. • Both the CDC and the National School Boards Association recommend that students and parents receive anaphylaxis education. • Any student who receives emergency epinephrine is transported to the emergency department. • Maintain a strong, open, and ongoing line of communication with the school nurse or designated trained school personnel and/ or the school physician (when available) regarding the individual student's medical condition and current management.				

18. Golden, D. B. K., Demain, J., Freeman, T., Graft, D., Tankersley, M., Tracy, J., Blessing-Moore, J., Bernstein, D., Dinakar, C., Greenhawt, M., Khan, D., Lang, D., Nicklas, R., Oppenheimer, J., Portnoy, J., Randolph, C., Schuller, D., & Wallace, D. (2017). Stinging insect hypersensitivity: A practice parameter update 2016. *Annals of Allergy, Asthma & Immunology, 118*, 28-54. https://doi.org/10.1016/j.anai.2016.10.031	Meant to improve the care for patients with stinging insect hypersensitivity This parameter is intended to refine guidelines for the use and interpretation of diagnostic methods and for the institution and implementation of measures to manage stinging insect hypersensitivity.	Practice parameter/ guideline	(S)- Practice parameter update on stinging insects (L)- Not specific to children; more general to individuals with stinging insect allergy	• Systemic reactions to insect stings are characterized by S/S, including combination of hives and angioedema, bronchospasm, edema of the large airway, hypotension, or other clinical manifestations of anaphylaxis. • If there is a history of systemic reaction to an insect stinging, the patient should avoid stinging insects (Grade D), carry epinephrine (Grade C), and consider carrying medical identification for stinging insect (Grade C). • Measures to avoid stings: remove nests; avoid walking outside barefoot or with open shoes; cover skin; be cautious in areas where stinging insects may frequent; keep insecticides available; and avoid eating and drinking outside. • Treat acute systemic reactions to insect stings like any anaphylactic reaction. Administer epinephrine early in anterolateral thigh. Antihistamines and corticosteroids should not be considered as substitutes for epinephrine. Large local reactions can be treated with antihistamines, cold compresses, and analgesics.	Emergency medication Avoidance measures	II	1	B

19. Greenhawt, M., Shaker, M., Stukus, D. R., Fleischer, D. M., Hourihane, J., Tang, M. L. K., Abrams, E. M., Wang, J., Bingemann, T. A., Chan, E. S., Lieberman, J., Sampson, H. A., Bock, S. A., Young, M. C., Waserman, S., & Mack, D. P. (2020). Managing food allergy in schools during the COVID-19 pandemic. *The Journal of Allergy and Clinical Immunology: In Practice, 8*(9), 2845-2850. https://doi.org/10.1016/j.jaip.2020.07.016	Explore the issues related to evidence-based management of food allergy at school, and the issues of managing the health of children attending school that are acutely posed by the constraints of an infectious pandemic How to balance accommodation needs for food allergic children and CDC guidelines on resuming school during the pandemic, so that all kids can safely attend school	Review Expert panel recommendations	(S)- Reviews current food allergy policies regarding changes needed for global pandemic (L)- Not generalizable for standard food allergy policy in schools (L)- Expert opinion	• No evidence that banning foods from classroom or schools can reduce allergic reactions or rates of epinephrine use • Physicians do not have a role in the development of a 504 plan. These plans are not medical documents. The 504 plans might specify that a child eats in a separate area, creating a separate table that restricts particular allergens from being eaten, mandating strict washing of hands/ surfaces after food contact, and prohibiting food sharing. Schools may also elect to ban certain allergens in schools or classrooms. • Strong evidence exists to show that cleaning protocols and not sharing food can decrease risk. • Hand sanitizer does not remove the allergen. • CDC 2013 Voluntary Guidelines for Managing Food Allergy in Schools does not explicitly mention how to manage accommodations for food allergy or conflicts between policy and disability law accommodations. • No data supports the efficacy of food allergen bans at school to decrease allergic reactions.	School policies (banning foods from class not effective) 504 plans Enforce strict handwashing/ cleaning of surfaces and prohibit the sharing of food. Labeling allergens for school-made foods Stock epinephrine Epinephrine storage Allergy Action Plan and where it is kept Training staff and retraining (consider training students) Recognizing bullying and implementing policy against it Communi-cation with family	II	4	C

				• No evidence shows that inhalation of food protein or skin contact from casual environmental contact increases the risk of having a systemic reaction. • Recommends against banning specific foods. It can be inequitable for children who have reduced choices in what can be eaten; it could also burden those who rely on free or reduced lunch at school, as these foods commonly contain major allergens. • If food needs to be consumed in a classroom setting, eating lunch at a separate desk, especially when proper cleaning protocols are followed, does not increase the chances of an allergic reaction. • Have schools practice allergen labeling on prepackaged foods and make ingredient lists available for all foods offered in the school; have teachers help food allergic children identify appropriate foods • Schools should stock unassigned epinephrine and ensure teachers know where it is stored. • Consider stocking specific epinephrine in the child's classroom • Keep a copy of student's food allergy action plan in classroom if lunch is being served in the classroom setting to facilitate timely treatment.				

				• Train or renew training on EAI use with staff, including reviewing all types of devices. • Consider educating students on how to recognize anaphylaxis. • Implement zero-tolerance bullying policy. • If there are a large amount of food allergic children, consider having them eat in a dedicated classroom (if food needs to be consumed in a classroom due to increased restrictions related to the pandemic). Younger children and children with developmental challenges are more at risk for potentially spreading allergens. • Clear communication and open conversations among families regarding changes in food allergy policies are needed				
20. Greenhawt, M., Wallace, D., Wesley Sublett, J., Maughan, E., Tanner, A., Kelley, K. J., Fineman, S., White, M., Cash, G., Anderson, C., Schoessler, S., Gupta, R., & Pistiner, M. (2018). Current trends in food allergy-induced anaphylaxis management at school. *Annals of Allergy, Asthma & Immunology, 121*, 174-178. https://doi.org/10.1016/j.anai.2018.04.015	Review the evidence and current policies regarding the use of epinephrine at schools and childcare centers	Expert opinion/review	(S)- Evaluation of current policies in the school system (L)- No national or statewide guidelines, allergy professional society, or major advocacy group to recommend specific allergen restriction policies (L)- Lack of data surrounding use of allergy action plans; areas of concern include the uniformity and variation of the instructions in plans, differences in outcomes of who assesses the student (nurse or layperson),	• Food allergic children can have anxiety, depression, social isolation, and stress. • Teenagers can be at higher risk for a reaction as they are more apt to be peer pressured and take risks, and often do not carry their epinephrine. • Less than 25% of states have guidelines in place to manage food allergies in the school setting. • Existing policies focus on peanut and tree nut allergy and trend toward restriction or exclusion of the food allergens.	School policies (no data to support food bans) Training Stock epinephrine (supply, maintain, or pay for device) School nurse availability could be barrier to managing anaphylaxis	II	5	C

			ease of adhering to the plan, and post-management strategies -No studies to evaluate the effect of the type of law (mandate vs. option), differences in funding and provision of devices, and differences in planning or resources to implement policies on outcomes (L)- More research is needed to look at how stock epinephrine policy might benefit SES disadvantaged children where they could be affected by sociodemographic disparities Check 2006 National Institute of Allergy and Infectious Disease and Food Allergy and Anaphylaxis Network guidelines	• The gap in food allergy management is limited to systematic research on current food allergy management strategies. • Many school policies are implemented without data to support the necessity. Most schools enact restriction policies in the class, lunchroom, and school. Other schools implement plans based on the 504 plans. • Lack of evidence/data on the outcomes of classroom or school level allergen restriction • Need further exploration on how school personnel are trained, and to determine the cost effectiveness and efficiency of these training plans • Forty-nine out of 50 states have opted in or mandated stock epinephrine legislation. Most states have passed laws that opt in policies to voluntarily stock epinephrine without specifying how to supply, maintain, or pay for devices. • Availability of school nurses in the school setting might be a barrier to managing anaphylaxis. Only 39.3% of schools have full-time registered nurses and 25% of schools have no nurse at all, which is a concern of stock epinephrine policy for implementation and for mandated reporting of epinephrine use.	Documentation of use of epinephrine Medication administration (who can do it) School policies Epinephrine storage Anaphylaxis registry			

				• The EpiPen4Schools program took place from 2014-2015 and is an example of stock epinephrine implementation and outcome reporting across multiple states. All EAIs were provided by one device maker who sponsored the study. There were 12,275 schools in this study and 2,191 reported cases of epinephrine. Stock epinephrine was used in 631 of 1,267 cases. • Delegation of medication administration is inconsistent amongst states, which is challenging for stock epinephrine policy implementation. Some states have initiated systematic data collection for meds administered at school, but not a national effort. • Device storage of stock units can vary; 59% of students were provided epinephrine that was stored in a locked container (77% was kept in nurse's office) and 55% of stock epinephrine was not stored in a locked container. Only 69.1% of schools had a standing stock device order. About half was donated by a drug company and 30% procured by district funds.				

				• Need to identify if current criteria for managing anaphylaxis is appropriate or if it should be updated to include lay people • Establish national anaphylaxis registry for healthcare-related facilities and schools to track symptom-level data and med admin to better understand outcomes. • Establish how schools stock, maintain, store, and administer epinephrine • Need more data to determine effectiveness of stock epinephrine legislation				
21. Greenshields, S. (2019). Anaphylaxis in children and young people. *British Journal of Nursing, 28*(18), 1187-1189. https://doi.org/10.12968/bjon.2019.28.18.1187	Signs and symptoms of anaphylaxis and treatment U.K.-based study	Literature review	(S)- Provides detailed summary of S/S of anaphylaxis (L)- Only reviews S/S of anaphylaxis (L)- U.K.-based study	• Anaphylaxis is a severe, generalized, multi-system organ reaction. It can vary greatly between individuals, and can be triggered by food, drugs, and venom. • Common symptoms: urticaria, swelling of subcutaneous tissue, respiratory distress, wheeze, stridor, cough, profound hypotension, tachycardia, pallor, and unresponsiveness • Caused by the body's response to an allergen that causes the body to release compounds in response to the trigger • Onset is usually between 1 minute and 3 hours after a trigger.	Assessment Treatment Psychological support	II	5	C

				• Lack of consistent presentation of anaphylaxis can result in challenges for accurate diagnosis. • Epinephrine is the most important treatment in anaphylaxis and should be given as soon as symptoms present; if in a community setting, 911 should be called. • Biphasic reaction can occur 6-12 hours after initial reaction. Those that have a severe initial reaction should be monitored for longer observation. • Need to create emergency care plans for children in school settings • Provide psychological support for those having had a reaction, especially for children and their families				
22. Hui, J. W., Copeland, M., & Lanser, B. J. (2020). Food allergy management at school in the era of immunotherapy. *Current Allergy and Asthma Reports, 20*(32), 1-8. https://doi.org/10.1007/s11882-020-00933-5	Current food allergy guidelines and legislation; an assessment of allergen-free schools; the importance of written anaphylaxis action plans, training and education of school personnel; emerging treatment options; and the social implications of having food allergies	Systematic qualitative review	(S)- Review of various organizations and government networks in the U.S. that have created guidelines addressing food allergies (L)- Does highlight policies that are not based in the United States	• Twenty-five percent of food allergic reactions can occur in children without prior diagnosis of food allergy. • CDC guidelines are voluntary and highlight the need for an individualized plan for food allergy and anaphylaxis management. • The first legislation in the world to require all schools have anaphylaxis policy was in Ontario, Canada. A study that compared schools with legislation to those without in other parts of Canada found greater consistency with anaphylaxis guidelines.	Treatment/ management Food Allergy Action Plan Training/ education to improve readiness/ preparedness Prevention School policies Prevention Barriers	II	3	C

				• Schools in Massachusetts did have peanut-free tables, which showed a lower rate of epinephrine administration compared to those without peanut free tables (0.2 vs. 0.6 per 10,000 students). • Peanut-free schools can provide a false sense of security, can place a burden on those with other food allergies, and result in students feeling isolated or anxious. • Since 25% of food allergic reactions occur in children without a prior diagnosis of food allergy, schools need to be vigilant of all children. • No data to recommend allergen-free school policies • Focus on increasing awareness and education to better manage food allergies in schools • Preschool and early childcare centers should adopt different policies, as this age is at higher risk for unintentional ingestion and cross-contamination due to children sharing food, sharing toys, etc. • Some schools, districts, and states now mandate reporting when epinephrine is given. • Need multidisciplinary approach that involves care coordination between families, schools, and clinicians to appropriately manage food allergic children; need emergency training and development of individual health plan for each student	Unclear benefit/ effectiveness of peanut-free/allergen-free schools; slight benefit in peanut-free table Education/ awareness Benefits to policies of allergen-free facilities for younger children, since they are more likely to put stuff in their mouths Documentation is greater than report when epinephrine is given Emergency Care Plan Care coordination Documentation Stock epinephrine Epinephrine storage			

				• Gaps in anaphylaxis management: insufficient knowledge in identifying anaphylaxis by physicians, caregivers, and patients, as well as a lack of understanding in using injectable epinephrine. • Survey of childhood staff in Illinois that works with infants, toddlers, and preschoolers <6 years was performed to assess food allergy experience. It found three out of four worked with a child with a food allergy, one in four was unfamiliar with action plans, and one in four witnessed an allergic reaction and may have administered epinephrine despite feeling unprepared. This demonstrates the need of emergency readiness. • Another study on a brief educational intervention in preschool staff and childcare center workers has been shown to increase comfort in identifying and administering epinephrine, shedding importance on brief training to improve school preparedness. • Cutaneous symptoms alone can be treated with cetirizine. • Action plans should be broader to decrease the risk of accidental ingestion (e.g., tree nuts instead of cashews).	Self-carry Basic info on OIT and precautions that might need to be taken			

				• A 504 plan is created in collaboration with the family, schoolteachers, nurses, and administration using information from clinicians. It allows the family to create a written management plan clearly detailing how the school will address the unique needs of the student and allow them to safely participate with peers. It is helpful for situations like bus travel, field trips, overnight trips, etc. • In 2013, U.S. legislation was passed to allow schools to maintain a supply of epinephrine in a secure, but easily accessible, location that could be administered to any student having anaphylaxis. • The Austin (Texas) Independent School District made unassigned epinephrine available in schools. In looking at 2015-2017, 31 individuals received epinephrine, and of those, unassigned epinephrine was used in 68% of cases. Epinephrine administration occurred in 22% of individuals with history of allergy, and 45% of individuals that required epinephrine had a documented allergy, but not their own assigned epinephrine. • Children can likely self-carry epinephrine by 12-14 years of age. This should be based on the child's ability to recognize symptoms, correctly use epinephrine, comfort of carrying epinephrine, and other medical or developmental conditions.				

				• Bullying is common among food allergic children; a policy regarding bullying needs to be in place.				
23. Lawlis, T. Bakonyi, S., & Williams, L. T. (2017). Food allergy in schools: The importance of government involvement. *Nutrition & Dietetics, 74*, 82-87. https://doi.org/10.1111/1747-0080.12225	Examine the availability, drivers, and communication of school food allergy awareness and management policies and guidelines in one Australian education jurisdiction	Cross-sectional Study n = 100 Principals from public and Catholic primary and high schools were asked to participate in an online survey. Only 27 completed the survey	(L)- Takes place in Australia	• Over 50% of the schools in the study (14) described themselves as "nut free." Two schools were "free" of two or more foods. • Twenty-four percent (six schools) reported they were allergy or anaphylaxis aware/ friendly. • Sixty-three percent (17 schools) had food allergy awareness and management guidelines in place. • Food allergy management and EpiPen training for school staff varied from 6 months to 2 years, with a third of schools providing staff training on an annual basis; three schools had EpiPen training as part of first aid certificate renewal which was every 2 years. • Overall identified four key areas of inconsistencies: reliance of different food allergy management guidelines; limited communication of guidelines to the wider school community; classification of schools as allergen "free;" and non-compliance with allergy and EpiPen training.	Training School policies	II	3	C

24. Leroy, Z. C., Wallin, R., & Lee, S. (2017). The role of school health services in addressing the needs of students with chronic health conditions: A systematic review. *The Journal of School Nursing, 33*, 64-72. https://doi.org/10.1177/1059840516678909	Assess the role of school health services or school-based health centers in addressing five chronic health conditions among K-12 children: asthma, food allergy/ anaphylaxis, diabetes, seizure disorders, and poor oral health	Systematic review of RCTs, quasi-experimental, and qualitative studies	(L)- Limited research available on chronic health conditions in the school setting (L)- Few studies to measure health and academic outcomes among students with chronic health conditions (L)- Studies analyzed in this review were in regard to asthma, not generalizable to other CHCs	• School nurses are responsible for coordinating and performing health assessments and planning and implementing individualized healthcare plans for safe, effective management of chronic health conditions. • Direct access to school nursing can improve clinical symptoms, medication adherence, and healthcare utilization. • School nurses facilitate communication between schools and healthcare providers to improve collaboration for medical management.	Developing, implementing individualized healthcare plan Assessment School nurse availability Communication between school and HCP	II	3	C
25. Lieberman, J. A., Bingemann, T. A., & Wang, J. (2020). Diagnostic challenges in anaphylaxis. *The Journal of Allergy and Clinical Immunology: In Practice, 8*(4), 1177-1184. https://doi.org/10.1016/j.jaip.2019.11.003	Definitions of anaphylaxis Difficulties and limitations in managing and evaluating anaphylaxis	Qualitative systematic review	(S)- Defines anaphylaxis and provides examples of symptoms to expect with anaphylaxis (L)- Discusses management of anaphylaxis in an acute care setting and in an outpatient office	• Lack of widely accepted definition of anaphylaxis • Lack of consensus of what differentiates anaphylaxis from an allergic reaction • Signs and symptoms of anaphylaxis listed in article • Anaphylaxis criteria listed in article	Assessment	II	3	C
26. Lineberry, M., Whitney, E., & Noland, M. (2018). The role of school nurses, challenges, and reactions to delegation legislation: A qualitative approach. *The Journal of School Nursing, 34*(3), 222-231. https://doi.org/10.1177/1059840517741526	This study aimed to elicit perceptions from school nurses that (a) define the role of school nurses in Kentucky, (b) describe the impact of school nurses on students, (c) explore challenges (including delegation) faced by school nurses,	n = 25 Descriptive Qualitative study Convenience sampling of three focus groups to three purposively sampled regions in Kentucky	(S)- Describes role and responsibilities of school nurse (L)- Specific to the state of Kentucky, so is not generalizable to other states	• School nurses promote health and prevent disease. • School nurses deliver education on many topics, including training teachers, bus drivers, and school staff to prevent, recognize, and treat food allergy reactions.	Training Food allergy prevention Implementing proper care plan Assessment Treatment	II	3	C

	and (d) describe if and how school nursing had changed due to budget cuts and legislation since the amendment to KRS 158.838.			• School nurses can increase students' time in the classroom and parents' time at work by assessing and recommending next steps for the student (return to classroom or go home). • School nurses triage and treat acute complaints and manage chronic conditions. • School nurses document students' conditions and treatments in the health record. • School nurses provide psychological support and community referrals. • Due to budget cuts, some school nurses are being cut in schools, requiring legal changes in laws to allow unlicensed personnel to administer medications after having been assessed by a school nurse. • Responsible for assessment of acute injuries/illness; care of chronic conditions; administration of authorized meds; health promotion and prevention activities; age-appropriate health education in the classroom; coordination of care and resources to understand students' conditions and care plans; educating/training/delegating health services to other school staff; and emotional support • UAP needs to be comfortable delivering services if needed.	Documentation Psychological support Implementing treatment plan Delegation			

27. Lowe, A. A., Gerald, J. K., Clemens, C., Gaither, C., & Gerald, L. B. (2022). Medication administration practices in United States' schools: A systematic review and meta-synthesis. *The Journal of School Nursing, 38*(1), 21-34. https://doi.org/10.1177/10598405211026300	How does the level of professional training impact medication administration policies and practices in schools?	Systematic review and meta-synthesis	(L)- Inconsistent policies between states and schools	• Medication management is needed for acute and chronic health conditions. If no school nurse, need to rely on UAP, but nurse remains responsible for outcomes • If tasks are delegated to UAP (a) school nurse can still be held liable, (b) UAPs may not be protected by civil liability even if task is performed to the best of their ability, (c) school may have a heightened level of risk for liability when delegation authority is implemented on campus, and (d) UAPs may not want or be required to complete tasks that are not directly written in job description. • Delegation authority of medication administration varies across states. • Policies can be inconsistent with medication administration practices. Local policies need to be in line with state policies. • Medication errors most commonly occur among UAPs and most commonly are a missed dose. Root causes for medication errors include disorganization of the medication cabinet or MAR; competing priorities during recess (which is when most children receive their medications); lack of documentation; and not counting the remaining number of doses in storage. Standard work instructions can help decrease these errors.	Medication management Delegation Training School policies Minimizing medication errors Guidelines and standing medication orders, especially if delegating meds administration to other staff	II	1	C

				• If medication delegation to UAP is to take place, the school district's policy should match the state law. • If medication administration is delegated, this should be communicated to the family. and there should be a well-written policy in place. • Policies regarding delegation of medication administration during school field trips and school-sanctioned events are lacking. • Inconsistent/inadequate guidelines for emergency medications • Need guidelines/ standing orders regarding emergency medication administration in schools • Barriers to using emergency medications: (a) locking the emergency medication in a secured location, which can impede access and delay administration, and (b) cost of stock medications. • Need to evaluate current training in place • Schools, nurses, health professionals, and policymakers should work together to create written policies to outline content that should be included in training, and the frequency at which school personnel shall be trained.				

28. McCaughey, R. A., McCarthy, A. M., Maughan, E., Hein, M., Perkhounkova, Y., & Kelly, M. W. (2022). Emergency medication access and administration in schools: A focus on epinephrine, albuterol inhalers, and glucagon. *The Journal of School Nursing, 38*(4), 326-335. https://doi.org/10.1177/1059840520934185	Determine practices related to the use, administration, and storage of stock and student-specific epinephrine, albuterol inhalers, and glucagon, with a particular emphasis on epinephrine	n = 6,298 Cross-sectional design Descriptive study All active members of NASN were eligible, and state school nurse leaders were asked to forward the survey to school nurses in their state Responses from 6,298 school nurses	(S)- Reviews the results from the 2015 School Nurse Medication Survey for epinephrine, albuterol, and glucagon (L)- Limited data on administration of emergency medication in schools and medication administration policies	• Need established procedures and protocols for urgent or emergency medication. • Epinephrine can be stored in the nurses' office or with the student. • To get stock epinephrine, it is usually authorized by a local healthcare provider associated with the school or a private medical doctor or health department. • Stock epinephrine can be funded by a drug company donation or district funding. • Stock epinephrine is usually stored in a locked or unlocked location. • Some schools will lock emergency medications, which limits access to these medications in an emergency. • If students are not carrying medication, consider stocking epinephrine in an immediately available, known location.	Policies for medication administration Stock epinephrine funding Stock epinephrine location Barriers to using epinephrine	II	3	C
29. Michelet, M., Schluckebier, D., Petit, L.-M., & Caubet, J.-C. (2017). Food protein-induced enterocolitis syndrome: A review of the literature with focus on clinical management. *Journal of Asthma and Allergy, 10*, 197-207. https://doi.org/10.2147/JAA.S100379	Management of FPIES	Qualitative systematic review	(S)- Provides overview of S/S of FPIES and common treatments used to treat FPIES (L)- Not well understood; diagnosis is based on clinical history	• Non-IgE-mediated GI food allergy that consists of repetitive profuse vomiting, pallor and lethargy 1-4 hours after eating the offending food; usually after the first or second ingestion of a food • Fluid repletion is the first-line therapy. • The administration of ondansetron can help reduce or prohibit nausea and vomiting.	Assessment of FPIES Treatment of FPIES Emergency Care Plan	II	3	C

				• Emergency treatment letters should be provided to patient/family to be shown in case of emergency.				
30. Mikhail, I., Stukus, D. R., & Prince, B. T. (2021). Fatal anaphylaxis: Epidemiology and risk factors. *Current Allergy and Asthma Reports, 21*(28), 1-10. https://doi.org/10.1007/s11882-021-01006-x	Information regarding risk factors and variations related to food, medication, and venom allergies	Qualitative systematic review	(S)- Identifies possible culprits of anaphylaxis and factors that increase risk of fatal anaphylaxis (L)- Not pertaining to schools	• Diagnosis of anaphylaxis is based on clinical symptoms. Presentation can vary and range in severity. • Lists three criteria to diagnose anaphylaxis. • Mild: cutaneous symptoms only • Moderate: respiratory, cardiovascular, or gastrointestinal involvement • Severe: hypoxemia, hypotension, neurological compromise. • In about 20% of anaphylactic reactions, cutaneous findings are not present. • Upright posture has been associated with fatal food-related anaphylaxis. Patients should be placed in supine position to reduce stress on the cardiovascular system. • Reading food labels and communicating with food handlers can help decrease the risk of accidental exposure. • Most fatal food reactions occur outside of the home. • Causes for delayed epinephrine: lack of knowledge (missed diagnosis, improper technique), and lack of access.	Assessment and diagnosis of anaphylaxis Positioning of patient Treatment	II	3	C

				• Asthma is also associated with fatal anaphylaxis from food allergies. • Venom-related anaphylaxis is the second most common cause of fatal anaphylaxis in the U.S.				
31. Navalpakam, A., Thanaputkaiporn, N., & Poowuttikul, P. (2022). Management of anaphylaxis. *Immunology and Allergy Clinics of North America, 42*, 65-76. https://doi.org/10.1016/j.iac.2021.09.005	Avoidance measures Treatment of anaphylaxis	Literature review	(S)- Review of medication to be used during anaphylaxis (L)- Not specific to treatment in school setting	• Early recognition and prompt assessment of anaphylaxis and appropriate treatment can reduce morbidity and mortality. • Place patient in recumbent position during anaphylaxis. Sitting upright can lead to decreased blood flow in the heart causing "empty ventricle syndrome," leading to cardiac arrest and death. • Epinephrine is the gold standard of treatment of anaphylaxis. • Epinephrine dose is 0.01mg/kg. • Epinephrine can be repeated every 5-15 minutes as needed if symptoms persist. • Antihistamines have slow onset of action and can take 60-120 minutes to reach plasma levels. They are not first- or second-line treatment of anaphylaxis. They should only be used after epinephrine has been given to stabilize a patient, and can relieve skin symptoms, but do not prevent or treat cardiovascular and respiratory symptoms.	Assessment and treatment of anaphylaxis Positioning of patient Treatment of patient in anaphylaxis Adjunct medications	II	5	C

				• Give inhaled short-acting bronchodilators in patients with bronchospasm despite epinephrine treatment. These should not be used in place of epinephrine.				
32. Pham, M. N., & Wang, J. (2018). Management of food allergies and asthma in schools. *Annals of Allergy, Asthma & Immunology, 121*, 391-399. https://doi.org/10.1016/j.anai.2018.07.028	Recommendations for food allergy and asthma management in schools Resources for optimizing food allergy and asthma management for students	Qualitative systematic review	(S)- Comprehensive review of food allergy management in the school setting	• Need to be able to distinguish between allergic reaction and asthma, as these two conditions often coexist. • In the National Health and Nutrition Examination Survey, those with physician-diagnosed asthma had an increased prevalence of food sensitization. • Most food allergic reactions at school occur in the classroom (79%-83%) and the lunchroom (12%-15%). • Food allergic children are more prone to bullying. Most episodes took place in school with the majority of perpetrators being classmates. Students also felt teased or harassed by teachers or school staff at times. • Need to adopt avoidance measures: allergen-conscious food prep; awareness of hidden allergens for avoidance; practicing good cleaning techniques; and school policies for implementation. • Need to train staff to recognize symptoms	Assessment recognizing bullying Prevention Training Emergency Care Plans Management Policies	II	3	C

				• Have access to emergency care plans and emergency medications • The effectiveness of allergen restrictive policies is unclear and controversial. • One study found that the teacher was the first to recognize food allergy reactions in 59% of cases. • Benefit to train all staff, but need to be clear as to who is allowed to administer emergency medications; need clear policies and procedures • No standardization of anaphylaxis training among staff • Allergen avoidance is mainstay of food allergy management. • If respiratory symptoms are present, food reactions should be considered, especially if no real trigger for asthma; will need epinephrine instead of inhaled beta-agonist • Need individualized emergency care plans for students with food allergies • Every student with food allergies should provide an unexpired epinephrine auto-injector for the school year. • Kids 12-14 years of age are typically deemed capable of self-carrying medications.				

33. Pistiner, M., DiLaura Devore, C., & Schoessler, S. (2015). School food allergy and anaphylaxis management for the pediatrician – Extending the medical home with critical collaborations. *Pediatric Clinics of North America, 62*, 1425-1439. https://doi.org/10.1016/j.pcl.2015.07.016	Guide community pediatricians by improving food allergy management in school settings Identify resources Empower pediatricians to collaborate and bridge the medical, family, and educational homes for kids with food allergies	Review/expert opinion	(S)- Identifies role of school nurse with food allergy reaction prevention and treatment (S)- Identifies what is needed from community physicians	• Pillars of food allergy management are prevention and emergency preparedness • Prevent accidental exposure by reading labels, prevent ingestion of hidden ingredients, prevent cross contact, utilize effective cleaning strategies, and communicate clearly • Treat by being able to recognize an allergic reaction; having epinephrine available and knowing when and how to use it; and contacting emergency services. • Need emergency care plan • All school staff responsible for a student with a food allergy must be educated and prepared to recognize their role in an allergic emergency. • School nurses serve as care coordinators, advocates, responders, and educators. • School nurses can train and prepare others to recognize their reaction. • Implement school-wide policies to prevent and treat allergic reactions • School nurses can serve as a leader with planning and implementing school district's health policies and food allergy management plan.	Prevention of allergic reaction Treatment of allergic reaction Training and retraining opportunities Emergency Care Plan Assessment of child Policies Documentation: 504 plans, education plan	II	5	C

				• Recommend annual training on food allergy prevention and preparedness. • Individualized healthcare plans outline the nurse's plan of care for students with special needs. It includes assessment data, nursing diagnosis, student goals, expected outcomes, and evaluation. It is based on HCP's orders given to the school, including diagnosis, medication orders, treatment orders, and other needs. Written by a nurse for licensed persons. It is the responsibility of the school nurse to prepare. • A 504 plan requires the school to provide accommodations based on guidance from the treating prescriber and can be useful if there are no school nurses or food allergy/ anaphylaxis emergency preparedness plans. Requires formal meetings with 504 coordinator, essential staff, and family to create official plan. • An individualized education plan is for students with other disabilities that affect their education beyond food allergy. This is the highest level of support.				

34. Posanka, B. (2022, May). Adverse event leads to quality improvement plan. *NASN School Nurse, 37*(3), 132-135. https://doi.org/10.1177/1942602X221077234	Review preventable adverse events and quality improvement plan to address communication deficit, knowledge deficit, hierarchical culture, product labeling, and data collection	Case study	(S)- Brings awareness to latex allergy and necessary steps to keep children at risk for latex allergy safe (L)- Case study	• School nurses use info from student's medical team and family to create individualized healthcare plans to relay essential health info to school staff. • Best to practice strict avoidance of latex in children with spina bifida, as they are at increased risk for developing an allergy. • In the case study, preparatory measures were taken at the time of the student's enrollment. This included consulting with a care coordinator from the local children's hospital to ensure that the school environment would be safe. The coordinator toured the school and identified products that might contain latex. • Need to check classroom, cafeteria, gym, playground, housekeeping supplies, school bus, nurse's office, and possibly field trips • Update IHP annually. • Need to review and update school policies annually. In regard to the case study, the principal had deemed the school latex-free, but it was not written in handbook or any school policies. Latex-free building designation was also not in the child's IHP.	Advocacy Training Care coordination Care planning	II	5	C

				• Lack of communication between healthcare team and school care team, which can be problematic if there is a change in staff • Lack of checking kits or supplies for latex • Lack of understanding that contact and inhalation of latex could result in a reaction • Annual in-person review to improve communication between school and families • Nurse-led staff training to provide education on health considerations for curriculum and supplies • Consider developing relationships between student's medical team • Advocating for improved labeling and school health data reporting				
35. Posner, L. S., & Camargo Jr., C. A. (2017). Update on the usage and safety of epinephrine auto-injectors, 2017. *Drug, Healthcare and Patient Safety, 9*, 9-18. https://doi.org/10.2147/DHPS.S121733	Review possible causes of delayed epinephrine administration	Qualitative systematic review	(S)- Discusses barriers to use of epinephrine (S)- Reviews proper way to administer epinephrine, including how to properly restrain a child (L)-Includes data from countries other than the U.S., which may not allow for data to be generalizable	• A 2010 multicenter study of ERs found that half of the children with food-related anaphylaxis never received epinephrine, and the majority were treated with antihistamines. • Antihistamines are not meant to treat critical cardiovascular or pulmonary symptoms. • Mylan provides free EAIs to schools participating in the EpiPen4Schools program. More than 60,000 U.S. public and private schools have participated in this program. • Safety concerns often get in the way of EAIs being used. Parents are worried about injuring their child, incorrect use, and poor outcomes.	Management of allergic reactions Funding stock epinephrine Barriers to using epinephrine Topics that need to be covered in training Proper administration of epinephrine	II	3	C

				• Accidental injection in a finger can lead to tissue necrosis and could result in digit amputation. • Study of general pediatric physicians in Turkey found that when asked to simulate administration of EAI, 36% used a technique that could cause self-injection into their thumb. After theoretical and practical training, this was reduced to 7%. • Lacerations can occur when the child is not properly restrained. This can also occur if the needle is reinserted after a child jerks free.				
36. Rajaee, A., Masquelin, M. E., & Pohlgeers, K. M. (2021). Pediatric allergy: An overview. *Primary Care: Clinics in Office Practice, 48*, 517-530. https://doi.org/10.1016/j.pop.2021.04.006	Review of most common allergic diseases and anaphylaxis	Literature review	(S)- Overview of various allergic conditions (L)- Review article	• Food allergies are either IgE- or non-IgE-mediated allergies. • Food allergy management involves dietary avoidance. • Latex allergy is an IgE-mediated allergy to natural rubber latex. There is some cross-reactivity with some foods like banana, avocado, and kiwi. The highest risk of latex allergy is seen in kids with spina bifida. The mainstay of treatment is avoidance of latex. • Sting allergy patients should carry epinephrine auto-injectors. • Anaphylaxis is caused by degranulation of mast cells and systemic release of IgE complexes in response to an allergen.	Management Emergency medications	II	3	C

				• S/S of anaphylaxis • Epinephrine dose is 0.01mg/kg. • Lay patient supine with elevation of lower extremities, supplemental oxygen, and IV fluids • Can also use adjunctive therapy such as H1 antihistamines, H2 antihistamines, bronchodilators, and glucocorticoids				
37. Raptis, G., Perez-Botella, M., Totterdell, R., Gerasimidis, K., & Michaelis, L. (2020). A survey of school's preparedness for managing anaphylaxis in pupils with food allergy. *European Journal of Pediatrics, 179*, 1537-1545. https://doi.org/10.1007/s00431-020-03645-0	Assess school preparedness in dealing with allergic reactions in primary schools	n = 275 Descriptive study Out of 275 primary schools, 157 responded to the survey	(L)- Based in England	• Current guidelines in England state that all school staff should receive training on how to prevent, recognize, and respond to anaphylaxis. • Eighty-nine of the 157 schools reported allergic students that had experienced a severe allergic reaction. • Of 86 schools that responded to the question about the presence of an action plan for students, 77 schools confirmed they had action plans. • Some 152 schools responded to the question of having existing guidelines and protocols. Of these schools, 111 had a standard management protocol in place for emergency treatment for a severe reaction. Of the schools with allergic students, 77 had a protocol. Twenty-six out of 60 schools with no students at risk for anaphylaxis reported they had no protocol in place.	Assess preparedness of staff Determine effectiveness of current training.	II	3	C

				• Out of 112 respondents, 53 felt confident in managing anaphylaxis. Schools with allergic pupils rated themselves more confident managing anaphylaxis than those without. • One hundred fourteen out of 140 schools felt that further training was needed; 70 out of 116 wanted face-to-face training. • One hundred twenty-eight schools out of 147 identified that they would want further info on management of severe allergic reactions				
38. Ren, Q., Chen, F., Zhang, H., Tu, J., Xu, X., & Liu, C. (2022). Effects of a standardized patient-based simulation in anaphylactic shock manager for new graduate nurses. *BMC Nursing, 21*(209), 1-8. https://doi.org/10.1186/s12912-022-00995-y	Determine the effectiveness and safety of standardized patient-based simulation methods for contemporary nursing education, especially for inexperienced nurses	n = 104 Convenience sampling of 104 students and 10 instructors Quasi-experimental All students had to be new grad nurses hired to work for one year in a hospital in Zhejiang province, China, with no prior simulation experience. Any nurses that were pregnant or had illness were excluded.	(S)- Rescue protocol training checklist for anaphylactic shock was developed with advice from University of Pittsburgh professors (S)- Findings were consistent with a similar study on medical students; while this study is not focusing on teachers or school nurses, the findings in two separate studies yielded similar findings (L)- Utilized for new nurses in a hospital, not school nurses or teachers; not generalizable (L)- Took place in China	• Underwent the simulation two times one month apart; after the first simulation, all students improved in six competencies in the second simulation. • Students were highly satisfied with all aspects of the training. • One hundred and three students felt the simulation training would guide them in clinical practice. • Ninety-six students reported improvements in clinical judgment and emergency response. • When compared to in-class training, 78 students reported that the simulation training enhanced their clinical judgment and emergency response.	Effective training	II	3	C

				• When compared to in-class training, 78 students reported that the simulation training enhanced their clinical judgment and emergency response. • Allows for training in a safe environment that mimics reality and helps with understanding roles and responsibilities during the rescue of a patient in anaphylactic shock				
39. Rustagi, S., Mullins, D., & Yanney, E. (2020). Current updates in diagnosis and management of eosinophilic esophagitis. *Current Problems in Pediatric and Adolescent Health Care, 50*, 1-4. https://doi.org/10.1016/j.cppeds.2020.100783	Diagnosis and management of EoE	Qualitative systematic review		• EoE presents as a chronic inflammatory response. • Presentation: history of food impactions, food refusal, chronic GERD, regurgitation, dysphagia, odynophagia, failure to thrive, vomiting, and abdominal pain • Treatment: PPI, swallowed topical steroids, and food elimination	Assessment of EoE Management of EoE	II	3	C
40. Sampson, H. A., Aceves, S., Allan Bock, S., James, J., Jones, S., Lang, D., Nadeau, K., Nowak-Wegrzyn, A., Oppenheimer, J., Perry, T. T., Randolph, C., Sicherer, S. H., Simon, R. A., Vickery, B. P., & Wood, R. (2014). Food allergy: A practice parameter update – 2014. *The Journal of Allergy and Clinical Immunology, 134*(5), 1016-1025. https://doi.org/10.1016/j.jaci.2014.05.013	Create a practice parameter that addresses recent advances in the field of food allergy and the optimal methods of diagnosis and management based on an assessment of the most current literature	Practice parameter/ guideline	(S)- Broad overview of all food allergies and recommended therapies (L)- Not specific to children (L)- Completed in 2014, so may contain outdated information	• In younger children, EoE can present with feeding disorders, vomiting reflux symptoms, and abdominal pain. Adolescents and adults can have dysphagia and food impactions. • FPIES presents as repetitive projectile vomiting and dehydration 2-4 hours after ingesting. • FPIES symptoms can include emesis (1-3 hours), lethargy (1-3 hours), and diarrhea (2-10 hours).	Avoidance measures Treatment options Training Allergy Action Plan	II	1	B

				• EoE is treated with PPI twice a day • Primary therapy for food allergy is strict avoidance of the food, regardless of whether it is an IgE- or non-IgE-mediated food allergy. • Standard cleaning procedures are sufficient to remove allergens from surfaces and hands. • Patients and caregivers need to be educated about label reading, cross-contact, hidden foods, and environmental exposures when obtaining or preparing meals. • Review recognition and treatment of IgE-mediated food-related reactions with patient and caregivers (Grade C). • Use epinephrine as first-line management for treatment of anaphylaxis (Grade C). • Ensure epinephrine is readily available to patients (Grade C). • Patients and caregivers should be educated on common food triggers for FPIES and strict food avoidance for symptom management. • FPIES management involves IV volume replacement (Grade B). Single doses of methylprednisolone and ondansetron may be considered. A letter is often sent to school regarding management as FPIES is often underrecognized and mismanaged.				

				• Schools and childcare centers should have policies and programs for facilitating avoidance of food allergens. • Staff education should include label reading and info on cross-contact during food prep, proper cleaning of utensils, and potential allergens in class projects. • Develop written action plan for treatment of allergic reactions to food, including avoidance and treatment plan (Moderate/Grade D). • Bullying should not be tolerated and should be promptly recognized and reported and the consequences should be significant.				
41. Shaker, M. S., Wallace, D. V., Golden, D. B. K., Oppenheimer, J., Bernstein, J. A., Campbell, R. L., Dinakar, C., Ellis, A., Greenhawt, M., Khan, D. A.., Lang, D. M., Lang, E. S., Lieberman, J. A., Portnoy, J., Rank, M. A., Stukus, D. R., Wang, J., Riblet, N., Bobrownicki, A. M. P., . . . Wickham, A. (2020). Anaphylaxis – A 2020 practice parameter update, systematic review, and Grading of Recommendations, Assessment,	Diagnosing anaphylaxis Managing anaphylaxis	Practice parameter/ guideline	(S)- Systematic review on the treatment of anaphylaxis (S)- Early use of epinephrine in anaphylaxis can help prevent poor outcomes. (L)- High-certainty evidence is lacking regarding use of antihistamines and glucocorticoid as supplemental therapies in anaphylaxis management.	• Food and stinging insects are the most common cause of anaphylaxis in children. • Food allergies can affect 8%-11% of children and adults. Systemic reactions to stinging insect allergy can occur in 0.5% to 3.3% of patients in the U.S., with most fatalities occurring in those with no prior history. • Epinephrine 0.1mg/kg to a maximum of 0.5mg in adults and 0.3mg in children in anterolateral thigh is first line of treatment for anaphylaxis (MOA listed in article). • Dose can be repeated every 5 to 15 minutes.	Treatment (epinephrine and consider antihista-mines; if epinephrine is given, transfer to ER/call 911) Assessment Education for those who have had epinephrine	II	1	B

Development and Evaluation (GRADE) analysis. *The Journal of Allergy and Clinical Immunology, 145*(4), 1082-1123. https://doi.org/10.1016/j.jaci.2020.01.017				• Antihistamines are a second-line treatment. They can be used as adjunctive therapy for residual cutaneous symptoms associated with anaphylaxis. • Antihistamines can take 30-90 minutes to take effect. • Epinephrine should be used as a first-line treatment. • Delaying epinephrine may be associated with higher morbidity and mortality. • After diagnosis and treatment of anaphylaxis, patients should be kept under observation in a setting capable of managing anaphylaxis. • All patients with anaphylaxis should receive education on anaphylaxis. • Criteria for anaphylaxis listed in article				
42. Sicherer, S. H., & Sampson, H. A. (2018). Food allergy: A review and update on epidemiology, pathogenesis, diagnosis, prevention, and management. *The Journal of Allergy and Clinical Immunology, 141*(1), 41-58. https://doi.org/10.1016/j.jaci.2017.11.003	Review of epidemiology, pathogenesis, diagnosis, prevention, and management of food allergies	Expert review		• Epinephrine is the primary treatment of anaphylaxis • Clinical criteria for anaphylaxis • Epinephrine can be given every 5-15 minutes. • Recommend keeping EAIs at a temperature of 68-77 degrees Fahrenheit	Management of allergic reaction Assessment of allergic reaction	II	5	C

43. Sicherer, S. H., & Simons, E. R. (2017). Epinephrine for first-aid management of anaphylaxis. *Pediatrics, 139*(3), e20164006. https://doi.org/10.1542/peds.2016-4006	Identify those at risk for anaphylaxis New information on epinephrine and EAIs Importance of educating patients and families on recognizing and managing anaphylaxis in the community	Clinical report from the American Academy of Pediatrics	(S)- AAP's recommendations on epinephrine prescription (S)- Identifies barriers to use of epinephrine (S)- Identifies the importance of education on recognizing and treating anaphylaxis	• Anaphylaxis criteria listed • Delayed administration of epinephrine increases the risk of hospitalization and poor outcomes. • H1 antihistamines prevent and relieve itching and hives, but do not relieve life-threatening symptoms. • H2 antihistamines and glucocorticoids are adjunctive and not appropriate for initial treatment or as only treatment. • B2 adrenergic agonists can help with lower respiratory symptoms but should not be used as initial treatment or only treatment. • If response to the first epinephrine injection is inadequate, it can be repeated every 5 to 15 minutes. • Recommended that epinephrine be given for sudden onset of any anaphylaxis symptoms • In the community setting, if a caregiver is unsure if the reaction is severe, they should be instructed to err on the side of caution and give epinephrine. • Barriers to using epinephrine: failure to recognize anaphylaxis; spontaneous recovery during a previous anaphylactic reaction and the assumption it will happen again; relying on oral antihistamines or inhaled bronchodilators; no EAI available; fear of needles, and concerns about adverse effects of epinephrine	Assessment Epinephrine use over other medications Epinephrine storage Self-carry Training to recognize and treat anaphylaxis Emergency Action Plan Stock epinephrine (check with state legislature, which may help with funding)	II	4	C

				• Barriers for parents using EAIs: worry about hurting child or bad outcome • Can also have lacerations when a child is not restrained properly or unintentional injections into digits or other body parts • Teenagers are at increased risk of death in anaphylaxis due to high-risk behavior, failure to recognize symptoms, and failure to carry epinephrine or inject it promptly. • Patients and caregivers need training in recognizing anaphylaxis and using an EAI. • Should have regular review of anaphylaxis recognition and injection technique (e.g., annually) to ensure knowledge is retained • After epinephrine is given the patient should be assessed in an ER to determine if further interventions are needed. • AAP recommends that kids aged 12-14 can begin to share responsibilities with parents when it comes to recognizing and treating anaphylaxis. This transition should be individualized based on presence of asthma and absence of cognitive dysfunction. • Adults have the ultimate responsibility for children and teenagers under their supervision.				

				• EAIs should not be kept in excessive heat or cold as this can degrade the medication. It should not be discolored or have precipitate. • EAIs are best prescribed in the context of a written, personalized anaphylaxis emergency action plan. • Prevention and treatment of anaphylaxis in schools, childcare settings, camps, etc., require a comprehensive approach, including awareness training and practical preparation. • Check with state legislature regarding stock epinephrine regulations.				
44. Vollmer, R. L., Girsch, V., & Foster, J. S. (2022). A qualitative investigation of parent and child perceptions of school food allergy policies in the United States. *The Journal of School Health, 92*(2), 185-193. https://doi.org/10.1111/josh.13121	Explore children's and parents' experience and perceptions of school safety and supportiveness in relation to child's food allergy Compare perception to documented school policy on food allergy	n = 18 pairs (36) Qualitative study U.S. parents and children with food allergies 8-18 years old were recruited for a one-time, one-on-one phone interview. Recruited through public posts on Facebook, posts in private FB groups for food allergies, and snowball sampling Semi-structured interviews Total of 18 parent-child dyads	(S)- Evaluates the impact of school food allergy policies on parents and children (L)- Not generalizable (L)- Policies are so variable between schools	• Social emotional well-being: balancing safety with normalcy; safe alternatives for celebrations at schools; concerned about the child being excluded at tables or in the classroom • Opportunities to improve safety: improper cleaning protocols of equipment and hands; nut-free school might provide a false sense of security; training to recognize and treat anaphylaxis is needed for all staff. Parents taught to ban food without food label or ban food rewards in the classroom.	Policies Prevention Training	II	3	C

				• Policy enforcement: parents and children that went to the same school with the same classmates for several years felt the concern, awareness, and trust of others improved over time. • Child empowerment: teaching and trusting the child to read food labels; self-carrying epinephrine; allowing child to take charge and advocate for himself or herself; and rules that would prevent allergic reactions. • Food allergy policies varied greatly between schools. Common policies were around epinephrine and FAAP.				
45. Wahl, A., Stephens, H., Ruffo, M., & Jones, A. L. (2015). The evaluation of a food allergy and epinephrine autoinjector training program for personnel who care for children in schools and community settings. *The Journal of School Nursing, 31*(2), 91-98. https://doi.org/10.1177/1059840514526889	Development of a training program for food allergies, implementation of the program, and evaluation of its effectiveness	n = 4818 Descriptive observational study		• Training from a nurse educator can be effective in helping those that work with children to manage allergic reactions. These results are independent of receiving prior training and were sustained for 12 months following training. • Prior training was low among camp counselors, childcare providers, and food service workers. These would be groups to focus on.	Effective training strategies	II	3	C

46. Wang, J., Sicherer, S. H., & SECTION ON ALLERGY AND IMMUNOLOGY. (2017). Guidance on completing a written allergy and anaphylaxis emergency plan. *Pediatrics, 139*(3), e1-e9. https://doi.org/10.1542/peds.2016-4005	Review information to help healthcare providers understand the role of a written, personalized allergy and anaphylaxis emergency care plan to optimize care of child at risk for allergic reaction	Clinical report	(S)- Beneficial to implement as it can improve outcomes in students at risk for anaphylaxis (S)- Helps clearly identify what should be done in simple wording if there is an allergic reaction (L)- Notes that guidance in the clinical report has not undergone systematic review or strict weighing of evidence, and should not be considered practice guideline	• Written action plans are recommended by the AAP and CDC. • Written action plans can potentially improve outcomes of anaphylaxis by reducing frequency and severity of a reaction, improve knowledge, improve use of EAI, and reduce anxiety. • Many iterations of action plans exist which can lead to confusion. • Emergency action plans can serve as guides for patient, caregiver, and school personnel to determine how to treat allergic reaction; helpful for any allergic disorder that places child at risk for anaphylaxis (food allergy or sting allergy) • Plans should be made annually or whenever there is a change to triggers or medical condition • Plan should include demographic info; date created; allergic triggers; weight; other comorbid conditions; and ability to self-carry; and indicate that if anaphylaxis is suspected but uncertain, EAI should be administered • All states have laws regarding self-carry. It may require a form to be signed by the parent(s). There are no specific guidelines to determine when a child is OK to self-carry, but AAP has found 9-11 years of age can recognize anaphylaxis and 12-14 can usually self-carry EAIs.	Allergy Action Plan Policy Treatment	II	4	C

				• The caregiver or school personnel should be able to recognize anaphylaxis and be able to administer it and activate the emergency response. • Plan may indicate giving EAI with definitive sting or ingestion of food that could result in anaphylaxis • With one mild symptom, an oral antihistamine is appropriate. If additional symptoms develop or more than one organ system is involved, then epinephrine should be given. • Should specify medications and dose • Should always have two EAIs available • Consider second-generation antihistamines like cetirizine over diphenhydramine for mild allergic reaction, as it is longer-lasting and not as sedating.				
47. Waserman, S., Cruickshank, H., Hildebrand, K. J., Mack, D., Bantock, L., Bingemann, T., Chu, D. K., Cuello-Garcia, C., Ebisawa, M., Fahmy, D., Fleischer, D. M., Galloway, L., Gartrell, G., Greenhawt, M., Hamilton, N., Hourihane, J., Langlois, M., Loh, R., Muraro, A., . . . Brozek, J. L. (2021).	Guidelines provide evidence- informed recommendations to help policymakers determine optimal strategies for managing food allergies in childcare centers, primary/ elementary schools, middle/junior high schools, and secondary/high schools.	Systematic literature review	(S)- Reviews common practices implemented in school settings (L)- Statement in guidelines paper from JACI that recommendations are limited due to the low quality of available evidence (L)- Guidelines are most applicable in settings where food allergies are recognized as a public	• On average, if a school had 350 students, about 1.3 allergic reactions of any severity would occur at each school per year. Anaphylaxis would be approximately one in 15 schools per year, and epinephrine would need to be given in one in 24 schools per year. One in 10 allergic reactions and cases of anaphylaxis occur at childcare centers or schools.	Training Allergy Action Plan Protocols/ policies to manage those without confirmed food allergy Treating with epinephrine	II	1	C

Prevention and management of allergic reactions to food in childcare centers and schools: Practice guidelines. *The Journal of Allergy and Clinical Immunology, 147*(5), 1561-1578. https://doi.org/10.1016/j.jaci.2021.01.034			health concern, and local childcare, schools, and healthcare systems that can manage allergic reactions.	**1.** Childcare centers and schools implement training for teachers and personnel in prevention, recognition, and treatment of allergic reactions to food. **2.** All schools and childcare centers should require an up-to-date allergy action plan. **3.** Childcare centers and schools should implement site-wide protocols for management of suspected allergic reaction to food for those without action plan on file. **4.** Childcare and school personnel should only use epinephrine if they suspect that someone is experiencing anaphylaxis, rather than using it for all suspected allergic reactions. **5.** It is recommended that school personnel do not preemptively administer epinephrine in cases where there are no S/S of allergic reaction, even if known ingestion. Special circumstances: (a) If childcare/school personnel think someone might be having anaphylaxis, but are not certain, it is recommended that epinephrine be given immediately. (b) If student with known allergy is found with impaired consciousness, give epinephrine and call EMS even without other signs of allergic reaction.	Prohibiting foods site wide is not backed by evidence Allergen-restricted zones not backed by evidence			

				(c) If student has a signed allergy action plan or note that instructs childcare/ school to follow different treatment protocol, then these instructions should be followed. Or if a student's HCP advises personnel by phone to administer certain treatments during suspected allergic reaction, then these instructions should be followed. (d) If local laws limit the ability of childcare/school to administer epinephrine then the laws should be followed. **6.** When laws permit, it is recommended that childcare centers and schools stock unassigned epinephrine onsite instead of making students bring their own. Special circumstances: (a) If childcare center and school stock unassigned epinephrine, most panel members in support of students with allergies are not required to store personal auto-injectors onsite for designated at-school use. Rather, they can carry them if mature enough. If carrying them, the auto-injector can be used to treat anaphylaxis if it occurs, and no stock epinephrine is readily available. (b) Some childcare centers and schools may have enough stock auto-injectors to equip personnel on field trips and other offsite				

				activities with stock auto-injectors while maintaining an adequate supply onsite. However, if there are not enough resources to provide stock epinephrine for offsite activities, then the school or childcare center should inform the student with allergy and their parents beforehand, require the student with allergy to bring their personal auto-injectors, and take steps to ensure personal auto-injectors are readily accessible during activity. Implementation consideration: If the childcare center or school stocks unassigned epinephrine, then they should develop clear policies and procedures for obtaining, storing, using, and replacing stock auto-injectors. Stock at least two auto-injectors in each dose. Store the auto-injectors in an easily accessible location. Store at correct temp (68-77 degrees Fahrenheit). Replace used and expired epinephrine, and train personnel on where to find and how to use it. To determine when a child is mature enough to carry, talk with the parents. They are generally able to keep it on them when they can hold onto it without losing, not play with it, or take it out at inappropriate times.				

				7. Do not prohibit specific food sitewide. **8.** Do not establish allergen-restricted zones except in special circumstances. Special circumstances: (a) when students lack developmental capacity to self-manage due to young age or physical or cognitive impairments, or (b) if local laws require childcare centers or schools to regulate presence of certain foods; policymakers and personnel should follow applicable laws. Implementation consideration: Communicate food policies to all community members. Studies have found that food allergy training is associated with short-term improvement in allergy-related test scores and self-reported levels of knowledge, skills, and preparedness. Very few studies have assessed the effects of food allergy interventions on the rate of allergic reactions in childcare centers and schools.				

APPENDIX D

Implementation of Allergy and Anaphylaxis CPG and Toolkit Resources: 3S Model

The 3S Model provides a visual representation of key school health data utilizing three components Student, School Nurse, and School Community (Wolfe et al., 2019). The following logic model provides guidance on how to identify key data points and areas of assessment needed to implement the CPG recommendations and toolkit resources into school nursing practice. This logic model provides a visual framework to clarify and identify the characteristics of each population (3S), general steps in the implementation process, and outcomes identification for evaluation of the implementing evidence-based practice (EBP).

EBP involves the integration of three components, the best external evidence (CPG recommendations), individual clinical expertise (SN), and patient values and expectations (Student and School Community) (Melnyk et al., 2009). Table D1 outlines the implementation of the CPG into school nursing practice through data.

Table D1: *3S Model for Implementation of Allergy and Anaphylaxis Clinical Practice Guidelines*

	Structure	Process (SN interventions)	Outcomes
School nurse (SN)	■ Model of care/SN assignment ■ Knowledge of allergies/ management ■ Experience with providing emergency allergy management ■ Knowledge of school and district policies, procedures, state laws	■ Continuing education on allergies/care management ■ Review of CPG recommendations and toolkit templates/ resources ■ Review school and district allergy policies, procedures, state laws ■ Review health services protocols, including trainings and forms ■ Identify any changes to current practice that need to be considered ■ Identify barriers and facilitators to your local environment for practice/policy/procedure change ■ Identify current resources ■ Identify gaps in resources ■ Make plan for implementing changes and gaps in resources, as needed ■ Review current data collection/documentation method/ processes ■ Identify data points and collection method/processes to track implementation ■ ***Implement evidence-based allergy management plan/CPG recommendations*** ■ Evaluate implementation, successes, and areas for improvement utilizing identifies data points (see outcomes)	■ Increase SN knowledge in evidence-based allergy care management ■ Increase in evidence-based care (evaluated by CPG measures - see data points) ■ Increase SN knowledge of school and district polices-procedures/state laws
Student	■ Students with allergies and at-risk for anaphylaxis (type of allergy, care needs, history of anaphylaxis, etc.) ■ Attendance ■ Academic outcomes ■ Access to healthcare ■ Access to emergency medication ■ Self-care abilities ■ Sense of safety/social isolation/ mental health ■ Family/social support		■ Reduce incidence of allergen exposure/ episodes of anaphylaxis ■ Increase school attendance and learning time/school activities ■ Increase health outcomes ■ (evaluated by CPG measures - see data points) ■ Increase access to healthcare ■ Increase access to emergency medication and trained staff ■ Increase sense of safety/social isolation/mental health ■ Increase collaboration with family/ family support

School community	■ General student population (number, general demographics, SDOH, etc.) ■ Chronic absenteeism ■ Student population with healthcare needs/acuity ■ Staffing (availability/training) ■ Resources available in community/school ■ Sense of safety/social isolation/ mental health/school climate ■ School and district policies, procedures, state laws		■ Increase awareness of student needs/ acuity ■ Increase in community resources, access to/utilization of resources ■ Increase school attendance and learning time/school activities ■ Increase safety measures, access to trained staff ■ Increase preparedness ■ Policies/procedures aligned with best practice (evaluated by CPG measures - see data points) ■ Increase sense of safety/social isolation/ mental health/school climate ■ Increase alignment of school and district policy, procedures, state laws with best practice

Structure represents the characteristics of each population that the school nurse must assess and identify any impacts they may have on the implementation of the best practice recommendations through assessment data. These characteristics are specific to each school nurse, each student, and each school community, and illustrate the individualized nature of evidence-based practice implementation. These individualized factors are utilized by the school nurse to determine the best way to implement best practices based upon the current and potential needs of each population and specific practice setting.

Process, or school nurse interventions is the step considered by the school nurse in implementing best practice recommendations and strategies as outlined in the CPG and Toolkit. These interventions are general guidance that serve as the bridge between the CPG/Toolkit and individual practice. The specifics of each process step will be unique to each school nurse and school community based upon the student needs and practice setting. Each of these process steps can be broken down into many action steps to create a more specific action plan for implementation with objectives, time frame, accountable staff, resources, and evaluation for each action step within the objectives.

Outcomes represent data the school nurse can utilize for evaluation purposes. Each of these outcomes can be measured in a variety of ways, but the data points identified in the evaluation section of the CPG can be helpful. The outcomes can also provide a measure of effectiveness of the implementation process. If the outcomes (data) are not reflecting what was anticipated or expected, it provides the school nurse with the opportunity to take a closer look at the process steps to identify areas for improvement, also known as quality improvement (QI).

For example, when measuring sense of safety, preparedness level, and access to resources, measurements may include qualitative responses of students, parents, staff, and administrators, the school nurse evaluation of school simulation exercises, assessment of data related to type of treatment provided (what kind, by whom, disposition) to students, results of SN assessment of student self-carry spot check (by spot check occurrence and over time), components of school climate surveys, and changes in policy/training practices. Additional examples are noted below (Table D2), though not exhaustive. It can be helpful to identify baseline levels of the outcome measure data points prior to CPG implementation. This provides the school nurse with the opportunity to identify current data collected, access and ability to retrieve data, and an overall view of current practices in relation to CPG recommendations. These are the action steps that are individualized to each school nurse and practice setting during the process or SN interventions.

Table D2: *Sample CPG Data Points to Measure Outcomes*

Population (3S)	Outcomes	Sample Data Points for Outcome Measurement
School nurse (SN)	▪ Increase SN knowledge in evidence-based allergy care management ▪ Increase in evidence-based care (evaluated by CPG measures - see data points) ▪ Increased SN knowledge of school and district policies, procedures, state laws	▪ Number of students with HCP life-threatening allergy ▪ Number of these students who are chronically absent ▪ Number of students by type of life-threatening allergy (food, sting, other) ▪ Number of students with AAP/EAP/ECP ▪ Number of students with IHP ▪ Number of students with a 504 plan with allergy accommodations ▪ Number of students with an IEP with allergy accommodations ▪ Number of students who self-carry ▪ Results of self-carry spot checks (total number, EAI present, expiration date, skills review) ▪ Number of students with antihistamines at school ▪ Number of students with EAI at school ▪ Number of staff trainings by type (general, mock drills, etc.) ▪ Number of staff trained (type of staff, frequency) ▪ Staff reported experiences reported during debriefing post-allergic reaction response ▪ Student report of mental health, somatic symptoms (clinic visits/time out of classroom), participation in activities, attendance rate ▪ Number of reports of bullying, resolution ▪ Number of communications with family/reachability ▪ Number of students with an allergic reaction at school ▪ Type of treatments required for allergic reactions at school (antihistamine, EAI, stock EAI) ▪ Number of antihistamine/EAI administered by (student, staff, RN, etc.) ▪ Number of doses administered by incident/student and total for the school year ▪ Disposition of students treated for allergic reaction (RTC, home, 911) ▪ Follow-up care (type/needs/school changes) ▪ Number of and type of school changes (policy/procedure/signage) ▪ Parent/student satisfaction ▪ School climate survey (engagement, satisfaction, safety, mental health) ▪ Number of reports shared with administrators (impact—increased awareness, action through policy, staffing changes, etc.) ▪ SN completion of identified Nursing Continuing Professional Development (NCPD), confidence level ▪ SN compliance/application of school/district/state policy and laws (examples: number of changes needed/ number of successful changes) ▪ Yearly policy/procedure audit for alignment with best practices ▪ Number of school/community resources (identified, partnerships, referrals, resources)
Student	▪ Reduce incidence of allergen exposure/ episodes of anaphylaxis ▪ Increase school attendance and learning time/school activities ▪ Increase health outcomes ▪ (evaluated by CPG measures - see data points) ▪ Increase access to healthcare ▪ Increase access to emergency medication and trained staff ▪ Increase sense of safety/social isolation/ mental health ▪ Increase collaboration with family/family support	
School community	▪ Increase awareness of student needs/ acuity ▪ Increase in community resources, access to/utilization of resources ▪ Increase school attendance and learning time/school activities ▪ Increase safety measures, access to trained staff ▪ Increase preparedness ▪ Policies/procedures aligned with best practice (evaluated by CPG measures - see data points) ▪ Increase sense of safety/social isolation/ mental health/school climate ▪ Increase alignment of school and district policy, procedures, state laws with best practice	