Chronic Neurological Conditions In the Classroom: A School Nurse Curriculum For Sustaining a Healthy Learner

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Advanced practice nurses in child neurology recognize that school nurses have a key role in providing comprehensive health services to children and adolescents and frequently interface to coordinate the care of students with chronic neurological conditions. Schools are bound by federal mandates to provide a free and appropriate education for children with disabilities. The Rehabilitation Act Section 504 (U.S. Department of Education, 1973, 2008), the 1990 Individuals with Disabilities Education Act, previously known as the Education for All Handicapped Children Act of 1975 (U.S. Department of Education, 1990, 1997, 2004), and the Americans with Disabilities Act Title II: State and Local Government Activities (U.S. Department of Justice, 1990, 2008) establish the mandates requiring schools to deliver health services for children with chronic health conditions during the school day.

The cohort of children, teens, and young adults with chronic neurological health conditions is at the health care and education system intersection (Thies, 1999). As their numbers grow, their special needs in the academic environment pose challenges for parents, school nurses, school administrators, and health care providers. For example, newer anticonvulsant medications have improved seizure control, and children with epilepsy can attend school more regularly. In some school settings, seizure rescue medications can be used for immediate treatment, often avoiding activating emergency medical services or a trip to the emergency department. Changing practice standards in the area of migraines and post-concussion management have also enhanced assessment and symptomatic treatment, helping children attend school more regularly.

School nurses have varying levels of confidence in managing common chronic child neurological conditions (Olympia, Wan, & Avner, 2005), and there is an ongoing need for targeted continuing education and evidence-based practice. There is also a need for a comprehensive and consolidated child neurology curriculum. Through the lens of two conceptual frameworks, the Child Neurology Process-Oriented Triage (Rosenblum & Sprague-McRae, 2009) and the Healthy Learner Model (Erickson, Splett, Mullett, & Heiman, 2006) to promote and maintain student health. This collection of child neurology educational and assessment content guides school nurses through in-person or telephone interactions with health care providers, students, and parents for selected child neurology issues.

Issues Related to the Care Of Students with Chronic Neurological Diseases

The special health needs of students with neurological conditions require a chronic disease resource school nurse and other school nursing staff to develop and maintain a high level of clinical expertise. As a consequence, there is a need for ongoing, targeted continuing education. Based upon their experience as nurse practitioners in child neurology, the authors identified four common neurological condi-
tions that most frequently elicit questions from school nurses: epilepsy/seizures, headaches/migraines, tic disorders, and concussions. As clinical practices continually change, school nurses can benefit from updated educational content.

Epilepsy/Seizures
Each year, approximately 200,000 people in the United States will be diagnosed with epilepsy, and 45,000 of these new cases will be among school-aged children (O’Dell & O’Hara, 2007). For many children and adults, their epilepsy is well controlled. School nurses, students, and families can benefit from ongoing knowledge and skills regarding epilepsy, seizures, safety, medication management (daily antiepileptic drugs and rescue seizure medications), post-seizure evaluations, and emergency response.

Headaches/Migraines
Many children and adolescents experience headaches, and headaches are a common reason for school absences. Bille’s (1962) classic study found that 40% of children have headaches by seven years of age, and 75% have them by 15 years of age. Migraine prevalence is 5% to 10% in children younger than 15 years of age. Once a clinician has excluded an acute or chronic illness beyond headache (e.g., brain tumor), attention turns to pain and symptom management (Rosenblum & Fisher, 2001). In between episodes, the symptoms abate, and the child is able to attend school. The school nurse is in a unique position to assess the student, family, and academic needs. Operating as a key player, the school nurse can develop care plans to support the child’s school attendance and/or create alternate methods for students to obtain necessary credits and classes.

Tic Disorders
Tics can be very distressing to students, families, teachers, and school nurses. Tics generally start between six and seven years of age and can be motor or vocal. Not all children with tics have Tourette syndrome, but Tourette syndrome is estimated to occur in 3 per 1,000 children (Centers for Disease Control and Prevention, 2009). Because tics are not harmful and rarely require medication, it is imperative that teachers, school nurses, and parents understand the etiology and course of tics, and strategies for management. The school nurse is in a position to provide education (to school staff, students, and parents) and suggest appropriate academic accommodations as necessary.

Concussions
Athletes are one group of school-aged students at risk for head injuries (Meehan & Bachur, 2009). Concussion and traumatic brain injury in children and adolescents are increasingly controversial topics in schools and sports programs. Fortunately, there is more attention around this issue; states are passing laws related to the management of concussed student athletes (e.g., California Assembly Bill 25 [2011]) and education of school athletic coaches (e.g., California Assembly Bill 1451 [2012]). School nurses, staff, and administrators need education on current return-to-play recommendations, and how to assess and triage students immediately after head injury. The return-to-play plan can generate controversy among parents, athletes, and coaches, but it is imperative that an athlete be free of post-traumatic symptoms and of all post-concussive symptoms at rest and with exertion (American Academy of Neurology, 2010, 2013; Cantu, 1998, 2001, 2009; Giza et al., 2013). Equally as important, but often poorly recognized, is a broader picture extending beyond athletics. Non-athletes must also be symptom-free during physical exertion to participate in physical education and other curricular activities. Other considerations should include the post-concussive impact on cognitive function, emotional stability, and psycho-social issues. School nurses play a vital collaborative role with health care providers as all students are transitioned, often with accommodations, back into the academic setting.

Child Neurology Telephone Encounter Guides
A comprehensive, coordinated effort is needed to integrate a broad spectrum of common child neurology conditions and to help school nurses blend educational, medical, and health services action plans. In response to the significance of these topics and the questions they generate, the authors developed a child neurology school nurse continuing education curriculum. The curriculum was created based upon the Child Neurology Telephone Encounter Guides (Sprague-McRae et al., 2009), part of a larger project with the Association of Child Neurology Nurses, the Child Neurology Society, and the Child Neurology Foundation.

The Child Neurology Telephone Encounter Guides were originally developed as a reference collection of specialized educational content for new or less-experienced registered nurses and advanced practice nurses in primary care and child neurology specialty settings. It quickly became apparent, however, that this resource could be adapted for a variety of settings, including school. The guides are a valuable resource for assisting school nurses with in-person or telephone child neurology encounters.

The guides were designed for situations where the diagnosis may or may not have been established. They are presented as a toolkit with a three-part structure for each topic. The first part is a general narrative overview of pertinent areas for assessing a selected child neurology problem. The second part offers a more comprehensive operational approach, including a data collection tool that can be used for training or charting. The third part is the “pocket guide.” This condensed version is a quick reference tool that also guides areas of assessment but is more portable. Topics covered in the guides include epilepsy, alteration of consciousness, paroxysmal involuntary movements, tic disorder, headache, post-concussion monitoring, and developmental delay.

This unique comprehensive collection of educational content is based upon the Child Neurology Process-Oriented Triage (ChiNePOT) conceptual framework, which was developed by Rosenblum and Sprague-McRae in 2009. This framework is built upon the synergistic benefit of blending knowledge, skill, and judgment to enhance patient care outcomes. Blending this framework with the educational content in the Child Neurology Telephone Encounter Guides provides a solid foundation for developing a child neurology school nurse curriculum and aligns well with Healthy Learner Model (HLM) principles. The following sections further explain ChiNePOT, the HLM, and the curriculum.
**Child Neurology Process-Oriented Triage (ChiNePOT)**

Process-oriented triage is a structural format, thought process, or framework for the teaching and learning of condition-specific information and development of action plans linking health care providers, families, students, and the school. Merging process and content in a global way allows for adaptability of a variety of patient care settings. ChiNePOT lends itself to chronic condition management in concert with the HLM.

The three elements of ChiNePOT are knowledge, skill, and judgment (see Figure 1). A thorough knowledge base is required to understand and synthesize pathophysiologic and pharmacologic elements of care, use evidence to base care on research as appropriate, and understand causes of error and allocation of responsibility and accountability. Skill in data collection from the student or parent and other health professionals is also central in employing the model in this context. Eliciting patient, family, and community values in the setting of a diverse student population is an ongoing challenge. Clinical judgment is the final overriding principle of this model. Knowledge and skill are crucial, but the practitioner must also appropriately interpret data to render safe, effective care. The school nurse’s combination of knowledge, skill, and judgment specifically related to child neurology conditions ultimately enhances the child’s potential to be a healthy learner.

**The Healthy Learner Model (HLM) for Student Chronic Condition Management**

Erickson and colleagues (2006) developed the HLM. This model proposes a bridge between the medical model, focusing on the clinical setting, and school initiatives in the school environment. “The HLM is an integrated, coordinated effort to optimize the health status and support the academic success of children with chronic conditions” (Erickson et al., 2006, p. 312). The model is dependent upon two fundamental prerequisites. The first is a professional school nurse with a baccalaureate degree who displays knowledge, skills, and expertise in all relevant areas. The sec-

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**Figure 1. The Child Neurology Process-Oriented Triage Model**

![ChiNePOT Diagram](image1)

**Note:** The Child Neurology Process-Oriented Triage Model combines a thorough knowledge base, skill at data collection, and clinical judgment to appropriately interpret data and render safe and effective care.

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**Figure 2. The Healthy Learner Model for Student Chronic Condition Management**

![HLM Diagram](image2)

**Note:** The aim of this model is to enable students with chronic conditions to be healthy, in school, and ready to learn.

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The Curriculum

HLM and ChiNePOT complement each other. The HLM answers the question: Why is this curriculum necessary? The ChiNePOT answers the question: How is the curriculum best presented? Based on ChiNePOT principles (knowledge, skill, and judgment), the educational content in the Child Neurology Telephone Encounter Guides was adapted, and a child neurology curriculum was created for school nurses, focusing on their scope of practice.

In the curriculum, four child neurology school nurse curriculum topics – epilepsy, headaches, tic, and concussion – were developed, integrating several areas of assessment:

- Description of symptoms.
- Medications and treatments.
- Medical update: Childhood illnesses and issues.
- General health and psychosocial issues.

The center of the model is the healthy learner who is supported by an infrastructure and intricate process. The leadership role is shared between school staff and members of the community. A key facilitator in this model is the school chronic disease resource nurse. This nurse has specialized clinical expertise and operates as a champion, mentoring other school nurses. With an expertise in evidence-based chronic disease management and capacity building, the chronic disease resource nurse encourages partnerships between health care professionals, families, and schools. These partnerships are an integral part of optimizing student health, improving academic performance, and making students healthy learners. With continual evaluation and leadership to enhance capacity building, the model is dynamic. HLM is a much-needed framework for schools and the community to support students with chronic health conditions, helping them stay healthy in school so they can be present to learn (Erickson et al., 2006).

<table>
<thead>
<tr>
<th>Description of Symptoms</th>
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<tr>
<td>1. Identify headache classification and general status.</td>
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<td>2. Identify longest headache-free period.</td>
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<td>3. Identify date and description of last headache.</td>
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<td>4. Describe typical headache frequency, type, location, pain quality, associated features, triggers, timing, aggravating factors, duration, patterns, changes in patterns, and level of disability.</td>
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<tr>
<td>5. <strong>Identify worrisome “red flags” (intractable vomiting, diplopia, ocipital pain, weakness, or ataxia).</strong></td>
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**Medication and Treatments**

1. List all current and past headache rescue and preventive medications and describe efficacy and frequency of use.
2. List other prescribed or over-the-counter (OTC) drugs, vitamins, nutritional, herbal, or homeopathic drugs, supplements, or substances.
3. Indicate strength, formulation, dosing schedule, compliance, recent dosing changes, duration of treatment, and frequency of use.
4. Indicate signs and symptoms of side effects, toxicity, or drug interactions.
5. Identify other non-medication therapies and efficacy.

**Medical Update: Childhood Illnesses and Issues**

3. Chronic: Status of other medical or physical co-morbid problems, disabilities, and environmental risks.
4. Laboratory or procedural testing: Imaging (CT or MRI) and other relevant labs or procedures (type, date, and results).

**ACTION:**

**Headache Symptoms and Medical Update**

Medication, Treatments, Childhood Illnesses, and Issues

- Access results of laboratory or procedural testing as appropriate.
- Consult with the child neurology provider as indicated, regarding drug side effects or interations (analgeslic overuse), recent acute illness, pertinent lab results, indications for adjusting or adding medication (rescue or prophylactic), indications for further laboratory or procedural testing, status of medical co-morbidities and disabilities, acuity, need for acute intervention (urgent care or ED), and priority for follow up.
- Discuss with the family headache triggers, headache diary, supportive management and as indicated, the use of rescue or prophylactic medication (dosing, side effects, drug interactions, and symptoms of analgesic overuse).
- Review with the family guidelines for follow up: Headaches, worsening in frequency, intensity, or duration; “red flags” (intractable vomiting, diplopia, occipital pain, weakness, or ataxia), drug side effects or worsening co-morbid medical problems or disabilities.
- Arrange interval follow up and insurance authorization as indicated (office or telephone appointment visit with child neurology provider or RN).
- Refer the patient to the primary care provider for symptoms of acute illness and update regarding headaches and management plan.
- Refer back to other specialists as indicated for worsening medical co-morbidities or disabilities.

**General Health and Psychosocial Issues**

1. Sleep: Current patterns, changes in patterns, or problems with snoring.
2. Nutrition: Poor appetite, vomiting, loose stools, constipation, weight loss or poor gain, inadequate access to food, excessive weight gain or pica.
4. Behavior: Temperament; new, ongoing, or worsening behaviors; relationship to recent changes; provocative factors, and typical management.
5. Communication and social skills: Difficulties with peer or family relationships, communicating, teasing, or bullying.

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### Family Dynamics and Coping
1. Status of psycho-social issues or changes in family dynamics or structure.
2. Financial or health insurance issues.
3. Parents’ and patient’s understanding of headache and level of concern.
4. Family support systems.

**ACTION:**

**General Health, Psycho-Social Issues, Family Dynamics, and Coping**
- Discuss with the family the nature of the headache and suggest strategies to address current issues and headache pattern changes.
- Provide information on nutritional, financial, and health insurance assistance programs if indicated.
- Offer referral or suggest return to social worker counseling or child psychiatry services if indicated.
- Encourage the use of community resources, supports, and specialty Web sites, and provide educational materials.
- Consult or update the child neurology provider as indicated regarding health, psycho-social family issues, and follow-up plan.
- Update the primary health care provider regarding health, psychosocial, or family issues.

### School and Therapy Programs
1. Intervention services: Pre-school or therapies (PT, OT, speech, or adaptive PE).
2. School: Grade level, status academically and socially, classroom setting, educational or ADD/ADHD testing (dates and results), identified learning disabilities, attention and focusing issues, educational interventions (IEP, 504 Plan [last review date], resource, or tutoring), response to medication (pre/post-reports if medicated for ADD/ADHD or other issues), attendance, and school headache plan.

**ACTION:**

**School and Therapy Programs If there are academic issues**
- Verify if consent is on file authorizing the exchange of medical, educational, and therapy information; if not, obtain one.
- Encourage testing (educational or ADD/ADHD) and IEP or 504 Plan as appropriate.
- Request letters from therapists and teachers describing current progress.
- Consider referral to school liaison and provide advocacy resources, patient education materials, and specialty Web sites.
- Update or consult the child neurology provider regarding new or worsening academic, focusing, behavioral, or learning disability issues, efficacy of treatment if medicated for ADD/ADHD or other issues, need to adjust or add medication, attendance problems, and follow-up plan to address school issues.
- Update or develop school headache management plan.

**Note:** A summary of the curriculum for headaches, addressing the description of symptoms; medication and treatments; medical update; childhood illnesses and issues; general health and psychosocial issues; family dynamics and coping; and school and therapy programs. Action plans are offered for relevant areas. Although originally developed for outpatient clinical practice, the pocket guide content is adaptable and aligns well with the school nursing scope of practice. The child neurology workshops are presented with the modified school nurse curriculum.

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There is a need to replicate this valuable curriculum for school nurses in every state. Advanced practice nurses in child neurology are in a unique position to provide this continuing education on a wider scope, if the barriers of financial resources and infrastructure can be addressed. If interested, please contact the authors for further details through the Association of Child Neurology Nurses (www.acnn.org).

References

Conclusion
The growing cohort of students with chronic neurological conditions presents an ongoing challenge for school nurses, teachers, and administrators. As school nurses gain more knowledge and their skill levels increase, their judgment is enhanced, and they are better prepared to care for these students in the classroom.


