

PRIMARY CARE RESOURCE AND REFERRAL GUIDE FOR CHILDREN 4-11 YEARS
OF AGE WITH ADHD

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ABSTRACT

The practice-improvement project (PIP) assessed five family nurse practitioners and one pediatrician regarding the use and evaluation of a community treatment guideline packet. Attention deficit hyperactivity disorder (ADHD) is a commonly diagnosed, chronic, neurobehavioral disorder, and high-quality, evidence-based management is associated with improved outcomes. Research has shown an increase in the diagnosis rate for ADHD, and the need for intensified clinical management of children, 4-11 years of age, with ADHD. Without proper evaluation or management of ADHD symptoms, the child may continue to struggle throughout life. Family nurse practitioners (FNPs) employed in rural communities may be the first point of contact for children, 4-11 years of age, who present with ADHD symptoms. Providers need to be knowledgeable about ADHD, the treatment guidelines, community resources, and the proper referrals within the community.

The PIP was designed to assist providers in 5 Minnesota communities who see 4-11 year-old children with ADHD symptoms. The PIP design included the creation and presentation of a treatment-guideline packet for 5 FNPs and 1 pediatrician in the rural communities. The providers volunteered to utilize and evaluate the packet for 6 weeks in January and February, 2014. To evaluate the treatment-guideline packet, a post-questionnaire was completed by each provider who participated.

The practice improvement project results indicated that 100% (n=6) of the providers felt that the treatment-guideline packet was helpful and would benefit practice. Providers felt the packet addressed a practice need by containing both a community resource/referral algorithm and an evidence-based ADHD process-of-care algorithm. Three-fourths of the providers felt that using the Vanderbilt Assessment Scales for diagnosing children would be a helpful addition to

the packet to assist with diagnosing ADHD in children of this age group. Overall, providers felt that being more aware of the potential referrals and resources in the community would allow a multi-modal approach of care, therefore improving their management of children, ages 4-11, with ADHD.

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CHAPTER 1. INTRODUCTION

Attention deficit hyperactivity disorder (ADHD) is a commonly diagnosed chronic neurobehavioral disorder that is characterized with symptoms of inattention, inappropriate behaviors, and impulsivity that can continue into adulthood (American Psychiatric Association, 2010; National Institute of Neurological Disorders and Stroke, 2011). Research has shown more diagnoses of ADHD, and there has been an intensified need to clinically manage these children in an effective, timely manner. The child who is 4-11 years of age with symptoms of ADHD may not be able to sit still, may have persistent difficulty sustaining attention, and may be unable to follow directions. With increased concern about the implications of these ADHD symptoms in children, what, then, are the risks of not treating these children? Children without proper evaluation, diagnosis or management of ADHD symptoms may continue to struggle throughout life. Improper management of ADHD symptoms can have a profound effect on financial costs; it can have a negative impact on the individual's family relationships, peer relationships, self-esteem, overall health and safety, as well as the ability to learn and make age-appropriate behavioral and academic progress.

Statement of the Problem

Family nurse practitioners employed in rural communities may be the first point of contact for children who present with symptoms of ADHD. Today there is a high prevalence of mental health needs with 1 in 5 American children diagnosed with a mental disorder, such as ADHD and only 20-25% of these children receiving treatment (American Academy of Child and Adolescent Psychiatry, 2009). The diagnosis and management of ADHD can be complicated, and the primary-care provider may not have knowledge or awareness about the treatment guidelines and what referral resources are needed to deliver the highest quality of care

to children ages 4-11. According to the American Academy of Pediatrics (AAP), the updated guidelines recommend that primary-care providers (PCP), such as the family nurse practitioner (FNP), are responsible for evaluating all children 4-18 years of age, with ADHD symptoms (AAP, 2011b). The AAP treatment guidelines provide high-quality, evidence-based, and comprehensive care.

The practice-improvement project (PIP) addresses the complex and collaborative nature of ADHD for the evaluation, treatment, and management of children. The FNP working with this patient population must have an adequate understanding of ADHD to guide and manage the patients and their families. Evaluating and diagnosing ADHD in children can be difficult and complex. The ADHD disorder has high rates of comorbid disorders and associated psychopathology. It is important for the FNP to be knowledgeable about ADHD, the treatment guidelines, available resources, and with whom to collaborate and correctly refer the child for successful management. Without knowledge and access to adequate resources, and referrals, care can become fragmented, resulting in suboptimal care for children.

Significance for Family Nurse Practitioners

The family nurse practitioner as a PCP in rural, primary-care settings needs to be knowledgeable about ADHD. The PCP has to be knowledgeable with both the updated American Academy of Pediatrics (AAP) guidelines as well as the proper community resources and referrals that are available to effectively manage children who are, 4-11 years of age, and have ADHD. Collaboration with the correct community stakeholders will ensure that the child is treated early and efficiently. Fundamentally, the FNP needs to stay current with the best evidence-based practice to effectively address parental concerns and to know when to refer the child to a specialist.

The FNP as a PCP is in a position to initiate an evaluation for any child, 4-18 years of age, with ADHD symptoms according to the practice guidelines. Many PCPs who practice in rural communities are confronted with children who have ADHD symptoms at varying levels of ages and severities. Many preschool-aged children may not have reached their developmental threshold and are a challenge for the PCP who is evaluating for ADHD symptoms. Preschool-aged children, typically, are impulsive and have trouble sitting still or sustaining attention for long periods of time. Therefore, the primary-care provider may find it difficult to accurately evaluate ADHD symptoms in the preschool-aged child. However, research suggests that early treatment is important and helpful for the child and the family who will deal with the ADHD symptoms.

Significantly, it is of utmost importance for all PCPs to be familiar with the most-current practice guidelines to provide the basis for high-quality, evidence-based care. The PCPs can bear the sole responsibility of evaluating, diagnosing, and managing a child with ADHD if they feel comfortable. If a PCP is not comfortable with the sole responsibility for the diagnosis or management of the child, the PCP should collaborate with subspecialists, such as child psychologists or mental-health providers, to ensure that the child receives consistent, appropriate management for this disorder and comorbidities (AAP, 2011a).

The guidelines recommend that the PCPs, such as FNPs, collect a history of presenting symptoms which include: a relevant past and family medical history of ADHD, any cardiac problems, or unexplained sudden deaths; a review of systems to consider other conditions or comorbidities that may present as ADHD or-coexist with ADHD; a thorough physical examination, which includes height, weight, blood pressure, heart rate, vision, hearing, and

neurologic assessments; and a review of validated assessment scales, including a comorbidity screen (AAP, 2011a).

CHAPTER 2. REVIEW OF LITERATURE

Attention Deficit Hyperactive Disorder (ADHD)

Attention deficit hyperactivity disorder (ADHD) is a common chronic neurobehavioral disorder that is diagnosed in children and can continue into adulthood (American Psychiatric Association, 2010; National Institute of Neurological Disorders and Stroke, 2011). ADHD is a medical condition that is commonly recognized in childhood and is characterized by the symptoms of inattention and/or hyperactivity-impulsivity (Krull, 2014). The child with ADHD has developmentally inappropriate behaviors of inattention, hyperactivity and impulsivity that are not typically observed in children at the same level of development (American Psychiatric Association, 2010; National Institute of Neurological Disorders and Stroke, 2011). Proper management of ADHD is important or it can have a profound effect on a child's behavioral, emotional, social, cognitive and academic functioning in multiple setting of life (Hodgkins, Dittmann, Sorooshian & Banaschewski, 2013; Krull, 2014).

ADHD is a complex disorder that is managed by educating the patient and family and by using medications and/or cognitive behavioral therapy (GroupHealth, 2011). One of the largest studies done was the Multimodal Treatment Study of Children with ADHD (MTA), which was the first conducted by the National Institute of Mental Health, which examined the long-term effectiveness of medication versus behavioral treatment versus both treatments for ADHD (Arnold et al., 1997). The study found that medication alone was effective and sufficient treatment, however, combining behavioral treatment with medication management allowed children to be on lower doses of medications to adequately control the ADHD symptoms. The MTA study provided important information about needed guidelines from professional organizations.

Specialists in behavioral health, neuropsychology, and pediatrics, are often consulted by the primary-care provider to assist in the care of a child with ADHD. The main reason to use resources and referrals in health-care is the impairments associated with ADHD, such as comorbidities, the patient's age, the ADHD subtype, the treatment response history, as well as the treatment needs and goals of the patient and family (Hodgkins et al., 2013). Significantly, the AAP (2011a) developed a valuable resource: an ADHD toolkit for primary-care providers who manage children with ADHD symptoms. The toolkit was developed to assist the providers with the management of ADHD symptoms. Providers need to address each individual's medical, psychosocial, and developmental issues in order; to rule out, for example, any toxins, comorbidities or auditory or sensory processing disorders. The toolkit is placed within a clinical framework that allows PCPs, in collaboration with other disciplines, to manage and provide the best care possible for each child with ADHD symptoms.

Prevalence of ADHD

Today, more children are being diagnosed with ADHD. Statistics have shown that approximately 5-10% of U.S. children are diagnosed with ADHD (American Psychiatric Association, 2010; Nagui, 2009). According to the Center for Disease Control and Prevention (2011), the 2010 statistics for U.S. children, 3-17 years of age, who have been diagnosed with ADHD, are approximately 5.2 million. Overall, boys have been found to be 2.4-4 times more likely than girls to have ADHD symptoms in the United States (Center for Disease Control and Prevention, 2011; Nagui, 2009). The ADHD disorder has been found to be present around the world, and it is believed that some children may not outgrow the disorder, making it a chronic

condition. It is significant for the PCP who will be responsible to manage the disorder into adulthood.

Etiology of ADHD

The problem with ADHD for clinicians is that there is no exact etiology, but the disorder is believed to have both genetic and environmental factors. The environmental factors are believed to include central nervous system (CNS) injuries either at birth or after, viral infections, low birth weight, fetal alcohol syndrome, perinatal stress, hypoxia, lead, smoking during pregnancy, and other toxins (Millichap, 2008). The molecular-genetic studies have found a relationship between the dopamine transporter (DAT1) gene and ADHD, however, the mechanism of its effect is unknown (Durston et al., 2008). ADHD's genetic factors are believed to be an impairment of the dopaminergic and noradrenergic transmission studies have found that the basal ganglia are significantly smaller in children with ADHD (Durston et al., 2008) The study also found that the DAT1 binding ration in the basal ganglia was significantly increased in children with ADHD who were not receiving treatment for the disorder (Durston et al., 2008). A study done by Shaw et al. (2007), examining 223 children and adolescents with ADHD, found that, by measuring the cortical thickness of children with ADHD, the overall development pattern was similar; however, there was a delay in cortical maturation. The study found delays in cognitive processes, such as attention and motor planning, which were predominately seen in the prefrontal regions of the brain (Shaw et al, 2007). The study showed that the cognitive delays for children reaching their milestones were 10.5 years compared to the median age of 7.5 years (Shaw et al., 2007).

On the other end of the spectrum, there has been extensive research on families, twins, and adopted children to support the theory that ADHD is a highly heritable disorder

(Banaschewski, Becker, Scherag, Franke, & Coghill, 2010). Studies have found that approximately 75-76% of children with ADHD also had first-or second-degree relatives with a history of ADHD (Banaschewski et al., 2010; Freitag, Rohde, Lempp, & Romanos, 2010). Twin studies have shown that there is, in fact, a strong genetic, heritable component that may play a significant role in the development of ADHD. Monozygotic twins have an increased incidence of ADHD when compared with dizygotic twins. In the studies, the quantitative traits are analyzed by comparing phenotypic variance between monozygotic (MZ) twins who shared 100% of their DNA and dizygotic (DZ) twins who share 50% of their distinguished DNA (Beaver, Nedelec, Rowland, & Schwartz, 2012). If the environmental experiences between the MZ and DZ twins are similar, then the only reason that MZ twins should be more similar than DZ twins on ADHD and ADHD-like symptoms is because they share more genetic material (Beaver et al., 2012).

Studies with sibling pairs, such as full siblings, half siblings, and stepsiblings, also illustrated the strong genetic association in families. Studies were also done with adopted children who had ADHD symptoms, and the results were consistent with twin-based studies. The results of these studies revealed a significant association between ADHD symptoms in biological parents and ADHD symptoms in their adopted-away children (Beaver et al., 2012). Genetics may, in fact, be the primary factor associated with ADHD while environmental factors are a secondary reason.

Comorbidities

When a child is diagnosed with ADHD, the PCP must take into account that the disorder has been found to present with high rates of comorbid disorders and associated psychopathology. Approximately 70% of preschool-aged children diagnosed with ADHD

symptoms may have at least one other co-morbid diagnosis (Nagui, 2009). According to Freitag et al. (2010), a study done with twins found that approximately 90% of the children who had ADHD were affected by at least one comorbid disorder. The most prevalent comorbid disorders found in the studies included oppositional defiant disorder, 40-65%; conduct disorder, 27-47%; major depressive disorder, 0-24%; and generalized anxiety disorder, 13-21% (Freitag et al., 2010).

Health-care providers should collect a history of presenting symptoms, relevant past and family medical history, and a review of systems to consider other conditions or comorbidities that may present as ADHD or coexist with ADHD (AAP, 2011a). The PCP who is uncomfortable with a child, with the symptoms of ADHD, and/or with other comorbidities needs to refer the child to a specialist for the correct diagnosis.

Diagnostic Criteria for Attention Deficit Hyperactivity Disorder

Primary-care providers need to be aware of how ADHD is diagnosed using the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; *DSM-5*) criteria that were released in May 2013 from the American Psychiatric Association. According to the American Psychiatric Association (2013), the *DSM-5* is used to diagnose children and adults with ADHD. The ADHD diagnosis includes the symptoms of inattentiveness or hyperactivity-impulsivity (Table 1) in 2 or more environmental settings before the age of 12 years (American Psychiatric Association, 2013). The diagnosis of ADHD is that children must have 6 or more symptoms from either (or both) of the inattention and the hyperactivity-impulsivity criteria. The symptoms must have persisted for at least 6 months, must have shown maladaptation and inconsistency with the child's developmental level, and must directly affect the child negatively in social and academic activities (American Psychiatric Association, 2013).

The three subtypes of ADHD are hyperactive-impulsive, inattentive, and the combined type. The hyperactive-impulsive subtypes contain six or more symptoms that are found in the hyperactivity-impulsivity categories. The inattentive-subtypes contain six or more symptoms from the inattention category. The combined type is diagnosed when both the hyperactive-impulsive subtype and the inattentive subtype symptoms are present in each category (American Psychiatric Association, 2013).

Table 1

ADHD Symptoms (Adapted from American Psychiatric Association, 2013)

Inattention Symptoms	Hyperactivity and Impulsivity Symptoms
Fails to give close attention to details or makes careless mistakes with schoolwork, work, or other activities.	Often fidgets with hands or feet, or squirms in seat.
Often has difficulty remaining focused and sustaining attention in tasks.	Often leaves seat in classroom or in other situations where expected to remain seated.
Does not seem to listen when spoken to directly.	Often runs about or climbs excessively in situations where it is inappropriate.
Often does not follow through on instructions and fails to finish schoolwork or activities at home or school.	Has difficulty with playing or engaging in leisure activities quietly.
Often will have difficulty organizing tasks and activities.	Is often continuously on the go as if driven by a motor.
Avoids, dislikes, or is reluctant to engage in tasks that require a lot of mental effort.	Often talks excessively.
Loses things that are necessary for tasks or activities.	Often blurts out answers before questions have been completed.
Is easily distracted by extraneous stimuli.	Often has difficulty waiting his or her turn.
Is forgetful in daily activities.	Interrupts or intrudes on others' play or conversations.

Clinical Practice Guidelines

The American Academy of Pediatrics has guidelines that are recommended for primary-care providers to evaluate children from 4-18 years of age who present with symptoms of hyperactivity, inattention, or impulsivity and who have behavioral or academic problems (AAP, 2011b). The clinical guidelines recommend that PCPs collect a history of presenting symptoms; relevant past and family medical history; a review of systems to consider other conditions or comorbidities that may present as ADHD or-coexist with ADHD; a physical examination, including vision, hearing, and neurologic exams; and a review of validated assessment scales, including a comorbidity screen (AAP, 2011a).

The AAP (2011b) guidelines recommended evaluating children as young as 4 years of age and using behavioral therapy as the first-line treatment for 4-5 year olds. The treatment recommendations for children 6-11 years of age included FDA-approved medications and/or teacher-administered behavior therapy as a first-line treatment (AAP, 2011b; Center for Disease Control and Prevention, 2011). The guidelines were recommended for high-quality, evidence-based healthcare practices. The guidelines were developed with the collaboration of representatives from the American Academy of Pediatrics and several professional subcommittee participants; the American Academy of Child and Adolescent Psychiatry, the National Association of School Psychologists, the Society for Developmental Behavioral Pediatrics, the American Academy of Family Physicians, epidemiologists from the Center for Disease Control and Prevention (CDC), Children and Adults with Attention-Deficit/Hyperactivity Disorder (CHADD), and the Society for Pediatric Psychology (AAP, 2011b). These groups collaborated over a 2-year period using a multi-level, systematic approach that reviewed the evidence base for practice changes that occurred since the development of the

previous guidelines that addressed the diagnosis and treatment of children who were 6-12 years of age. With the treatment guidelines, a health plan will be useful and beneficial to direct primary-care providers.

The ADHD Toolkit

The ADHD toolkit from the American Academy of Pediatrics (AAP, 2011a) is an important resource for PCPs who are considering an individual's medical, psychosocial, and developmental factors when assessing for ADHD. Recently, the ADHD toolkit has been updated according to the new practice guidelines. The toolkit is designed to assist PCPs with the assessment and ongoing management of children who are 4-18 years of age. The toolkit includes the Vanderbilt Rating Scales which are useful to assess ADHD symptoms in pediatric patients (AAP, 2011a). The toolkit has evidence-based guidelines and evaluation tools, such as an algorithm with step-by-step guidance for the process-of-care for children with ADHD (Appendix A). Tools available in the ADHD toolkit include the National Initiative for Children's Healthcare Quality (NICHQ) Vanderbilt assessment scales which are useful to assess ADHD symptoms in pediatric patients, these questionnaires are completed by the child's parents and teachers. The ADHD toolkit also has scoring instructions for the NICHQ Vanderbilt assessment scales, two samples of ADHD management plans, tools to screen for comorbidities, and information and resources to support the parents of children with ADHD symptoms (AAP, 2011a).

Vanderbilt Rating Scales

The Vanderbilt Rating Scales (VARS) are recommended by the ADHD toolkit so that parents and teachers can assist the clinician with the diagnosis and management of a child who has ADHD symptoms. Parents and teachers are important stakeholders in the child's care; they

play an integral role for identifying symptoms associated with ADHD and should document observations made both in the child's personal life and in the school environment. The VARS is useful for PCPs to rule out any alternative causes for the symptoms and to assess for other conditions that might coexist with the ADHD diagnosis. The toolkit is customized to closely follow the criteria set forth in the *DSM-IV* and includes 18 ADHD symptoms that are reported in the *DSM-IV* (Langberg, Vaughn, Brinkman, Froehlich, & Epstein, 2010). The VARS is scored using a 4-point Likert scale that indicates whether each ADHD symptom occurs never (score 0), occasionally (score 1), often (score 2), or many times (score 3). The child can then be scored by the clinician and categorized, according to symptoms, into a subtype: inattentive, hyperactive/impulsive, or combined (Langberg et al., 2010).

The second section of the VARS includes performance items where parents and teachers rate 8 partially overlapping, functional impairment items (Langberg et al., 2010). This section is rated on a 5-point Likert scale with excellence (score 1), above average (score 2), average (score 3), somewhat problematic (score 4), or problematic (score 5) on the scale (Appendices F and G). VARS data have no reliable research about the validity for how this tool may identify children with potential learning disorders. The clinician should then refer the child to a psychologist to complete a psycho-educational evaluation (Langberg et al., 2010).

Cognitive Behavior Therapy/Cognitive Behavioral Parental Training

According to the AAP (2011a), evidence-based cognitive behavioral training (CBT) programs (Table 2) have been found to be effective through research and have been recommended as a first-line treatment option for preschool-aged children with ADHD symptoms and as an alternative or combination of treatment for older children. The assessment of behavior functioning as a basis for intervention selection needs to be tailored to the

individual child in order to improve the treatment's effectiveness for the symptoms (Cormier, 2009). According to McGuinness (2008), cognitive behavioral therapy includes a set of specific interventions which provide goals for modifying the physical and social environments for a child with ADHD symptoms.

Cognitive behavioral parental training (CBPT) is therapy that is implemented by educating and training parents how to use skills to help manage a child with non-compliant behavioral symptoms of ADHD (AAP, 2011b; Young & Amarasinghe, 2010). School-based cognitive behavioral modifications are also part of treatment that is similar to CBPT, but interventions are made by the teacher, parents, peers, and students themselves (AAP, 2011a). Parents and special educators learn how to reward positive behaviors through praise, positive attention, and tangible rewards, as well as how to ignore bad behaviors with time outs, other effective commands, and similar physical disciplinary techniques (Glasser & Easley, 2008; Young & Amarasinghe, 2010).

Today, CBT is viewed as a well-established, empirically supported psychosocial treatment for a child with ADHD. Research has shown that CBPT has been the most broadly investigated treatment for ADHD-related behavioral problems and that it is the most effective treatment (Young & Amarasinghe, 2010). CBPT techniques are beneficial to the family and the child by improving both child behavior and the maladaptive parenting behavior (Chronis, Chacko, Fabiano, Wymbs, & Pelham, Jr., 2004; Cormier, 2009). Cognitive behavioral therapy programs are helpful for the child who has non-compliant behaviors that are associated with ADHD not only in the home environment, but also in other environments the child encounters. The assessment of behavior intervention selection needs to be tailored to the individual child to improve the treatment's effectiveness (Cormier, 2009).

Table 2

Evidence-Based Cognitive Behavioral Treatment for ADHD (Adapted from AAP, 2011b)

Types of Interventions	Description of Treatment for Children with ADHD	Typical Outcome(s)
Cognitive behavioral parent training (CBPT)	Cognitive behavior-modification principles provided to parents for the home setting.	Improved compliance with parental commands and improved parental understanding of behavioral principles that have high levels of parental satisfaction with treatment.
Cognitive behavioral classroom management	Cognitive behavior-modification principles provided to teachers for the classroom setting.	Improved attention to instruction, improved compliance with classroom rules, decreased disruptive behavior, and improved work productivity.

Medication Treatment for Children with ADHD

Stimulants are still the most commonly prescribed medications for children with ADHD. Stimulants such as Ritalin, Adderall, and Dexedrine have been found to be safe and effective, as well as non-stimulants such as Atomoxetine (Strattera) as a first-line medication in treating the symptoms of ADHD. Stimulants and non-stimulants all have warnings for side effects. The most commonly reported side effects are decreased appetite, weight loss, sleep problems, anxiety, and irritability while less-common side effects may include tics and personality changes, such as a flat affect or being without emotion (National Institute of Mental Health, 2011). According to Berman, Kuczenski, McCracken and London (2008), amphetamines have been used medically for years; however recreational abuse is also a potential result with stimulants and is a growing concern. Treatment with stimulants that is started early in young children has been linked to slower metabolic rates, slowed growth of height and weight, and

less influence on the ADHD symptoms (AAP, 2011a; Berman et al., 2008). Healthcare providers who have pediatric patients on stimulants, non-stimulants and antidepressants need to closely monitor these children for side effects. Appendix F is a list of stimulant and non-stimulant medications that are approved by the U.S. Food and Drug Administration (FDA) for children with ADHD symptoms; the medications are listed by age group and side effects.

The FDA recommends that primary-care providers obtain a complete initial health, family history, and physical for any existing cardiovascular and psychiatric problems before referring the child to behavioral mental-health professionals or starting him/her on medications (National Institute of Mental Health, 2011). The American Heart Association (2011) recommends that children have a cardiac evaluation, including an electrocardiogram, before starting treatment with stimulant medications to rule out heart abnormalities. Stimulant medication should not be used with children or adults who have pre-existing heart conditions or structural heart problems.

Because there is no evidence about the long-term impacts for the child who is prescribed ADHD medications by the subspecialist, close monitoring by the PCP and the parents needs to take place. Studies about the effect on a developing brain are a concern when using Ritalin which might interfere with normal brain development in younger children (National Institute of Mental Health, 2011). For children with a personal history of depression, bipolar disorder, or suicide, it is important to carefully monitor the child for safety (National Institute of Mental Health, 2011). The medications have been found, in some cases, to cause hostility, aggression, anxiety, depression, and paranoia. Research is ongoing about the benefits and risks of specific ADHD medications. Many professionals and individuals in the community believe that medication should not be the primary option for treating ADHD (Jenkins, 2010).

Comprehensive Treatment Team

Collaborating with stakeholders is important for treatment options that are in the best interest of the child to prevent comorbidities and delays with developmental milestones.

The family nurse practitioner (FNP) plays a major role in managing ADHD and has the responsibility to assist the patient and family with a treatment plan that has the proper resources, referrals, and team players. As a primary-care provider in the community, it is important to identify the patient's needs and to collaborate with mental-health behavior professionals, such as the psychologist, psychiatrists, and mental-health therapists. Other stakeholders may include pediatricians, special educators, area schools, clinics, and organizations in the community.

Special Education and Accommodations

To assist in the management of children with ADHD, there are special education programs and accommodations for children who have ADHD and who are considered to be disabled. Federal law indicates that all students with disabilities are entitled to a free education in the least restrictive learning environment (Laughlin, 2012). According to the AAP (2011b), these special-education services include the Individualized Education Plan (IEP) and the 504 Plan which are reserved for a child with a disability such as ADHD. When a child is diagnosed with ADHD, it is important for the PCP to collaborate with the parents and the school to provide special-education services and accommodations for the child. First, the parents or guardians need to request an educational evaluation for the child. The provider then needs to provide a letter to the school confirming the child's diagnosis (AAP, 2011b). Special educators at the school are qualified to teach techniques for succeeding in school and are trained to provide accommodations.

The Plan Do Study Act Improvement Model

The practice improvement project (PIP) is aimed at making a positive change to clinical practice in the rural communities of northwestern Minnesota. To make improvements in clinical practice there has to be desire for change. A suitable model to improve practice that has gained popularity in health-care is Plan Do Study Act (PDSA). The PDSA is an evidence-based scientific method that is part of the Institute for Healthcare Improvement Model. The model is used to determine if there is a need for change and if the change in practice leads to an improvement in healthcare (Agency for Healthcare Research and Quality, 2012). The model has been useful for hundreds of health-care organizations to improve practice (Hughes, 2008; Institute for Healthcare Improvement, 2011). The PDSA is an action-oriented cycle that will continuously test any changes and has been found useful by health care to test change in practice (Agency for Healthcare Research and Quality, 2012).

The PDSA cycle is a systematic series of steps to gain knowledge for the continual improvement of the health care process (Hughes, 2008). The PDSA improvement model has three fundamental questions to start a planned approach: (1) What is the goal of the project (2) How will we know if a change is an improvement (3) What changes can be made for improvement (Institute for Healthcare Improvement, 2011). Once there is a decision about what is to be achieved, the PDSA cycles can be implemented.

The PDSA model (Figure 1) consists of four stages that will be used to test the practice improvement project on a small scale first which is the goal to determine if the packet will improve practice (Institute for Healthcare Improvement, 2011). The PDSA cycles are as follows: (a) The Plan stage details what is to be implemented for an improvement. At this stage of the PIP the barriers to healthcare may be the lack of knowledge about referrals and resources

in the community. (b) The second stage is the Do stage where the improvement project is in process on a small scale. At this stage of the PIP, primary-care providers are asked to consent to using the algorithm in their practice to manage children who are 4-11 years of age and have ADHD. (c) The third stage, the Study stage, examines the results of the implementation. This stage interprets what the study has shown and what is learned, aiming to build on the knowledge for improvement (Agency for Healthcare Research and Quality, 2012; Institute for Innovation and Improvement, 2013). At this stage of the PIP, one would analyze how change can benefit practice and if any change is needed to further improve practice. (d) The fourth and final stage is the Act stage where one plans the next change cycle or full implementation. If improvement is found with the change, then implementation is possible. If, however, the change does not cause an improvement, there must be a need for another change for improvement which then leads to a new PDSA cycle (Figure 1).

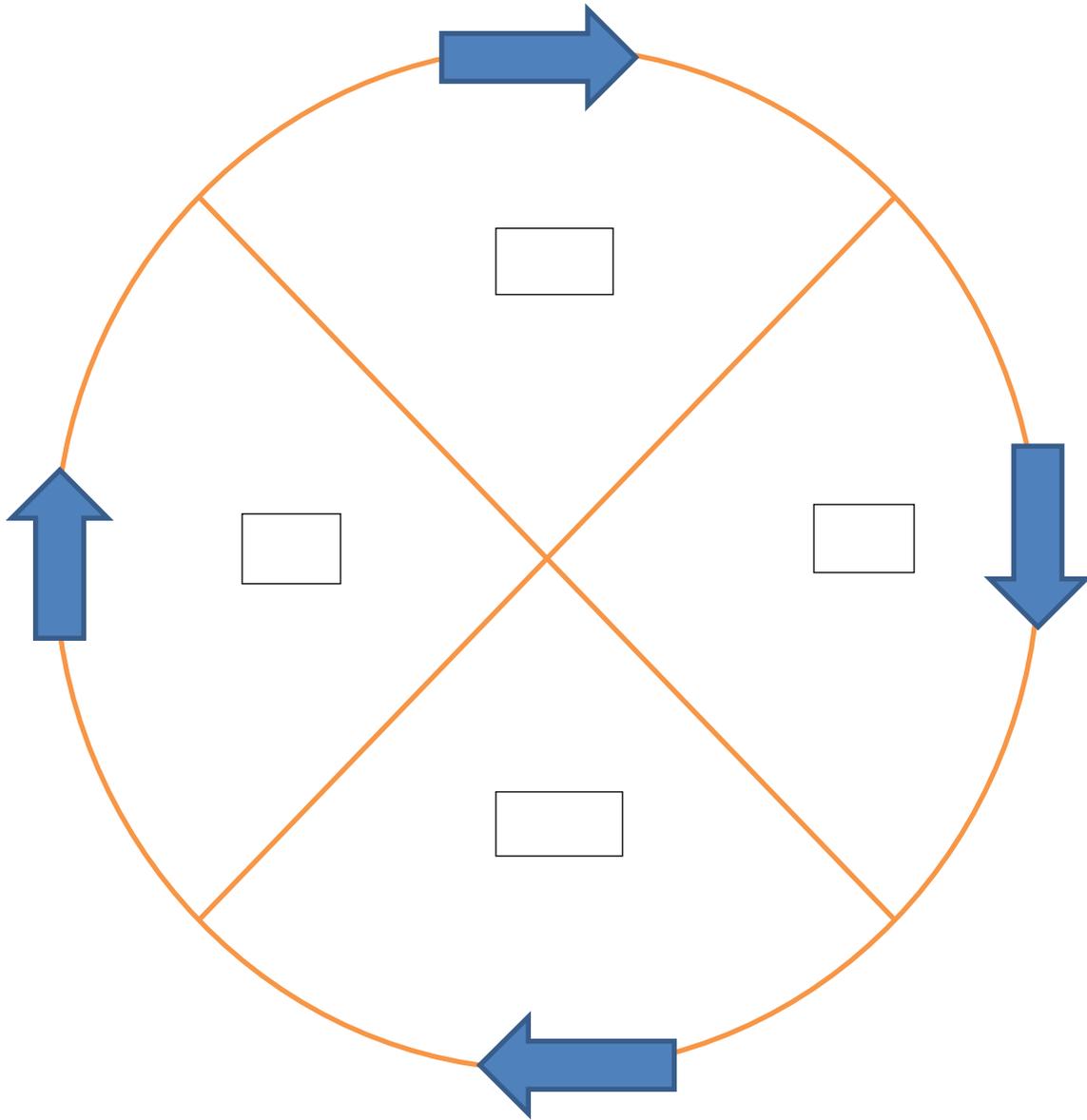


Figure 1. The Plan Do Study Act improvement model (Adapted from the Institute for Innovation and Improvement, 2013).

CHAPTER 3. PROJECT OBJECTIVES, DESIGN, AND METHODS

Population and Setting

The population of interest included family nurse practitioners who see children and a pediatrician who specializes in ADHD; they were in positions to evaluate and manage children, 4-11 years of age, for ADHD symptoms in the selected rural northwestern Minnesota region. The selected rural community settings in northwestern Minnesota included Detroit Lakes, Frazee, Perham, New York Mills, and Otter Tail. As a provider in this position, it is important to be knowledgeable about evidence-based guidelines; resources available in the area; and when, where, and to whom to refer children with ADHD symptoms.

Design and Methods

The PIP design was a small pilot study that included the development and presentation of a treatment-guideline packet to manage children with ADHD for specific health-care providers who care for children. The purpose of conducting a pilot study was to test the PIP design using the PDSA model. The PDSA cycles start with a small study and make adjustments before committing the design to a larger study. After receiving verbal approval from facility administrators and the practitioners, the treatment-guideline packet was presented and distributed in mid-December, 2013 to 5 FNPs and a pediatrician who care for children in the selected communities. The packet was designed to assist them with resources and referrals about when, who, and where to refer children who were 4-11 years of age and being managed for ADHD. The packet included a resource/referral algorithm, the ADHD care-process algorithm from the AAP, and a list of medications specific to ADHD. The packet was given to providers who agreed to utilize and evaluate the algorithm for approximately 6 weeks to determine if it was useful in practice to assist with managing children who were 4-11 and had

ADHD symptoms. After the 6-week trial period, the FNPs and the pediatrician were given a questionnaire regarding how the packet was useful and/or if it did or could improve practice when managing children with ADHD symptoms. The questionnaire asked the providers for any input about improving the packet or algorithm. A follow-up interview was completed with the participating providers who needed to clarify any of their written answers.

Healthcare Algorithms

Algorithms are used throughout healthcare as a helpful tool in practice. The project utilized the use of algorithms to ensure that healthcare provider did not forget the essential elements of care in practice (Svirbely & Iyengar, 2009). The packet contained two algorithms that were easy to follow with evidence-based guidelines as well as recent resources and proper referrals in the community to be used by healthcare providers managing children, 4-11 years of age, with ADHD symptoms. One algorithm was provided by the AAP with standard-of-care practice guidelines that provided manageable steps throughout the care process with key actions for primary-care providers to follow (AAP, 2011b). The second algorithm was designed by the researcher, in collaboration with mental healthcare facilities and providers in the community, to illustrate the available resources and proper referrals with the available appointments and average waiting times. Algorithms used in healthcare are valuable and beneficial because they support medical decisions, use evidence-based guidelines, increase the accuracy of diagnosis and prognosis, and increase the scope of practice for providers while reducing subjective judgment and medical errors (Svirbely & Iyengar, 2009).

The Objectives of the Practice-Improvement Project

The goal of the practice-improvement project (PIP) was to provide a treatment-guideline packet that contained two algorithms, the American Academy of Pediatrics' ADHD algorithm

and an algorithm with the proper community resources and referrals. The packet would be used by 5 FNPs and a pediatrician who see children in the rural northwestern Minnesota region. The FNPs and the pediatrician agreed to participate in the PIP and were provided a treatment-guideline packet that included an area-specific algorithm to assist them with the proper referral sources and resources that are available to them. The AAP's guideline algorithm (Appendix A) was included in the health-plan packet to assist with the clinical management of children who have ADHD. Knowledge and awareness of the American Academy of Pediatrics' practice guidelines and the resources available in this region were found to be vital for these primary-care providers who gave evidence-based healthcare to children with ADHD.

The PCP who evaluates a child, 4-18 years of age, with symptoms of ADHD may wish to refer the child to a psychologist or a mental-health clinician for further evaluation. The PCP does continue to have the responsibility to manage the child while collaborating with the subspecialists, parents, educators, and other stakeholders in the child's care. The treatment-guideline packet allows the participating providers to individualize care using the evidence-based practice guidelines and the available resources in addition to addressing who may be the most appropriate referral according to the needs and abilities of the child and his/her family.

Project Objectives

1. Increase the knowledge and use of the evidence-based treatment guidelines set forth by the AAP.
2. Improve the awareness of when and to whom to refer when diagnosing and managing ADHD in children who are 4-11 years of age.
3. Promote the utilization of resources and referrals that are available in the community.

4. Present an ADHD treatment-guideline packet to 5 NPs and 1 pediatrician who specialize in ADHD in the region; the packet has the AAP guideline algorithm and an algorithm listing the available community resources and referrals.
5. Evaluate the packet's usefulness as a resource for the FNPs and other primary-care providers when managing ADHD in children.

Evidence-Based Practice Intervention Plan

Improved implementation of evidence-based practice in the clinical setting entails the adoption of new models for managing and improving practice for all PCPs. Evidence-based practice means integrating clinical expertise with the best-available external, clinical evidence from systematic research (Harris, Roussel, Walters, & Dearman, 2011). According to Lynch, Sood, and Chronis (2010), the health-care clinician, such as a family nurse practitioner, may be the primary provider for children with ADHD symptoms; however, it has been found that some providers do not fully integrate the evidence-based practice of assessment and treatment in their practice. The FNP and other primary care providers may need direction and awareness about what has been found to be the best-available evidence-based treatment guidelines and to use the knowledge from clinical experts to apply high-quality interventions for patient care (U.S. National Library of Medicine, 2011). A treatment guideline packet is available to clinicians, providing the integration of research, evidence, clinical expertise, resources available, and the patient's/family's preferences and values in managing each unique child with ADHD.

IRB Approval and Ethical Considerations

Utilizing the ADHD treatment-guideline packet in their practice was voluntary and did not pose any risk to the participants. Institutional Review Board (IRB) approval was exempt for review and was obtained from North Dakota State University, Essentia Health, and Sanford

Health before distributing the resource/referral guidelines to participants. The participants' rights were protected according to IRB, and no identifying information such as the participant's name, age, or address, were found in the results. Any identifying information, was protected and only known by the researcher and the chair. Participation was voluntary, and a written consent form was provided to participants along with the importance of their participation in the project to determine if using a treatment-guideline packet with a resource/referral algorithm for that specific region did or could improve practice. Participants verbally consented to participate and were informed that a follow-up phone call may be needed to answer any questions. Participation was emphasized as optional; however, there was an emphasis on the importance and benefits of the practice-improvement project when managing children, 4-11 years of age, with ADHD.

CHAPTER 4. EVALUATION

Methods of Evaluation

The research design included creating and presenting a packet to 5 FNPs and 1 pediatrician. The pediatrician volunteered to use and evaluate the packet because of an interest in learning about the community's available resources and referrals. The PDSA model provided the project with a planned set of cycles that are designed to provide the project with what should be tested, to test the guideline packet on a small scale, to decide if there was an improvement in practice and then to test any changes for a continuous improvement cycle (National Learning Consortium, 2013).

Plan: Step 1

Providers and parents have voiced a concern in practice regarding lack of knowledge about to whom and to where to refer for assistance in managing 4-11 year old children with ADHD symptoms and other mental-health concerns. During the Plan stage, the treatment-guideline packet was created with the assistance of mental health specialists and facility administrators in the region to assist primary care providers in the management of children with ADHD. A treatment-guideline packet that included the most recent practice guidelines from the American Academy of Pediatrics (AAP) algorithm, and the proper community resources and referrals in practice was developed. It was anticipated that offering providers access to a treatment-guideline packet with these resources would ensure that more providers followed proper referrals and treatments.

Do: Step 2

In second step, the Do cycle, the packet was provided to the 5 FNPs and the 1 pediatrician who volunteered and agreed to utilize and evaluate the algorithm. The providers

then utilized the guideline packet for 6 weeks. After the 6 weeks were completed, a paper post-questionnaire was administered to the providers who had agreed to participate and utilize the treatment-guideline packet. The post-questionnaire contained 7 questions regarding whether the information in the treatment-guideline packet was beneficial for the purpose of advancing practice. Through trialing the packet in practice, providers were able to determine if they were or would be useful in practice to assist in managing children, 4-11 years old with ADHD symptoms.

Study: Step 3

The third step is the Study cycle. The researcher analyzed the results of the post-questionnaire after permitting the providers to utilize and evaluate the treatment-guideline packet for 6 weeks. The data were collected from the answers given on the questionnaire. Additionally, three providers were interviewed by the researcher at the completion of the trial. The providers found that the treatment-guideline packet was beneficial for the purpose of advancing practice and recommended changes that could improve the packet in practice, as further discussed in Chapter Five.

Act: Step 4

The feedback provided by participants further develops the treatment-guideline packet and are intended to improve the utilization and effectiveness of the packet. The suggestions made by participants and the researcher are detailed in Chapter Five.

CHAPTER 5. RESULTS

Presentation of Results

A total of 6 health care providers who see children utilized and evaluated the treatment-guideline packet for children with ADHD and then answered the paper post-questionnaire. A follow-up phone interview was completed with 2 family nurse practitioners from whom clarity regarding their written answers was needed. The project indicated that 100% of the participants (n=6) thought that the treatment-guideline packet with a resource/referral guideline was useful or would be beneficial in practice when referring or managing children with ADHD. The treatment-guideline packet was utilized, to some degree, in practice by 50% (n=3) of the participating providers. For the providers who had the opportunity to utilize the packet, the primary reason for seeing the children included adequate ADHD symptom control, behavioral problems at home and school, and a well-child visit. Three-fourths of the providers felt that the Vanderbilt assessment scales for diagnosing children would be a helpful addition to the packet to assist with diagnosing ADHD in children of this age group. One respondent did recommend adding the Patient Health Questionnaire-9 (PHQ9), which is a depression scale and the Pediatric Symptom Checklist-17 (PSC-17) should be used in addition to the Vanderbilt assessment scales to assist with general screening for comorbidities and to rule out other mental-health disorder. The Vanderbilt assessment scales, the PHQ9, and the PSC-17 are supported by the American Academy of Pediatrics (2011a) and are provided in the ADHD toolkit compiled by the American Academy of Pediatrics. The Vanderbilt assessment scales are questionnaires that are given to both the teacher and the parent to collect information needed for the diagnosis of ADHD and any other functional impairments of the child. The Vanderbilt assessment scales are intended to screen for external comorbidities, such as conduct disorders, and internalizing

disorders, such as depression and anxiety (AAP, 2011a). The PSC-17 is a questionnaire for parents that screens for the child's behavioral disorders. The PHQ9 is a questionnaire for depressive disorders that may be used to identify or follow a patient with depressive disorders (AAP, 2011a). The results of the questionnaire given to the providers are shown in Table 3.

Objectives Achieved

Objective 1: Increase the knowledge and use of the evidence-based treatment guidelines set forth by the AAP. The packet provided the updated AAP evidence-based treatment-guideline algorithm and a community resource/referral algorithm for providers who participated in the PIP to evaluate and use in practice. Information was collected from the participating providers regarding whether the packet was useful for evidence-based management and community resources for children, 4-11 years of age, with ADHD symptoms. Evidence-based treatment guidelines are systematically developed aids to assist providers in choosing appropriate healthcare practices for many patients with specific clinical problems or prevention issues (GroupHealth, 2011). Providers must remember that guidelines are not meant to replace clinical judgment (GroupHealth, 2011). The questionnaire indicated that 100% (n=6) of the participants felt that the packet was useful or could benefit practice with the treatment guidelines as well as the resources and proper referrals in the community. To improve the packet with evidence-based guidelines, three-fourths of the providers felt that adding the Vanderbilt assessment scales for diagnosing children would be beneficial. One provider recommended adding the Patient Health Questionnaire-9 (PHQ9) and the Pediatric Symptom Checklist-17 (PSC-17) in addition to the Vanderbilt Assessment Scales to assist with general screening for comorbidities and to rule out other mental-health problems.

Table 3

Questionnaire Results

Practitioners	Q#1 How many children seen with ADHD?	Q#2 Reason for seeing child or children?	Q#3 Did the packet address a need in practice?	Q#4 Did the packet benefit practice?	Q#5 How did the packet not benefit practice?	Q#6 Barriers to using the algorithms	Q#7 How to improve the packet?
P 1	11	Behavioral problems at school and home	Yes	Yes	Not staying within the network	None	Vanderbilt assessment scales for children
P2	0	N/A	Yes	Yes	Not a big pediatric clientele	Keep it up-to-date	None
P3	0	N/A	Yes	Yes	None	None	None
P4	0	N/A	Yes	Yes	None	None	Vanderbilt assessment scales for children
P5	1	Well child visit	Yes	Yes	None	None	Vanderbilt assessment scales for children
P6	20	Adequate ADHD symptom control	Yes	Yes	None	None	Vanderbilt assessment scales for children, PHQ9 & PSC

Objective 2: Improve the awareness of when and to whom to refer when diagnosing and managing ADHD in children who are 4-11 years of age. Participating providers utilized the guideline packet for 6 weeks. At the end of the 6 weeks, 100% (n=6) of the providers felt that the AAP ADHD process-of-care algorithm was useful on when to refer the child and that the resource/referral algorithm was beneficial for improving practice by having the proper community resources and referral algorithm to locate the proper child mental-health specialist. Overall, providers felt that being more aware of the potential referrals and resources in the

community will improve their management of children, ages 4-11, with ADHD. Knowledge of community resources and referrals by providers in past project studies were not previously reported.

Objective 3: Promote the utilization of resources and referrals that are available in the community. The project was evaluated by the questionnaires that each care provider was given after participating in the PIP. Participating providers felt that the treatment-guideline packet addressed a need in practice and made them more aware of potential referrals and resources in the community. Approximately 50% (n=3) of the FNP providers expressed that they are new in practice and do not have a large pediatric clientele at this time, but they felt that the packet would benefit them later in practice when seeing more pediatric patients. One provider felt that it would improve the quality of care with the access of referrals and resources by enhancing the ability to treat promptly and adequately when managing ADHD in children who are 4-11 years of age. Another provider felt the packet was easy to utilize and perceived no barriers. One provider stated that appointments were made by staff and that she did not decide who the appointment was made with unless specified. The provider did feel that she can now use the resource/referral algorithm to specify what resources or whom to refer for specific treatments. Last, one provider felt that a barrier in practice was the facility referring within its own network.

Objective 4: Present an ADHD treatment-guideline packet to 5 NPs and 1 pediatrician who specialize in ADHD in the region; the packet has the AAP guideline algorithm and an algorithm listing the available community resources and referrals. The packet contained an AAP ADHD process-of-care algorithm and a community referral/resource algorithm for the management of 4-11 year old children with ADHD symptoms. At the

completion of the 6-week trial period, the packet was tested to discover if the easily accessible evidence-based guidelines assisted providers with the management of children who were 4-11 years of age and had ADHD. The packet was found to be beneficial and did address a need in practice for 100% of the study participants.

Objective 5: Evaluate the packet's usefulness as a resource for the FNPs and other primary-care providers when managing ADHD in children. Of the providers, 100% (n=6) felt that the treatment-guideline packet would be beneficial and a useful tool in practice. Of the participant providers, 2 of the 6 felt that the treatment-guideline packet was succinct and provided an easy-and-quick reference. To improve the packet with evidence-based guidelines, three-fourths of the providers felt that adding the Vanderbilt assessment scales for diagnosing children would be beneficial. One provider recommended adding the Patient Health Questionnaire-9 (PHQ9), which is a depression scale and the Pediatric Symptom Checklist-17 (PSC-17) to screen for behavioral disorders in addition to the Vanderbilt assessment scales to assist with screening for comorbidities and to rule out other mental-health disorders.

Key Barriers

Healthcare providers across the country are seeking ways to improve patient care and practice. With any improvements in care, there are barriers. According to the American Academy of Child and Adolescent Psychiatry (AACAP), one important barrier for healthcare is reducing administrative and financial barriers to access and to collaborate with resources in the community (AACAP, 2009). According to the surgeon general's report in 2009, there is a challenge for gaining access to mental-health services when there is a shortage of children's mental-health professionals, making collaboration and coordination of resources and care even more necessary with PCPs (AACAP, 2009). With the use of a treatment-guideline packet which

contains the most recent treatment guidelines for children with ADHD and the community resources available, there is hope to improve both the collaboration and coordination of resources and mental-health specialists with the PCP.

One of the barriers for some of the FNPs who participated in the PIP was not being in practice very long and not having a large pediatric population. Providers who have low pediatric populations may forget the packet is available as a resource. Another potential barrier for widespread use of the packet is the need for frequent updates to reflect the most recent resources or proper referrals within the community. Inviting providers who see children to use the packet in practice would be ideal. More providers utilizing the packet and then participating with its updates and improvements may increase the acceptance and utilization rates. Adopting the use of the provider packet may be a challenge for providers who do not have the time or interest. According the AACAP (2009) with the appropriate training and collaborative relationships, the PCP should be able to properly manage children with common mental-health disorders such as attention deficit/hyperactivity disorder (ADHD).

CHAPTER 6. DISCUSSION

Interpretation of Results

The literature review illustrated the growing concern about the proper diagnosis, management, and referral of children with ADHD. The PDSA cycle model provided feedback from the project study by testing the change in practice and then carefully observing and learning from the study, while providing the researcher with the needed modifications to improve the packet. The Plan cycle involved the researcher creating a clinical-practice guideline packet to be tested in rural communities by providers. The Do cycle put the packet into practice to be utilized by the providers. The Study cycle of the project involved receiving feedback with a 7-point post-questionnaire for providers to complete after having the opportunity to utilize the resource/referral guideline for managing children who were 4-11 years of age. The questionnaire was developed specifically to allow the researcher to recognize how the packet was useful in practice and how the packet might be improved.

The PDSA improvement model provided the researcher with evidence that a provider-ready algorithm along with evidence-based resources that assisted providers in the management of children with ADHD, was a need and benefited practice. The questionnaire found that all providers felt that the pamphlet guideline would be useful and could benefit practice. Using a packet that contains both a resource/referral algorithm and an evidence-based ADHD process-of-care algorithm from the AAP gave providers the knowledge of up-to-date treatment guidelines and the available community resources and referrals. Lastly, the Act cycle of the PDSA model allowed feedback on improvements to benefit the packet in practice. With packet improvements based on the questionnaire, the next step is to make the improvements and decide to continue with full implementation.

Limitations

The major limitations of the practice-improvement project were time and the sample size. The time given to providers was 6 weeks, limiting their opportunity to use and become familiar with the resource/referral guideline. Provider selection was limited because of the small number of family nurse practitioners who saw children in these rural communities. The project implementation was completed in the spring of year which may have been another limitation. Children with ADHD symptoms may have been assessed more in the fall of the year at the beginning of the school year when symptoms were first noticed by educators. Additionally, the time limitation restricted providers' ability to use the packet because some of them did not see a pediatric patient who exhibited ADHD symptoms during the project's implementation. Extending the use of the treatment-guideline packet on a trial basis to all providers in a position to assess and manage children with ADHD symptoms would have been ideal, but that step was felt to be too time consuming and outside the project's scope.

Implication for Practice

The nurse practitioner may have the first contact with a child who exhibits symptoms of ADHD. The management of ADHD will have a profound impact on healthcare today and in the future. With prompt and adequate detection of ADHD symptoms, the child will be diagnosed and treated properly. The nurse practitioner is a professional, an important player in healthcare of patients, and a needed participant in professional healthcare organizations to stay current on evidence-based treatment guidelines that affect the health of individuals and communities.

The resource/referral algorithm was developed by the researcher in collaboration with child mental-health specialists and facilities in the communities to assist providers who assess and manage 4-11 year old children with ADHD. The questionnaire was developed by the

researcher to assess whether the PIP objectives were met. The packet's reliability was not established before implementation. However, the practice-improvement project (PIP) demonstrated that a treatment guideline with a resource/referral algorithm and an evidence-based ADHD process-of-care algorithm was an effective tool to use in practice to meet the ongoing professional-development needs of primary-care providers. The information collected from this project can be used by providers for both the individual needs of the patient and the patient's family. The project provided guidance about the care of a child with ADHD, focusing on evidence-based, high-quality treatment obtained in a timely manner.

Recommendation and Application for Practice

Early intervention and management for children with ADHD symptoms is important and should be addressed at each visit, such as a well-child visit. The primary-care settings allow opportunities for providers who are in positions to evaluate children with ADHD symptoms for early identification and intervention, counseling, guidance, care coordination, and chronic illness management (AACAP, 2009). The treatment-guideline packet was developed to assist providers with accessing the proper resources and referrals in the community to manage these children appropriately. In a review of literature search, studies involving community resource/referral guides for primary-care providers were not found. The increased prevalence of ADHD suggested that children with the disorder would have high rates of health-related services, including increased use of community resources (Leslie & Wolraich, 2007). An increased use of resources and referrals leads to increased costs for healthcare. According to the AACAP (2009), healthcare policy needs to support the primary care clinician. Additional support of FNP's involvement in all mental-health care can be facilitated by adopting payment for assessment and treatment that is equal or comparable with payment of services of other

medical illnesses. According to Leslie and Wolraich (2007), providers understanding of service use and availability, will allow for resource planning and allocation for costs as well as better tailoring of guidelines by professional organizations.

The providers who participated in the PIP felt that the packet was useful in practice by providing awareness regarding the available community resources to effectively treat these children. The author's recommendations include adding the Vanderbilt assessment scales for children and updating the guideline yearly to ensure that the providers and resources are current. Care teams and care managers may be the key players in delegating other team players such as receptionists, to update the community resources. Future research should evaluate the importance of having the knowledge of resources and referrals available in all communities for the appropriate treatment according to clinical-based guidelines. Upon completion, information from the PIP will be shared with the participants to help improve practice. Based on the author's recommendations, the participant providers can decide how resources and referrals will be updated and whether the treatment-guideline packet should continue to be used in practice.

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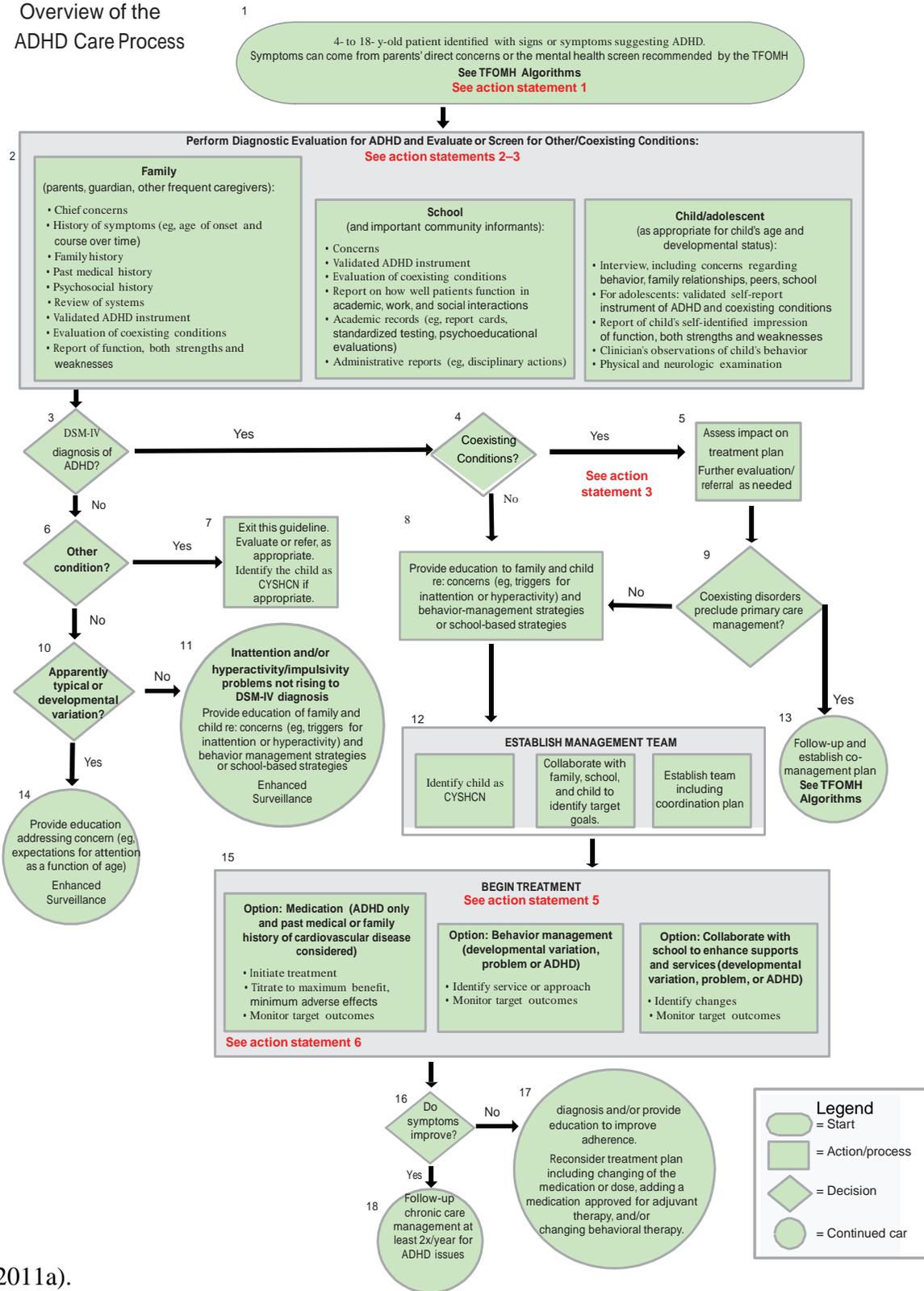
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http://www.nlm.nih.gov/hsrinfo/evidence_based_practice.html

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APPENDIX A. ADHD PROCESS OF CARE ALGORITHM

Overview of the ADHD Care Process



(AAP, 2011a).

APPENDIX B. NORTH DAKOTA STATE UNIVERSITY IRB APPROVAL

NDSU

NORTH DAKOTA
STATE UNIVERSITY

September 25, 2013

Federal Wide Assurance FWA00002439

Dr. Mykell Barnacle

Nursing Sudro Hall

Re: IRB Certification of Exempt Human Subjects Research:

Protocol #PH14042, "PRIMARY CARE RESOURCE AND REFERRAL GUIDE FOR CHILDREN WITH ADHD"

Co-investigator(s) and research team: Bonita Jenzen

Certification Date: 9/25/2013 Expiration Date: 9/24/2016

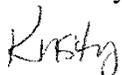
Study site(s): Detroit Lakes, Frazee, Perham, New York Mills, and Ottertail, MN Funding: n/a

The above referenced human subjects research project has been certified as exempt (category # 2) in accordance with federal regulations (Code of Federal Regulations, Title 45, Part 46, *Protection of Human Subjects*). This determination is based on protocol materials (received 9/25/2013).

Please also note the following:

- If you wish to continue the research after the expiration, submit a request for recertification several weeks prior to the expiration.
- Conduct the study as described in the approved protocol. If you wish to make changes, obtain approval from the IRB prior to initiating, unless the changes are necessary to eliminate an immediate hazard to subjects.
- Notify the IRB promptly of any adverse events, complaints, or unanticipated problems involving risks to subjects or others related to this project.
- Report any significant new findings that may affect the risks and benefits to the participants and the IRB.
- Research records may be subject to a random or directed audit at any time to verify compliance with IRB standard operating procedures.

Thank you for your cooperation with NDSU IRB procedures. Best wishes for a successful study.
Sincerely,



Kristy Shirley, CIP, Research Compliance Administrator

INSTITUTIONAL REVIEW BOARD

NDSU Dept 4000 I PO Box 6050 I Fargo ND 58108-6050 I 701.231.8995 I Fax 701.231.8098 I ndsu.edu/irb

Shipping address: Research 1, 1735 NDSU Research Park Drive, Fargo, ND 58102
NDSU is an EO/AA university.

APPENDIX C. SANFORD HEALTH HUMAN RESEARCH PROTECTION APPROVAL



November 22, 2013

PI: Mykell Barnacle, DNP

Project: 03-13-140 Primary Care Resource and Referral Guide for Children 4-11 Years of Age with ADHD

Project Review Level: Exempt 2

Project Risk: No more than minimal

Approved through exempt review: 11/22/2013

The study submission and informed consent for the proposal referenced above has been reviewed and approved via the procedures of the Sanford Health Institutional Review Board (IRB).

Attached is your original consent document that has been stamped with the IRB approval date. You must keep this original on file. Please use this original consent document to make copies for subject enrollment/re-consent. No other consent form should be used. In addition, each subject must be given a copy of the consent form.

Prior to initiation, promptly report to the IRB, any proposed project updates / amendments (e.g., protocol amendments/revised informed consents) in previously approved human subject research activities.

The forms to assist you in filing your: project closure, continuation, adverse/unanticipated event, project updates /amendments, etc. can be accessed online at Sanford Connect.

You have approval for this project starting from the approval date. Exempt projects do not expire; however, please update the IRB of your study status annually. Exempt projects can be closed when data collection is completed. When this study is completed please notify the Human Research Protection office.

Sincerely,



Director-Sanford IRB Sanford Health Human ResParch Protection Program, Roure #)033 • 1305 W. 18th Street • Sioux Falls SD 57107-5039 • P 605-312-6430

APPENDIX D. ESSENTIA HEALTH INTERNAL REVIEW BOARD APPROVAL



Essentia Institute of Rural Health

October 25, 2013

To Whom It May Concern:

I have been asked to review Bonita Jenzen's DNP project proposal which plans to utilize an ADHD referral and resource algorithm with FNs at Essentia Health over a 6-week period. Per our Student Learner Policy this project is a quality improvement project. As such, a submission to Essentia Health's Internal Review Board is not necessary.

If you have any further questions, please feel free to contact me at 218.786.3008 or kdean@eirh.org. We look forward to learning the results of Ms. Jenzen's project and request that a copy of the final dissertation is submitted to me. We appreciate the opportunity to work with students from your program.

Sincerely,



Kate Dean, MBA
Director Health Science and Graduate Medical Education
Essentia Institute of Rural Health

Ph: 218-786-3008

Email: kdean@eirh.org

APPENDIX E. INFORMED CONSENT ESSENTIA HEALTH CARE

North Dakota State University (NDSU)
Nursing Department 2670 P.O. Box 6050
Sudro Hall, Room 136
Fargo, ND 58108
(701) 231-7395

Title of Clinical Practice Improvement Project: Primary Care Resource and Referral Guide for Children with ADHD.

The Practice Improvement Project is conducted by:
Bonita Jenzen, FNP-S, RN, NDSU Doctor of Nursing Practice Student
(218) 405-0373
bonita.jenzen@my.ndsu.edu

Dr. Mykell Barnacle, RN, Doctoral of Nursing (DNP) (advisor & research chair)
NDSU Nursing Department Assistant Professor
(701) 231-7730
mykell.barnacle@ndsu.edu

Dear Professional Colleagues,

I'm Bonita Jenzen, a family nurse practitioner (FNP) student from NDSU. As a student I will be doing a practice improvement project (PIP) regarding resources and referrals for children with symptoms of Attention Deficit Hyperactivity Disorder (ADHD). The resources and referrals will be compiled into a pamphlet for FNPs in the communities of Detroit Lakes, Frazee, Perham, New York Mills, and Ottertail. The project will highlight the importance of seeking proper referrals and resources in the community to correctly manage children 4-11 years of age with the symptoms of ADHD. The pamphlet will provide you as a FNP information regarding professionals available for referral and the community resources that are available for the child with ADHD and their family.

I would like the opportunity to provide a pamphlet with a resource referral algorithm to FNP's in your facility. The purpose of the project is to discover if the algorithm with current resources and referrals would help assist providers and ultimately improve practice. Participation is entirely voluntary and you may change your mind at any time. The information obtained will be combined with other data and will have no identifiers such as the participant's name, age, or address.

Please contact me or my chair at bonita.jenzen@my.ndsu.edu or mykell.barnacle@ndsu.edu with any questions or concerns about this project, or to receive a copy of the results of this project.

Thank You,

Bonita Jenzen, RN, BSN

APPENDIX F. INFORMED CONSENT SANFORD HEALTH CARE

North Dakota State University (NDSU)
Nursing Department 2670 P.O. Box 6050
Sudro Hall, Room 136
Fargo, ND 58108
(701) 231-7395

Title of Clinical Practice Improvement Project: Primary Care Resource and Referral Guide for Children with ADHD.

The Practice Improvement Project is conducted by:
Bonita Jenzen, FNP-S, RN, NDSU Doctor of Nursing Practice Student
(218) 405-0373
bonita.jenzen@my.ndsu.edu

Dr. Mykell Barnacle, RN, Doctoral of Nursing (DNP) (advisor & research chair)
NDSU Nursing Department Assistant Professor
(701) 231-7730
mykell.barnacle@ndsu.edu

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Please contact me or my chair at bonita.jenzen@my.ndsu.edu or mykell.barnacle@ndsu.edu with any questions or concerns about this project, or to receive a copy of the results of this project.

Thank You,

Bonita Jenzen, RN, BSN

APPENDIX G. MEDICATIONS

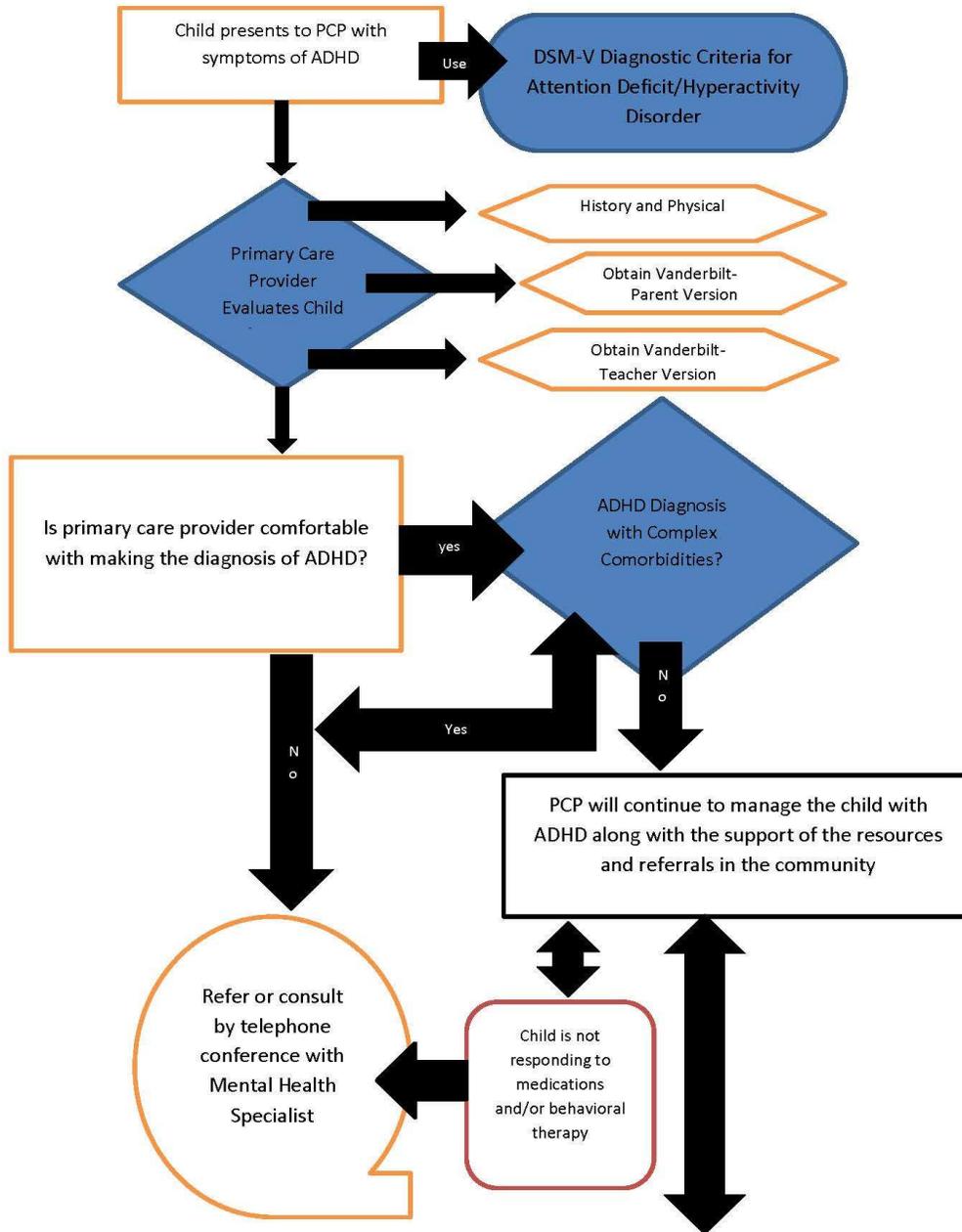
Medications Created 2011(adapted from National Institute of Mental Health, 2011, p. 1)

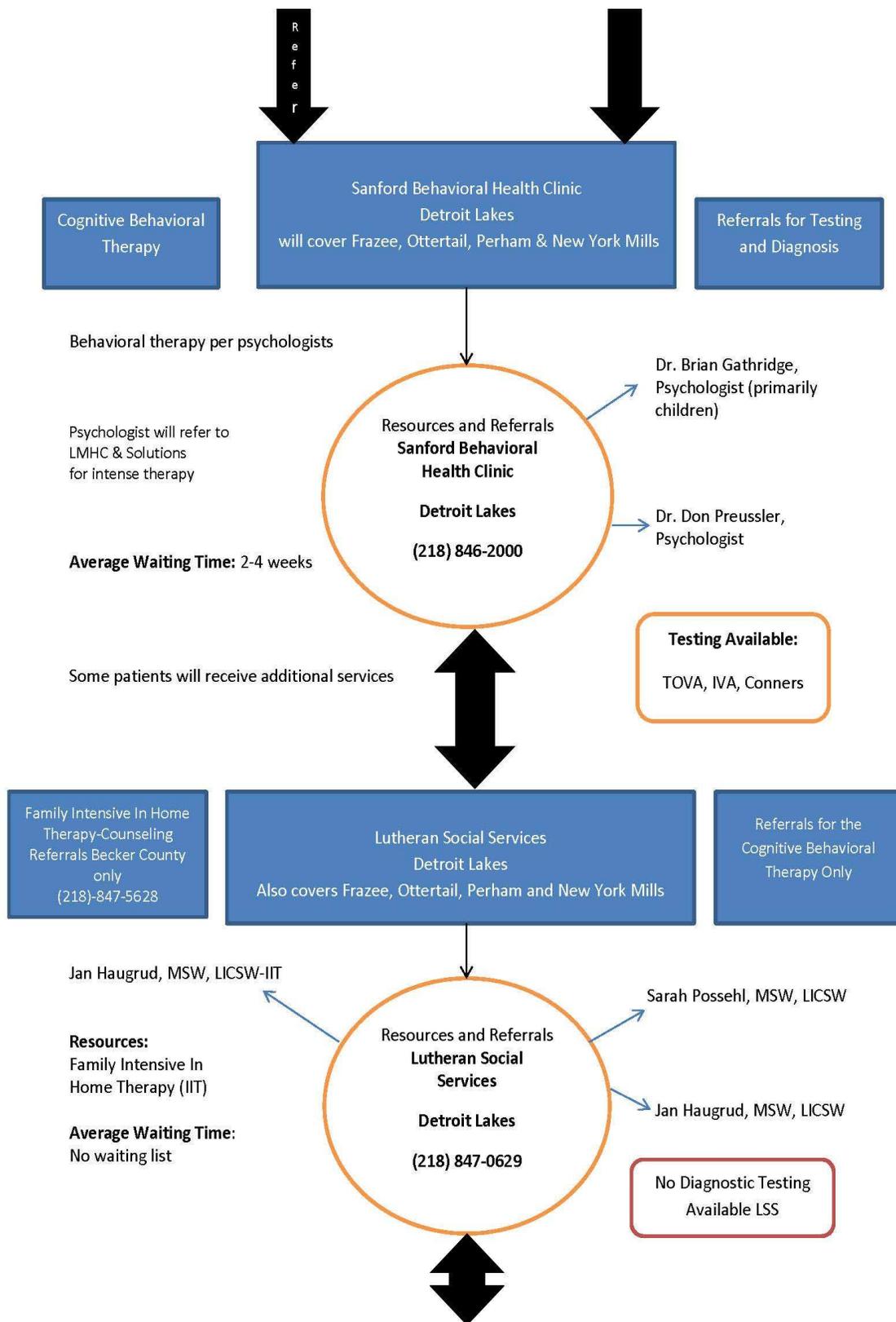
Trade Name	Generic Name	FDA-Approved Age	Side Effects
ADHD Medications (All ADHD medications are stimulants, except Intuniv and Straterra.)			Short-acting medicines require frequent dosing but longer-acting meds which are more convenient may have a greater effect on appetite and sleep.
Adderall	amphetamine	3 and older	Loss of appetite, weight loss, sleep problems, irritability, tics, and personality changes
Adderall XR	amphetamine (extended release)	6 and older	Loss of appetite, weight loss, sleep problems, irritability, tics, and personality changes
Concerta	methylphenidate (long acting)	6 and older	Losses of appetite, weight loss, sleep problems, irritability, tics, and personality changes.
Daytrana	methylphenidate patch	6 and older	Skin irritation with patch but all may have some loss of appetite, weight loss, sleep problems, irritability, tics, and personality changes.
Desoxyn	methamphetamine	6 and older	Loss of appetite, weight loss, sleep problems, irritability, tics, and personality changes.
Dexedrine	dextroamphetamine	3 and older	Loss of appetite, weight loss, sleep problems, irritability, tics, and personality changes
Dextrostat	dextroamphetamine	3 and older	Loss of appetite, weight loss, sleep problems, irritability, tics, and personality changes.
Focalin	dexmethylphenidate	6 and older	Loss of appetite, weight loss, sleep problems, irritability, tics, and personality changes.

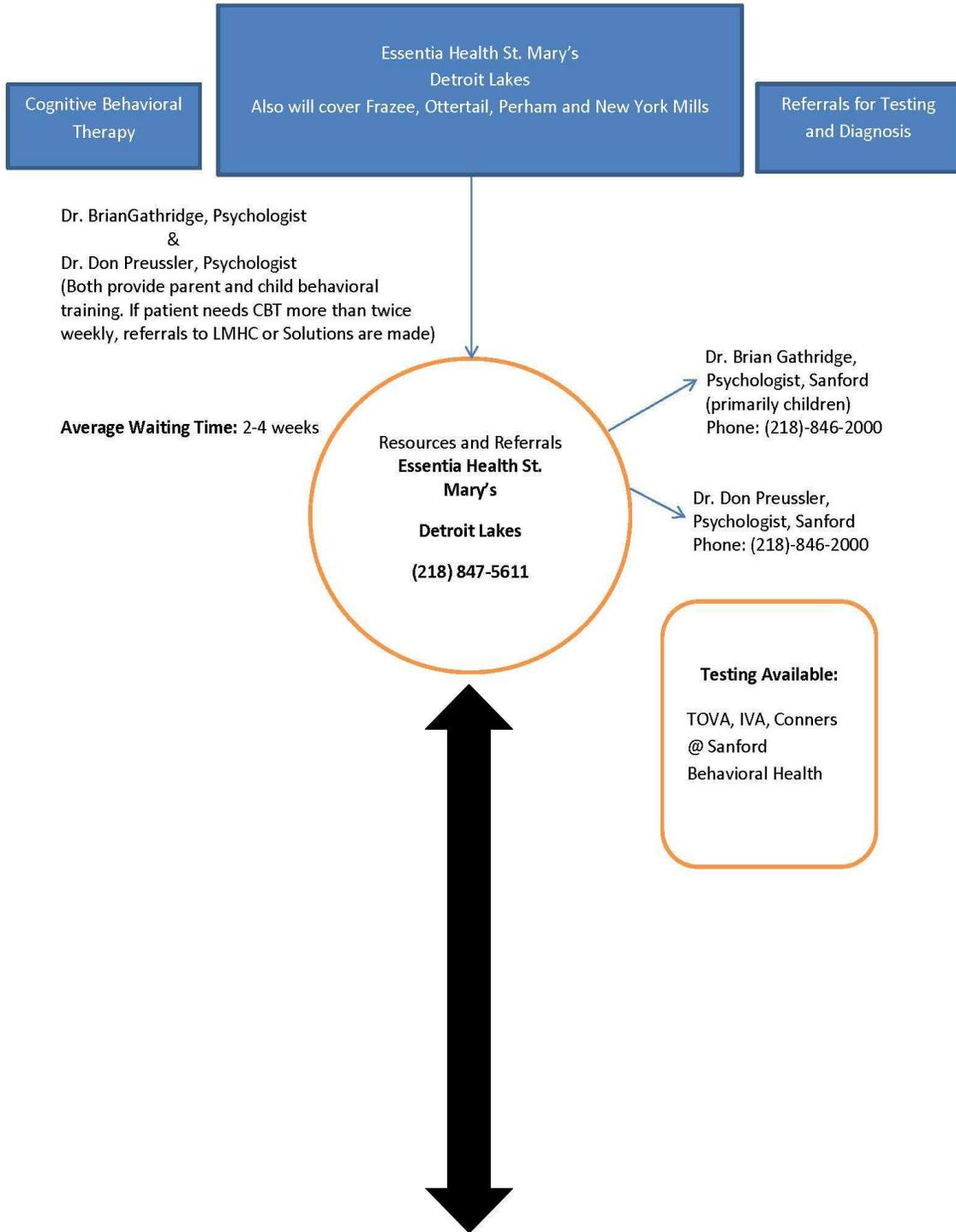
Trade Name	Generic Name	FDA-Approved Age	Side Effects
Focalin XR	dexmethylphenidate (extended release)	6 and older	Loss of appetite, weight loss, sleep problems, irritability, tics, and personality problems.
Intuniv (non-stimulant)	guanfacine	6 and older	Sleepiness, headache, fatigue, abdominal pain. Rarely, Intuniv can cause low blood pressure and heart rhythm changes.
Metadate ER	methylphenidate (extended release)	6 and older	Loss of appetite, weight loss, sleep problems, irritability, tics, and personality changes
Metadate CD	methylphenidate (extended release)	6 and older	Loss of appetite, weight loss, sleep problems, irritability, tics, and personality changes.
Methylin	methylphenidate (oral solution and chewable tablets)	6 and older	Loss of appetite, weight loss, sleep problems, irritability, tics, and personality changes.
Ritalin	methylphenidate	6 and older	Loss of appetite, weight loss, sleep problems, irritability, tics, and personality changes
Ritalin SR	methylphenidate (extended release)	6 and older	Loss of appetite, weight loss, sleep problems, irritability, tics, and personality changes.
Ritalin LA	methylphenidate (long-acting)	6 and older	Loss of appetite, weight loss, sleep problems, irritability, tics, and personality changes.
Strattera (non-stimulant)	atomoxetine	6 and older	Sleep problems, anxiety, fatigue, upset stomach, dizziness, dry mouth. Rarely, liver damage. some concerns of suicidal thoughts and personality changes
Vyvanse	lisdexamfetamine dimesylate	6 and older	Loss of appetite, weight loss, sleep problems, irritability, tics, and personality changes.

APPENDIX H. ADHD REFERRAL/RESOURCE ALGORITHM

An ADHD Referral/Resource Algorithm for Children 4 years to 11 years of age









Resource:

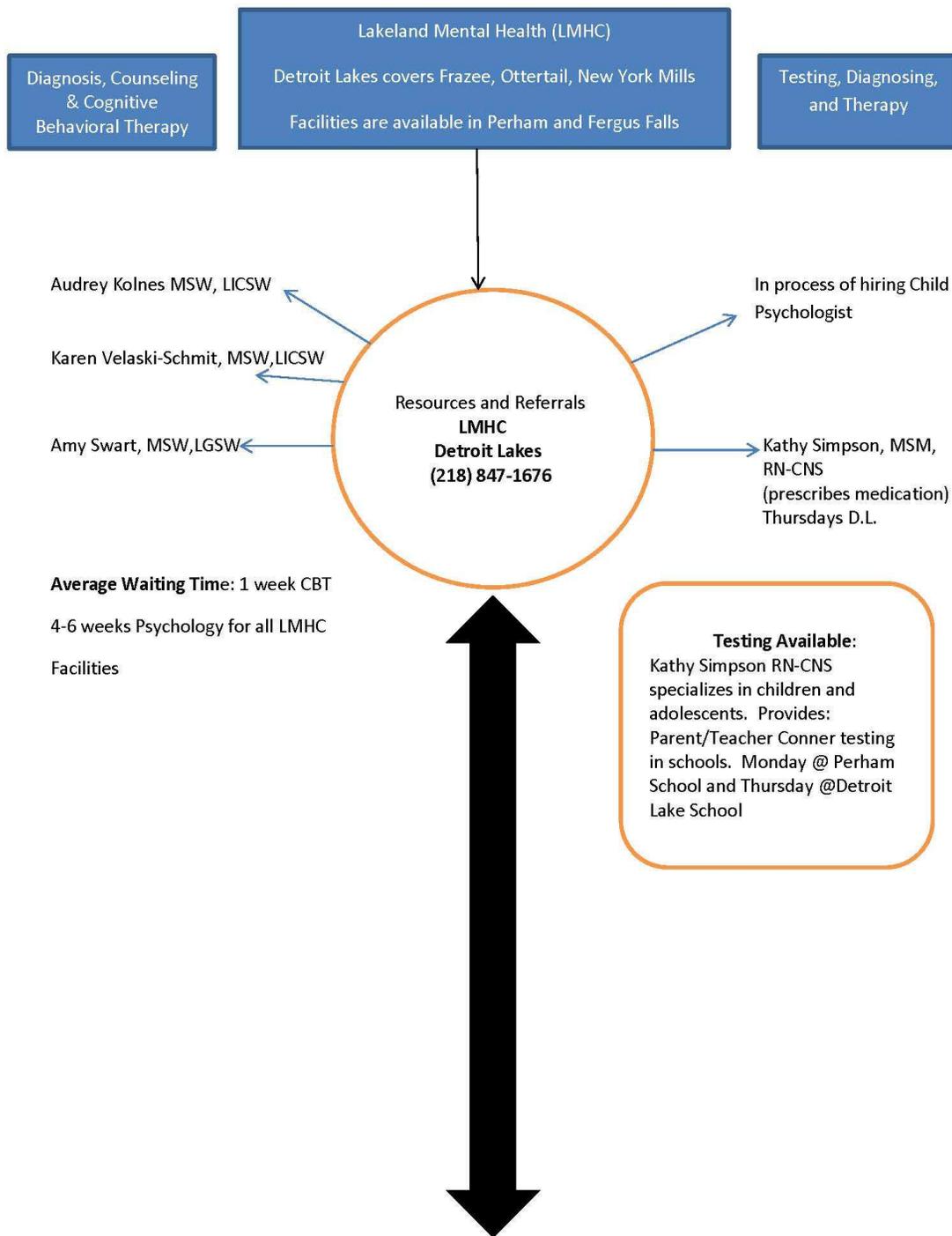
1. CTSS
2. Dina School-Children 3-6 years of age Group- teaches social skills (Modeled from Incredible Years)

In September starting a group for both Parents and children and will teach social skills like the CTSS program

Average Waiting Time: 1-2 weeks

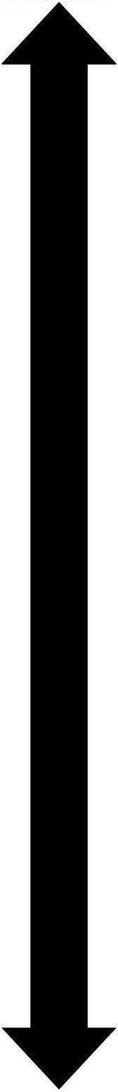
Testing Available:

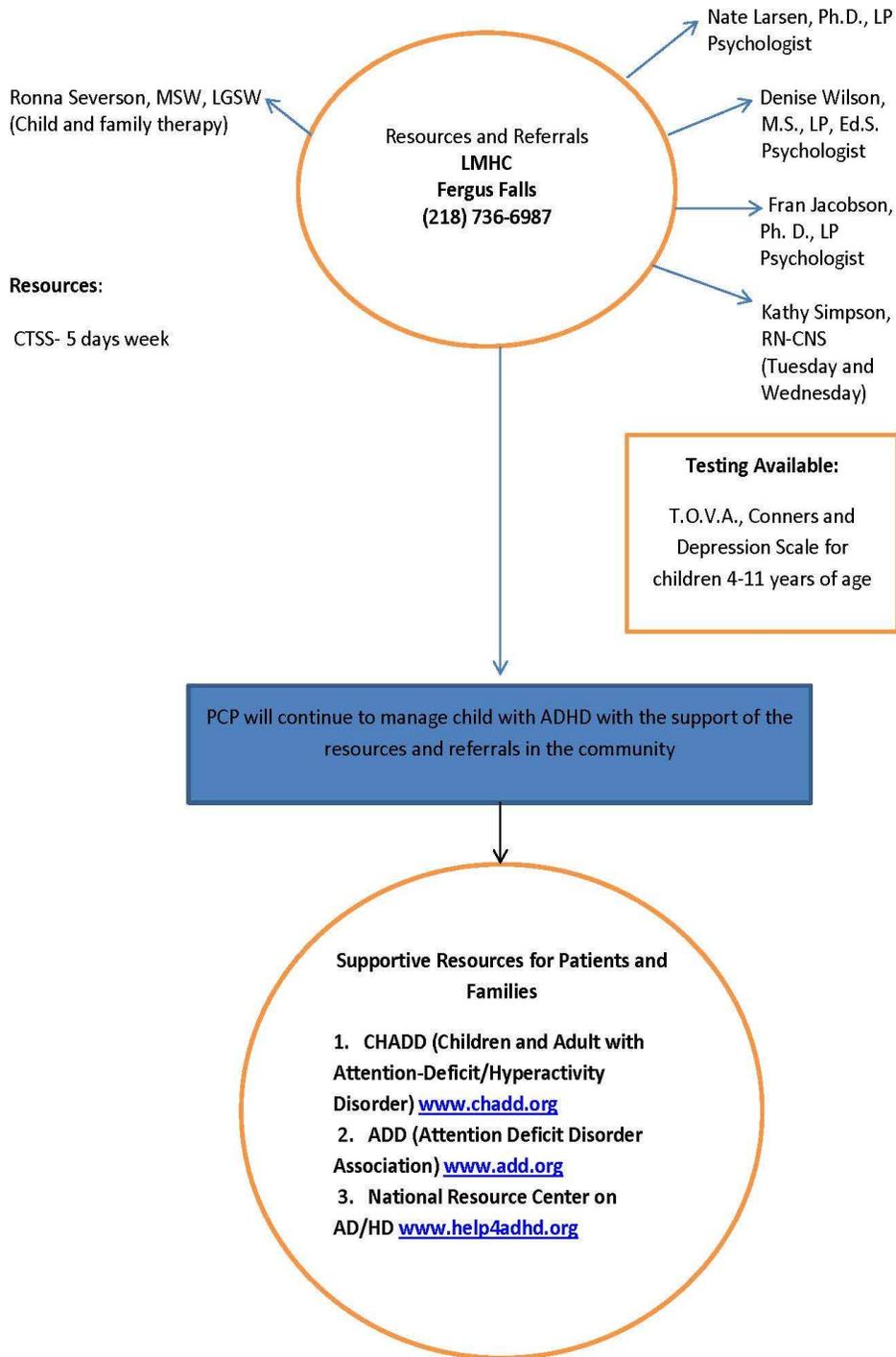
1. Wechsler Intelligence Scales- (WPPSI-III for age under six, and WISC-IV for six and over).
2. Continuous Performance Test -(CPT)-(Kiddie-Connors CPT for ages four and five, Connors CPT or Integrated Visual and Auditory CPT for ages six and up).
3. Connors Parent and Teacher/Daycare Provider Rating Scales.





Testing Available:
Only T.O.V.A.
testing available.
Will refer Fergus
Falls LMHC with
any further testing.





APPENDIX I. ADHD REFERRAL/RESOURCE KEY

Key

CNS-Certified Nurse Specialist can diagnose, test and prescribe medications.

CTSS-(Children Therapeutic Services and Supports) is a program with in the home to promote emotional and behavioral stability for children and their families. The program aims to provide the skills to strengthen the child and the family, by increasing parental skills which enable the parents to work more effective with the child in the home, the school and in the community.

IIT-(Family Intensive in Home Therapy).

IVA-Integrated Visual and Auditory Continuous Performance Test. The test assists clinicians in the screening and management of children by providing objective data on ones concentrate impulsive decisions.

MSW-Master of Science of Social Work.

LICSW-License Social Worker who specializes in children with mental health disorders can treat with Cognitive Behavioral Therapy.

LGSW- License Graduate Social Worker who works under the LICSW and specializes in children with mental health disorders can treat with Cognitive Behavioral Therapy.

LMHC-Lakeland Mental Health Center.

T.O.V.A.-Test of Variables of Attention. TOVA is a computerized test of attention. The test is to assist the clinician in the screening and the management of attention disorders, like Attention Deficit Hyperactivity Disorder (ADHD).

APPENDIX J. POST-QUESTIONNAIRE

POST-QUESTIONNAIRE FOR THE RESOURCE/REFERAL GUIDE FOR CHILDREN WITH ADHD

1. How many children 4-11 years of age with the symptoms of ADHD have you seen in the last 6 weeks?

2. What was the primary reason for seeing the child who you determined had the symptoms of ADHD?

3. Do you feel that the algorithm packet addresses a need in your practice? If so, how? If not, why not?

4. In what way(s) did the packet benefit or improve practice?

5. In what way(s) did the packet not benefit your practice?

6. What barriers did you encounter or do you foresee when using the algorithm?

7. What are your professional feelings regarding how to improve the packet in practice?