

IMPLEMENTING CLINICAL PRACTICE GUIDELINES IN FAMILY PRACTICE: CARING
FOR CHILDREN WITH ADHD

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ABSTRACT

The purpose of this Practice Improvement Project was to promote evidence-based practice in caring for children ages 4-18 with Attention Deficit Hyperactivity Disorder (ADHD) in the family practice setting. The American Academy of Pediatric Clinical Practice Guidelines (CPG) and the Diagnostic and Statistical Manual of Mental Health Conditions, 5th Ed. (DSM-V) diagnostic criteria for ADHD were embedded in the electronic health record (EHR) in the form of an evaluation tool/template to guide the Primary Care Providers (PCPs) in documenting evidence-based practice in the assessment, diagnosis and treatment of ADHD. Primary stakeholders are PCPs of Riverview Clinic who care for children with ADHD.

Neuman's System Theoretical framework was used assuring a comprehensive holistic approach to caring for children with ADHD. The logic model was applied to direct project process while providing a framework for project evaluation. A focused forum was held to educate PCPs on the American Academy of Pediatrics (AAP) CPG and the DSM-V ADHD diagnostic criteria. PCPs were introduced to the tool with instruction on use. Six weeks post launching, a retrospective chart audit was done to evaluate for the presence of evidence based-practice documentation with the evaluation tool/template versus without.

When utilized, the evaluation tool/template demonstrates a higher rate of documentation supportive of evidence-based practice. The tool enhances provider's comfort level in caring for children with ADHD while promoting optimal quality outcome for the child. Project outcome suggests the tool be used by PCPs in documenting evidence-based practice. Key words: ADHD, children, management, EHR, template, co-morbid conditions, and clinical practice guidelines.

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LIST OF ABBREVIATIONS

AAP.....American Academy of Pediatrics

ADHD.....Attention Deficit Hyperactivity Disorder

AMA.....American Medical Association

APN.....Advanced practice nurse

DSM-V.....Diagnostic and Statistical Manual of Mental Health conditions 5th Ed.

EHRElectronic health record

NICHQ.....National Institute of Children’s Healthcare Quality

PCPs.....Primary care providers

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CHAPTER ONE

Introduction

Attention deficit hyperactivity disorder (ADHD) is the most common neurobehavioral disorder of childhood. ADHD is also among the most prevalent chronic health conditions affecting school- aged children. Inattention, hyperactivity, and impulsivity are the core symptoms. The onset of symptoms occurs in early childhood and often continues into adolescence and adulthood. School difficulties, academic underachievement, troublesome interpersonal relationships, and low self-esteem are often associated with this disorder (Barkley, 2006; Franks-Briggs, 2011; Hines, King, & Curry, 2012; Rader, McCauley & Callen, 2009; Xenitidis, Maltezos & Pitts, 2011).

The diagnosis of ADHD is primarily a subjective process and because of this, the evaluator's perception plays a vital role in the outcome of the evaluation. Many question the validity of this disorder as a result of the heightened awareness of its prevalence. Other compounding issues include the clinician's failure to conduct a comprehensive diagnostic evaluation, or neglect in utilizing the Diagnostic and Statistical Manual of Mental Health Disorders (DSM-V) criteria (Appendix A), which may result in over- diagnosing the disorder of ADHD. Moreover, ADHD may be under-diagnosed by another clinician as a result of the direction of his or her bias. Primary care providers (PCPs) are increasingly confronted with caring for individuals with this disorder and often lack knowledge and expertise in appropriate diagnosing and effective management of this disorder.

The American Academy of Pediatrics (AAP) has developed evidence-based clinical practice guidelines for the PCP's to aid in the assessment, diagnosis, and treatment of children with ADHD (Appendix B). Despite the availability of practice guidelines, research suggests underutilization of Clinical Practice Guidelines and/or use of the DSM-V diagnostic criteria in the family practice clinical setting (Co- et al., 2010; Rushton, Fant, & Clark, 2004). The rather high prevalence of ADHD, recognition of its chronicity, and frequent presentation to family practice warrants that PCPs take a proactive approach in caring for this disorder (Epstein, Langberg, & Lichtenstein, 2010).

The primary focus for this practice improvement project is implementing and evaluating an evidence-based evaluation tool/template linked to the electronic health record (EHR) for the primary care setting. The ADHD evaluation tool/template prompts the PCPs to use clinical practice guidelines for the assessment, diagnosis and treatment of school-aged children with ADHD in the family practice setting.

According to Madison and Stagger (2011) the use of EHR systems can improve communication and coordination of care, as well as promote better patient outcomes. Embedding clinical practice guidelines and the DSM-V ADHD diagnostic criteria into an EHR evaluation tool/template will assure clinical decision support that has the potential to improve the quality and consistency of care provided at the ADHD clinical encounter. The EHR evaluation tool/template will provide evidence-based decision support as presented to the clinician at the point of thought, providing critical evidence-based scientific literature that promotes timely and informed medical decision making to aid in optimal patient outcome (Madison & Stagger, 2011).

Project Statement/Purpose

This practice improvement project will include EHR adoption of an evaluation tool/template for the assessment, diagnosis, and treatment of ADHD in accordance with the guidelines set forth by the AAP and DSM-V, assuring evidence based practice. The specific aim of this project is to implement and evaluate an EHR evaluation tool/template that will provide PCPs a systematic approach to a comprehensive assessment, diagnosis, and treatment of ADHD in school aged children. The EHR evaluation tool/template will promote evidence based treatment and outcome measurements while providing evaluation of PCPs responses and utilization of the ADHD evaluation tool/template in the family practice setting.

Significance of the Project

ADHD is rarely a solo diagnosis. ADHD frequently presents with co-morbidities such as oppositional defiant disorder, anxiety, depression and learning disabilities. Social and educational functional difficulties such as academic failures, school suspension, disruptive behavior, delinquency and peer rejection are just a few of the problems a child with ADHD may face (Barkley, 2006). Adolescence with ADHD have earlier onset and higher rates of substance abuse than adolescence without ADHD (Ivan, Pearson, Kaplan, & Newcorn, 2010; Molina & Pelham, 2003). Failure to recognize ADHD and provide appropriate interventions can result in serious consequences; therefore early identification and treatment is essential.

Project Description and Purpose

The practice improvement project was implemented at Riverview Health Clinic in Crookston, MN. The project included the implementation of an the evaluation tool/template embedded in Riverview's EPIC electronic health record that provides a comprehensive evaluation for children ages 4-18, evaluated and treated for ADHD. The AAP clinical practice guidelines and the DSM-V ADHD diagnostic criteria were linked to the EHR as a "smart phrase," a computer software component of EPIC. A "smart phrase" allows prompts and drop down menus which guide the primary care provider (PCP's) in the documentation of a comprehensive assessment, diagnosis, and treatment of ADHD.

Project Objectives

According to the AAP, a reliable diagnosis of ADHD is dependent upon the fulfillment of three criteria: a) the use of explicit criteria for the diagnosis using the DSM-V, b) the importance of obtaining information about the child's signs in more than one setting, and c) evaluation for co-existing conditions which may make the diagnosis more difficult or complicate treatment planning. Assuring evidence-based practice in the assessment, diagnosis and treatment of children presenting with inattention, hyperactivity or impulsivity symptoms, the objectives of this clinical practice improvement project will center on fulfillment of these criteria.

Objective #1

The EHR ADHD Evaluation Tool/Template will provide documentation supporting the application of the DSM-V diagnostic criteria in the assessment, diagnosis, and treatment of ADHD.

Objective #2

The EHR ADHD evaluation tool/template promotes documentation of screening for common co-morbid conditions.

Objective #3

The EHR ADHD evaluation tool/template will facilitate and provide documentation supporting an interdisciplinary team approach to the assessment, diagnosis, and treatment of ADHD.

Objective #4

Application of the evaluation tool/template will promote documentation supportive of evidence-based practice in the assessment, diagnosis and treatment of ADHD.

CHAPTER TWO

Literature Review

ADHD Background

Attention deficit hyperactivity disorder (ADHD) is a complex chronic condition with genetic and environment causes. The onset of ADHD occurs in early childhood characterized by developmentally inappropriate levels of hyperactivity, impulsivity, and/or inattention (Barkley, 2006; Clarke, & Frank-Briggs, 2011; Clarke, Heussler, & Kohn, 2005; Resnick, 2005; Sabina, 2012). The prevalence of ADHD in school-aged children is estimated to be up to percent. ADHD is among one of the most common chronic neurobiological disorders in children. Untreated, children with this disorder often experience academic underachievement, low self-esteem and difficulty with peer relationships (Childress & Berry, 2012; Co, et al., 2010; Laver-Bradbury, 2012; Leslie, 2006; Rader, McCauley, & Callen, 2009; Wilens, & Zulauf, 2012; Xenitidis, Maltezos, & Pitts, 2011).

The diagnosis of ADHD accounts for nearly 50% of pediatric psychiatric patients (Franks-Briggs, 2011; Gioia & Isquith, 2002; Xenitidis, Maltezos, & Pitts, 2011). ADHD has been recognized and studied for over a century. ADHD has been identified as being the most researched mental health disorder in our country, yet still is found to leave many in disbelief of its existence (Frank-Briggs, 2011; Reiff, 2011). Society often views this disorder simply as a result of poor parenting, lack of child supervision and environmental factors.

ADHD Across the Lifespan

Sixty percent of children diagnosed with ADHD continue to manifest noticeable ADHD symptoms into adulthood. The realization that ADHD often persists throughout adulthood has

only been addressed over the last few decades (Barkley, 2006; Clarke, Huessler, & Kohn, 2005; Franks-Briggs, 2011; Xenitidis, Maltezos, & Pitts, 2011). Prior to recognizing the chronicity of ADHD into adulthood, research was focused primarily on the hyperactive component of the disorder. Hyperactivity often decreases as one ages and because of this, ADHD was thought to resolve prior to or during the adolescent stage of life. The hyperactivity component diminishes with age or changes to a feeling of inner restlessness, while impulsivity and inattentiveness often persists throughout the course of one's life (Waite & Ramsey, 2010).

ADHD Co-Morbid Conditions

ADHD is rarely a solo diagnosis. Co-morbid conditions such as mental health disorders, learning disorders or neurodevelopmental conditions occur in as many as two-thirds of children diagnosed with ADHD in the United States (Franks-Briggs, 2011). Co-morbidities can complicate the assessment and treatment of this disorder (Reiff, 2011). Frequency of co-morbidity was revealed in a survey conducted by the National Children's Health, revealing that 33% of children diagnosed with ADHD had one co-morbid disorder, 16 % had two and 18% had three or more. Learning disabilities account for 46%, conduct disorder 27%, anxiety 18%, depression 14% and speech impairment accounted for 12% of the co-morbidities (Larson, Russ, Kahn, & Halfon, 2011). Oppositional defiant disorder is also highly prevalent as a co-morbidity of ADHD (Franks-Briggs, 2011; Power, Mautone, Manz, Frye, & Blum, 2008; Woodard, 2006).

Children and adolescents with this disorder are at greater risk of sustaining injuries. They tend to have more frequent and severe injuries than peers without ADHD. Adolescents with ADHD are four times more likely to sustain a motor vehicle violation, eight times more likely to

have their driver's license revoked and four times more likely to be involved in a motor vehicle collision than the adolescent without ADHD (Cox-et al., 2007; Reiff, 2011).

Smoking and Substance Use

The disorder of ADHD has been shown to be a significant predictor for the onset of smoking before the age of 15 and is associated with higher risk of smoking into adulthood and a lower likelihood of smoking cessation. Several studies have documented a strong connection between ADHD, alcohol and drug abuse (Ivanov, Pearson, Kaplan, & Newcorn, 2010; Kousha, Shahrivar, & Alaghband-Rad, 2012; Wilens & Zulauf, 2012).

The individual with ADHD typically has problems with alcohol and drug abuse at an earlier age, and the problems tends to be more severe than individuals without the disorder. Many individuals with this disorder use substances as a way of self-medicating in an attempt to relieve the symptoms of ADHD or symptoms of associated co-morbid mental health disorder(s). Self-medication is often the result of undiagnosed or untreated ADHD (Sherman, 2007). Alcohol and marijuana are the most common substances of abuse in children and adolescents with ADHD (Wilens & Zulauf, 2012).

ADHD and Risky Behavior

The ADHD adolescent is often prone to risk taking behaviors, especially in the presence of impulsivity. They tend to engage in first time intercourse at an earlier age. There is a higher prevalence of multiple partners and less likely to use birth protection measures. Impulsive behavior is often associated with a higher frequency of sexually transmitted infections and unintended pregnancies in comparison to peers without ADHD (Reiff, 2011).

ADHD and PCPs

PCPs are increasingly confronted with treating children with ADHD. PCPs, including Advanced Practice Nurses (APN) are frequently confronted with the challenges of assessment, diagnosis, and management of this disorder. Diagnosing the disorder of ADHD is complex and multi-faceted. Accuracy in the diagnosis requires a thorough history, completion of behavioral rating scales, a thorough physical exam and evaluation based on the DSM-V ADHD diagnostic criteria (Childress & Berry, 2012; Epstein, Langberg, & Lichtenstein, 2010; Hardy, Warmbrodt, & DeBasio, 2004; Vlam, 2006; Woodard, 2006).

The American Academy of Pediatrics (AAP), American Medical Association (AMA), and American Academy of Child and Adolescent Psychiatry (AAPAP) have established guidelines and evidence-based protocols. These guidelines are systematically developed statements established to assist the PCPs in the assessment, diagnosis, and treatment of ADHD (Bukstein, 2010; Epstein, Langberg, & Lichtenstein, 2010). A toolkit is available to aid PCPs in the evaluation and management of children with ADHD developed by the National Initiative for Children's Healthcare Quality (NICHQ) according to AAP guidelines (Krull, 2011). Competency in the assessment, diagnosis, and treatment of children with ADHD require an understanding of the spectrum of this condition, its comorbidities and various treatment approaches. Despite the availability of evidence-based clinical practice guidelines, many PCPs are not accustomed to incorporating them into practice.

A survey conducted by Rushton, Fant, and Clark (2004) of 1374 primary care physicians in Michigan revealed that 77% were familiar with the AAP guidelines on ADHD. Approximately 60% had incorporated them into their practice. The majority of PCPs reported practice consistent

with individual components of the diagnostic and treatment guidelines. However, when adherences to multiple components were analyzed; only 26% reported routine use of all four diagnostic components. The study also found that some PCPs continue to use diagnostic neuroimaging and laboratory tests in routine ADHD evaluations; these modalities are no longer recommended. Only 53% reported routine follow-up visits (3-4 times per year) for medication management of children with ADHD.

A study involving 79 pediatricians caring for 412 children with ADHD from 12 primary care practice sites in Massachusetts revealed that EHR decision support improves care of children with ADHD. The study involved EHR decision support with prompts reminding the pediatrician to assess children's ADHD symptoms every 3 to 6 months. Additionally, a visit note template provided prompts to assess and record symptoms, treatment effectiveness, and adverse effects. Seventy-one percent of children in the intervention group had visits assessing ADHD as opposed to only 54% in the control group. The study also revealed that during routine well-child visits the providers were more likely to document and discuss ADHD symptoms and treatment in the intervention group (78%) as compared to only 63% in the controlled group. According to the researchers, the use of the ADHD template was associated with better documentation of symptoms and treatment effectiveness. Provider satisfaction rates on managing ADHD were higher among the pediatrician that had access to the decision support template (Co- et al., 2010).

Assessment of the Disorder ADHD

According to the AAP Clinical Practice Guidelines on ADHD, a thorough history includes a comprehensive interview with both the parent/caregiver and child. The emphasis of this clinical interview are the diagnostic criteria set forth by the DSM-V for ADHD, as well as recognizing

symptoms of potential co- morbid conditions. Questionnaires and behavioral rating scales are frequently used as part of the screening for the core symptoms of ADHD. During the interview the clinician inquires about the 18 symptoms listed in the DSM-V. The clinician determines the presence of each symptom noting age of onset, frequency, duration, and severity of each symptom. The child must have the required number of symptoms (at least six of nine of the inattention cluster or at least six of nine of the hyperactive/impulsive criteria, each occurring more days than not), a chronic course (symptoms do not remit for weeks or months at a time), and onset of symptoms during childhood. Following identification of symptoms, the clinician should determine in which setting impairment occurs. Presence of symptoms should be distinguished from presence of impairment. The DSM-V requires impairment in at least two settings (home, school or job) to meet criteria for this disorder (American Psychiatric Association ([DSM-V], 2013).

PCPs should ask specific questions pertaining to school performance as academic impairment is common in this disorder. When possible, the parent/caregiver is requested to bring in current examples of schoolwork, report cards, and attendance records for review. The frequencies of tardiness and/or problems with truancy are evaluated. If the child has had any psycho-educational testing it is valuable to have a summary of outcome at the time of assessment. The provider inquires whether the child has repeated any grades or receiving any special education at present or in the past. The provider must also determine if the child's behaviors have led to suspension, either in or out of school, or served detention, and if so, what behaviors or problems were the reason for the disciplinary action(s).

Following identification of symptoms, the PCPs should interview the parent(s) inquiring about other common childhood disorders. The interview is then focused on screening for the

presence of commonly occurring co-morbid conditions. The PCPs then determines whether the child meets criteria for a separate co-morbid condition in addition to ADHD, the co-morbid disorder is the primary disorder and the child's inattention or hyperactivity-impulsivity is directly caused by it, or the co-morbid symptoms do not meet criteria for a separate disorder but represent secondary symptoms stemming from ADHD. The comprehensive history includes obtaining information related to the child's present and past medical history, obstetrical and perinatal history, developmental, family history including any significant mental health disorders, substance abuse disorders as well as family functioning (Barkley, 2006; Childress & Berry, 2012; Woodard, 2006).

The initial evaluation of ADHD seldom requires laboratory or neurological testing. Neurological studies such as EEG, MRI, SPECT or PET are not indicated in the evaluation unless there is strong evidence of certain risk factors in the medical history. Psychological and neuropsychological tests are not recommended in the evaluation of ADHD unless the child's history suggests low general cognitive ability or low achievement in language or mathematics relative to the child's intellectual ability (Woodard, 2006).

Recommended Treatment

According to the AAP, a child-specific individualized treatment plan should be developed for children with the goal of maximizing function to improve relationships and performance at school, decrease disruptive behaviors, promote safety, increase independence and self-esteem. PCPs should establish a treatment plan that recognizes ADHD as a chronic condition. PCPs should provide age appropriate education regarding the disorder and counsel regarding family responses to the condition.

Treatment should be guided by PCPs, in collaboration with parent(s) or care giver, child and school personnel addressing targeted outcomes. In the event the child fails to meet the targeted outcome goals, the PCPs should re-evaluate the diagnosis, use of all appropriate treatments, adherence to the treatment plan and presence of co-morbid conditions. Periodic follow-up is suggested with ongoing monitoring directed to target outcomes and adverse effects, with information gathered from the parent(s), care giver, teacher, and child.

Theoretical Framework

As a multi-faceted disorder, ADHD requires a holistic approach to the assessment, diagnosis, and treatment of the disorder to assure optimal child outcome. Neuman's System Model, developed by Nurse Theorist, Betty Neuman, and was utilized to guide this clinical improvement project. The Neuman's System model is applicable as this project's focus is that of the individual as a whole. The goal of the Neuman's System Model is providing a holistic overview of the physiological, psychological, social-cultural, developmental and spiritual aspects of human beings (Fawcett, Newman, & McAllister, 2004).

Neuman refers to the client as being an open system. The client, as an open system, is confronted by stressors from the internal and external environment. Within the system is the central core that is essential in the maintenance of life. The central core is the product of five variables: physiological, psychological, social-cultural, developmental and spiritual. These variables are interrelated and need to be taken into consideration when addressing the client as a whole (George, 2002; Martsof & Mickey, 1998). Neuman refers to the environment as being all of the internal and external factors that surround or interact with the client. Stressors are referred to as environmental forces that interact with and potentially alter system stability.

Three circles of protection surround the central core. The inner circle is referred to as the line of resistance. This inner circle acts as a barrier providing protection to the inner core of the system. The second layer is referred to as the normal line of defense and the third or outermost circle is referred to as the flexible line of defense. The flexible line of defense remains strong when the individual provides his or her body with a balance of necessities: adequate nutrition, exercise, sleep, hydration, and time for recreation. These lines of protection, when in place, promote a state of equilibrium or wellness for the system, that being the client (Fawcett, Newman, & McAllister, 2004).

This model defines health as being on a continuum of wellness to illness that is dynamic and continually changing. The client is in a state of either wellness or illness, in varying degree, at any point of time. As a multidimensional being, the client is confronted by internal and external stressors on a continuous basis. The best possible state of health is referred to as the optimal state of wellness. Being in a state of equilibrium is considered the healthy state of the system, while disequilibria is referred to illness. As a wellness model, the goal is to facilitating a state of equilibrium. When the lines of protection become threatened or weakened by internal and external stressors, the client system enters a state of disequilibria or illness. It is during that state that intervention is necessary.

Neuman's model describes three levels of intervention. These interventions include primary, secondary and tertiary. The goal of implementing these interventions is to promote optimal client health. Primary intervention occurs before the system reacts to a stressor. Secondary intervention occurs after the system reacts to a stressor, and tertiary intervention occurs after the system has been treated through secondary prevention strategies (Fawcett, Newman, & McAllister, 2004).

The application of this model in guiding this clinical improvement project in the assessment, diagnosis, and treatment of ADHD is applicable as well as relevant. Application of this model assures a holistic approach identifying the client's stressors, as he or she perceives them. This framework promotes a holistic approach and when applied accordingly, it not only provides for an accurate assessment of ADHD, but also may appear with any one of the common co-morbid disorders commonly associated with ADHD. As previously discussed, the individual with ADHD is a multidimensional being, who is confronted with stressors on a continuous basis. These stressors, if not identified and addressed accordingly, often result in multi-faceted adversity for the client with ADHD.

The application of the Neuman's Theoretical Framework in guiding this clinical improvement project promotes a comprehensive assessment in the evaluation process of children with suspected ADHD. Application of this framework in turn assures accuracy as well as validity in the diagnosis of ADHD. Applying primary, secondary and tertiary interventions in the treatment of ADHD will assure optimal outcome (wellness) for the child confronted with the disorder of ADHD as well as potential co-morbid conditions.

The evaluation tool/template assures a comprehensive approach to the assessment, diagnosis and treatment of ADHD in school aged children ages 4-18. The evaluation tool/template elicits a comprehensive history including the five variables: a) physiological, b) psychological, c) social-cultural, d) developmental and e) spiritual. The child is an active participant in the development of an individualized plan of care identifying targeted treatment outcome. The evaluation tool/template, when applied, promotes primary, secondary and tertiary interventions.

CHAPTER THREE

Project Design

The logic model was used as a tool to guide this clinical improvement project process and evaluation (Appendix C). The logic model is defined as a picture of how a project does its work. This model identifies the theory and assumptions underlying the project. The model links outcomes (short, mid- and long-term) with project activities/process and the theoretical assumptions and principles of the project. The logic model provide a visual diagram presenting an understanding of the relationships among resources (inputs) as well as project activities leading to the achievements of project objectives (outcomes). The logic model provides a framework for evaluating the effectiveness of the project (Coffman, 1999). The model also provides guidance in selecting data collection in the evaluation of project objectives.

This project consists of a retrospective chart audit of EHR of all children accessing services for ADHD during the 6 week study. The retrospective chart audit elicited data in accordance with the data collection tool. The data collection tool consists of evidence based criteria adopted from the American Academy of Pediatrics Clinical Practice Guidelines and the DSM-V ADHD diagnostic criteria. A PCPs Survey was also completed at the end of the study. The survey contained evidence-based data in accordance to the AAP Clinical Practice Guidelines and DSM-V ADHD diagnostic criteria. Data from both instruments was quantitative in nature and analyzed using inferential statistics.

Project Implementation

Riverview's EPIC PCP Coordinator adopted the DSM-V ADHD diagnostic criteria and the AAP Clinical Practice Guidelines into the EHR as an evaluation tool/template. The evaluation tool/template was embedded in Riverview's EPIC EHR as a "smart phrase." A smart

phrase is a component of EPIC that allows prompts and drop down menu's which guide PCPs in the documentation of a comprehensive assessment, diagnosis and treatment of ADHD. Two smart phrases were created, one for initial assessment and another for follow-up successive ADHD encounters.

A focused forum was held for Riverview PCPs during January's monthly provider meeting. Five of Riverview's nine PCPs attended this forum. The project director provided PCPs an overview of the clinical improvement project including an educational module that contained a hard copy of the AAP ADHD Clinical Practice Guidelines, the DSM-V ADHD diagnostic criteria and directions on accessing and using the evaluation tool/template (Appendix G). The evaluation tool/template was launched and utilized in the PCPs clinical setting for a period of six weeks (January 16th through February 28th, 2014).

NDSU/Agency IRB Approval

This project was granted approval to take place at Riverview's Family Practice Clinic through North Dakota State University's Institutional Review Board. Riverview's CEO agreed to allow this study to take place on-site at Riverview Clinic (Appendix F).

Data Collection

Riverview's Medical Record personnel retrieved a listing of all children ages 4-18 that accessed services with the diagnostic ICD-9 code of 314.00 and 314.01 (ADHD without hyperactivity and ADHD without hyperactivity) during the 6 week period. A retrospective chart audit was conducted on-site at Riverview by the project director in the collection of data as outlined by the data collection tool (Appendix D). Six week post launching of the evaluation tool/template, a survey (Appendix E) was distributed to Riverview's PCP with request for completion while assuring anonymity and confidentiality. Data retrieved from the retrospective

chart audit and PCPs surveys were quantitative in nature. Data were analyzed with the application of inferential statistics.

CHAPTER FOUR

Evaluation

The evaluation of project objectives was guided by the use of the logic model (Appendix C). The logic model systematically connects project in-puts, project out-puts, and project outcomes (objectives) thereby promoting a theory of change. A data collection tool (Appendix D) and a PCP survey (Appendix E) were designed to elicit data pertaining to evidence based practice in accordance with the American Academy of Pediatric ADHD Clinical Practice Guidelines and the DSM-V ADHD diagnostic criteria. A retrospective chart audit was conducted in addition to the PCP survey in the retrieval of quantitative data. Data was then analyzed using inferential statistics.

Objective #1

“The EHR ADHD evaluation tool/template will provide documentation supporting the application of the DSM-V diagnostic criteria in the assessment, diagnosis and treatment of ADHD.” This objective was measured by a retrospective chart audit by use of the data collection tool. The data collection tool questioned if the EHR provided documentation to support the presence of ADHD DSM-V symptoms in the assessment, diagnosis and treatment of ADHD. The retrospective chart audit evaluated for the presence of DSM-V symptom documentation in the EHR of children accessing services for ADHD during the study period.

Objective #2

“The EHR ADHD evaluation tool/template promotes documentation of screening for common co-morbid conditions.” This objective was measured by a retrospective chart audit by use of the data collection tool and the PCP survey. The retrospective chart audit evaluated for the presence of screening for co-morbid conditions. The PCPs survey questioned if the evaluation tool/template promoted screening for co-morbid conditions. Quantitative data were then analyzed using inferential statistics in the outcome based evaluation of this objective.

Objective #3

“The EHR evaluation tool/template will facilitate and provide documentation supporting an interdisciplinary team approach to the assessment, diagnosis and treatment of ADHD in children ages 4-18.” This objective was measured by the retrospective chart audit and PCPs survey. The use of teacher ADHD rating scales in the assessment, diagnosis and treatment of ADHD promotes an interdisciplinary team approach. The evaluation of this objective is outcome based and guided by the use of the Logic Model. The retrospective chart audit contained questions if the EHR ADHD clinic encounters documented support of an interdisciplinary team approach to the assessment, diagnosis and treatment of ADHD. The PCPs survey also surveyed PCPS asking if the ADHD evaluation tool/template promotes an interdisciplinary team approach to the assessment, diagnosis and treatment of ADHD.

Objective #4

“Application of the evaluation tool/template will promote documentation supportive of evidence based practice in the assessment, diagnosis and treatment of ADHD.” This objective was measured by a retrospective chart audit and PCP survey responses. Both the data collection tool and PCPs survey includes content pertaining to the American Academy of Pediatric ADHD clinical practice guidelines and the ADHD diagnostic criteria in accordance with the DSM-V thereby promoting evidence based-practice.

CHAPTER FIVE

Results

During the six-week review there were 81 children ages 4-18 that accessed services for ADHD at Riverview Clinics. A retrospective chart audit was performed to acquire data as outlined in the data collection tool. Of the 81 ADHD clinic encounters, 63% documented utilization of the evaluation tool/template in the assessment, diagnosis and treatment of ADHD (n=51). Documentation supporting the use of ADHD rating scales were 90% (n=46) with use of the evaluation tool/template and 17% (n=5) when the evaluation tool/template was not used (See Table 1).

TABLE 1

EHR Documentation of ADHD Evaluation Tool/Template

EHR Documentation	ADHD Clinic Encounter with use of the evaluation tool/template (n=51)		ADHD Clinic Encounter without use of evaluation tool/template (n=30)	
Use of ADHD Rating Scales	46/51	90%	5/30	17%
Assessing presence of ADHD DSM-V symptoms	45/51	88%	25/30	83%
Screening for co-morbid conditions	46/51	90%	7/30	23%
Documentation supports an interdisciplinary team approach	34/51	67%	9/30	30%
Plan of care documents target treatment outcomes	51/51	100%	28/30	93%
Presence of written treatment plan with patient education	51/51	100%	30/30	100%
Recommendation for appropriate follow-up	51/51	100%	30/30	100%

Assessment for the presence of DSM-V symptoms in more than one setting was documented 88% with evaluation tool/template use (n=45) and 83% (n=25) in visits without the template use (see Table 1).

The evaluation tool/template use documentation supportive of targeted treatment outcome 100% (n=51) while encounters without evaluation tool/template was 93% (n=28). There was documentation supporting that the plan of care provided a written treatment plan and appropriate follow-up recommended (eg. initial assessment follow-up recommended within 2-4 weeks and maintenance follow-up recommended a minimum of every 3-4 months) 100% of encounters with or without evaluation tool/template use (n=81).

A five point likert scale survey was dispersed to Riverview's eight primary care providers following the six week evaluation tool/template launching with a response rate of 75% (n=6). The likert scale included six questions pertaining to the evaluation tool/template (Appendix E).

Question one asked if the ADHD evaluation tool/template was easy to access within the electronic health record. There were five strongly agree (83%) and 1 agree (N=6). Question two asked if the ADHD tool/template promotes an interdisciplinary team approach to the assessment, diagnosis, and treatment of children with ADHD. All six respondents strongly agreed. Question 3 asked if the evaluation tool/template promotes documentation of evidence-based practice. Again, all 6 responded strongly agreed.

Question four asked if the evaluation tool/template promoted screening for common comorbid conditions. Of the 6 respondents, 5 strongly agreed (83%) and 1 agreed. Question five asked if the evaluation tool/template is clear and concise and improves work flow in the family practice setting. There were 4 respondents whom strongly agreed (67%) and 2 agreed (33%). The final question asked if the primary care provider was comfortable in using the ADHD

evaluation tool/template. All 6 responded strongly agreed. Table 2 below summarizes the survey results.

TABLE 2

Primary Care Providers Likerts Scale Survey

PCPs Survey Questions	1=Strongly Agree	2=Agree	3=Neutral	4=Disagree	5=Strongly Disagree
Tool/ template is easy to access in the EHR	83%	17%	0%	0%	0%
Promotes an interdisciplinary team approach	100%	0%	0%	0%	0%
Promotes evidence-based practice	100%	0%	0%	0%	0%
Promotes screening for co-morbid conditions	83%	17%	0%	0%	0%
Tool/template is clear/concise and improves workflow	67%	33%	0%	0%	0%
PCP comfort in using the tool/ template	100%	0%	0%	0%	0%

Project Objective #1

The EHR ADHD Evaluation Tool/Template will provide documentation supporting the application of the DSM-V diagnostic criteria in the assessment, diagnosis, and treatment of ADHD. This objective was met as evident by the retrospective chart audit which revealed that when the evaluation tool/template was used, it provided documentation in support of the DSM-V symptoms in 88% of clinic encounters.

Project Objective #2

The EHR ADHD evaluation tool/template promotes documentation of screening for common co-morbid conditions. This objective is met as evident by results of the retrospective chart audit and PCPs Survey. The retrospective chart audit revealed a 90% presence of screening for co-morbid conditions with the use of the ADHD evaluation tool/template in comparison to 23% of visits that did not use the Tool. The PCPs survey questioned if the ADHD Evaluation tool/template provided screening for co-morbid conditions with a response rate of 83% strongly agree and 1 agree.

Project Objective #3

The EHR ADHD evaluation tool/template will facilitate and provide documentation supporting an interdisciplinary team approach to the assessment, diagnosis, and treatment of ADHD. This objective was met as evident by both the retrospective chart audit and the PCPs survey. The retrospective chart audit revealed documentation supportive of an interdisciplinary team approach 67% in comparison to 30% of the time when the ADHD Evaluation tool/Template was not used. The PCPs survey questioned if the ADHD Evaluation Tool/Template promoted an interdisciplinary team approach with a response of 100% of PCPs strongly agreeing.

Project Objective #4

Application of the evaluation tool/template will promote documentation supportive of evidence based practice in the assessment, diagnosis and treatment of ADHD. This objective was met by evidence of the PCPs Survey. The survey questioned if the ADHD

Evaluation Tool/Template promotes evidence-based practice. The PCPs survey response was 100% strongly agree.

CHAPTER SIX

Discussion and Recommendations

Interpretation of Results

Use of the evaluation tool/template promotes documentation supportive of evidence-based practice in the assessment, diagnosis and treatment of ADHD. There was a higher frequency in the use of rating scales and co-morbid condition screening with the use of the evaluation tool/template as opposed to without. There was a higher frequency in the assessment of the DSM-V symptoms and documentation of targeted treatment outcome when the evaluation tool/template was applied. The use of the evaluation tool/template promotes an interdisciplinary approach to the assessment, diagnosis and treatment of children with ADHD.

Limitations/Future Research

Limitations of this study are that it took place in a single setting with limited primary care providers. The study length of duration was only six weeks. Additionally, this project included children with and without co-morbid conditions. Data analysis did not differentiate use of the ADHD evaluation tool/template in comparison of children with versus without co-morbid conditions. Future practice improvement projects could be conducted in multiple family practice settings while expanding the duration of time studied using a larger sample size while evaluating more PCPs. Future practice improvement projects could focus on the impact of the child evaluating child outcome with the use of the ADHD evaluation tool/template.

Recommendations for Riverview

It is recommended that the ADHD evaluation tool/template continue to be utilized in the assessment, diagnosis, and treatment of children ages 4-18 accessing services in Riverview's Clinic. A post project focused forum could be planned for Riverview's PCPs in the dissemination of project outcomes. The post project forum would allow for additional education on the ADHD evaluation tool/template and aid in further discussion. PCPs feedback at a post project forum may result in evaluation tool/template revisions to further improve workflow and aid in higher use of this tool thereby promoting evidence based-practice. This clinical improvement project is in alignment with Riverview's organizational mission statement, that of delivering personalized exceptional care engaging in best practices to heal people and promote healthy communities. When utilized, the ADHD evaluation tool/template promotes documentation supporting the application of evidence-based practice.

Implications for Future Research

Dissemination of project outcome could be presented via power point presentations to area family practice clinics. Project outcome could also be discussed with EPIC IT representatives allowing them to provide the evaluation tool/template to other family practice clinics in which they contract with. Broadening the use of this evaluation tool/template to surrounding clinics will further promote evidence-based practice in servicing the population of children with ADHD, thereby promoting optimal child outcome.

Role of the DNP

The Advanced Practice Nurse, educated at the Doctor of Nursing Practice (DNP) level could provide a major breakthrough in the promotion of improved access, as well as providing a holistic approach to servicing the population of children with ADHD. Providers specializing in this disorder are often difficult to access, particularly in the rural setting. The complexity of this disorder requires the clinician to have the highest level of scientific knowledge and practice expertise to ensure high quality outcome. The DNP represents a practice-focused doctorate degree geared towards APN who are pursuing expert clinical practice in the clinical setting.

Educated at the DNP level provides the APN with a wide array of knowledge. The APN is able to translate this knowledge quickly and effectively in the clinical setting resulting in excellence in child outcome. The DNP is skilled in synthesis, analysis and application of research in the clinical setting. The DNP can assume leadership roles and act as a change agent in the clinical setting advocating the application of evidence-based practice to the clinical setting.

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APPENDIX A. DSM-V DIAGNOSTIC CRITERIA FOR ATTENTION DEFICIT
HYPERACTIVITY DISORDER

(American Psychiatric Association [DSM-V], 2013)

A. A persistent pattern of inattention and/or hyperactivity-impulsivity that interferes with functioning or development, as characterized by (1) and/or (2):

1. Inattention: Six (or more) of the following symptoms have persisted for at least 6 months to a degree that is inconsistent with developmental level and that negatively impacts directly on social and academic/occupational activities.

Note: The symptoms are not solely a manifestation of oppositional behavior, defiance, hostility, or failure to understand tasks or instructions. For older adolescents and adults (age 17 and older), at least 5 of the symptoms are required.

- a. Often fails to give close attention to details or makes careless mistakes in schoolwork, at work, or during other activities (e.g., overlooks or misses details, work is inaccurate).
- b. Often has difficulty sustaining attention in tasks or play activities (e.g. has difficulty remaining focused during lecture, conversations, or lengthy reading).
- c. Often does not seem to listen when spoken to directly (e.g., mind seems elsewhere, even in the absence of any obvious distraction).
- d. Often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (e.g., starts tasks but quickly loses focus and is easily sidetracked).

- e. Often has difficulty organizing tasks and activities (e.g., difficulty managing sequential tasks; difficulty keeping materials and belongings in order; messy, disorganized work; has poor time management; fails to meet deadlines).
- f. Often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental efforts (e.g., schoolwork, homework; for older adolescents and adults, preparing reports, completing forms, reviewing lengthy papers).
- g. Often loses things necessary for tasks or activities (e.g., school materials, pencils, books, tools, wallets, keys, paperwork, eyeglasses, mobile phones).
- h. Is often easily distracted by extraneous stimuli (for older adolescents and adults, may include unrelated thoughts).
- i. Is often forgetful in daily activities (e.g., doing chores, running errands; for older adolescents and adults, returning calls, paying bills, keeping appointments).

2. Hyperactivity and impulsivity: Six (or more) of the following symptoms have persisted for at least 6 months to a degree that is inconsistent with developmental level and that negatively impacts directly on social or academic/occupational activities.

Note: The symptoms are not solely a manifestation of oppositional behavior, defiance, hostility, or a failure to understand tasks or instructions. For older adolescents and adults (ages 17 and older), at least five symptoms are required.

- a. Often fidgets with or taps hands or feet or squirms in seat.
- b. Often leaves seat in situations when remaining seated is expected (e.g., leaves his or her place in the classroom, in the office, or other workplace, or in other situations that require remaining in place).

- c. Often runs about or climbs in situations where it is inappropriate. (**Note:** in adolescents or adults, may be limited to feelings of restless).
 - d. Often unable to play or engage in leisure activities quietly.
 - e. Is often “on the go,” acting as if “driven by a motor” (e.g., is unable to be or uncomfortable being still for extended time, as in restaurants, meetings; may be experienced by others as being restless or difficult to keep up with).
 - f. Often talks excessively.
 - g. Often blurts out answers before a question has been completed (e.g., completes people’s sentences; cannot wait for turn in conversation).
 - h. Often has difficulty waiting his or her turn (e.g., while waiting in line).
 - i. Often interrupts or intrudes on others (e.g., butts into conversations, games, or activities; may start using other people’s things without asking or receiving permission; for adolescents and adults, may intrude into or take over what others are doing).
- B. Several inattentive or hyperactive-impulsive symptoms were present prior to the age of 12 years.
- C. Several of the inattentive or hyperactive-impulsive symptoms are present in two or more settings (e.g., at home, school, work; with friends or relatives; in other activities).
- D. There is clear evidence that the symptoms interfere with, or reduce the quality of, social, academic, or occupational functioning.
- E. The symptoms do not occur exclusively during the course of schizophrenia or other psychiatric disorder and are not better explained by another mental disorder (e.g., mood

disorder, anxiety disorder, dissociative disorder, personality disorder, substance intoxication or withdrawal).

Specify whether:

314.01 (F90.2) Combined presentation: If both Criterion A1 (inattention) and Criterion A2 (hyperactive-impulsivity) are met for the past 6 months.

314.00 (F90.0) Predominantly inattentive presentation: If Criterion A1 (inattention is met but Criterion A2 (hyperactivity-impulsivity) is not met for the past 6 months.

314.01 (F90.1) Predominantly hyperactive-impulsive presentation: If Criterion A2 (hyperactivity-impulsivity) is met and Criterion A1 (inattention) is not met for the past 6 months.

APPENDIX B. AMERICAN ACADEMY OF PEDIATRICS CLINICAL PRACTICE
GUIDELINES

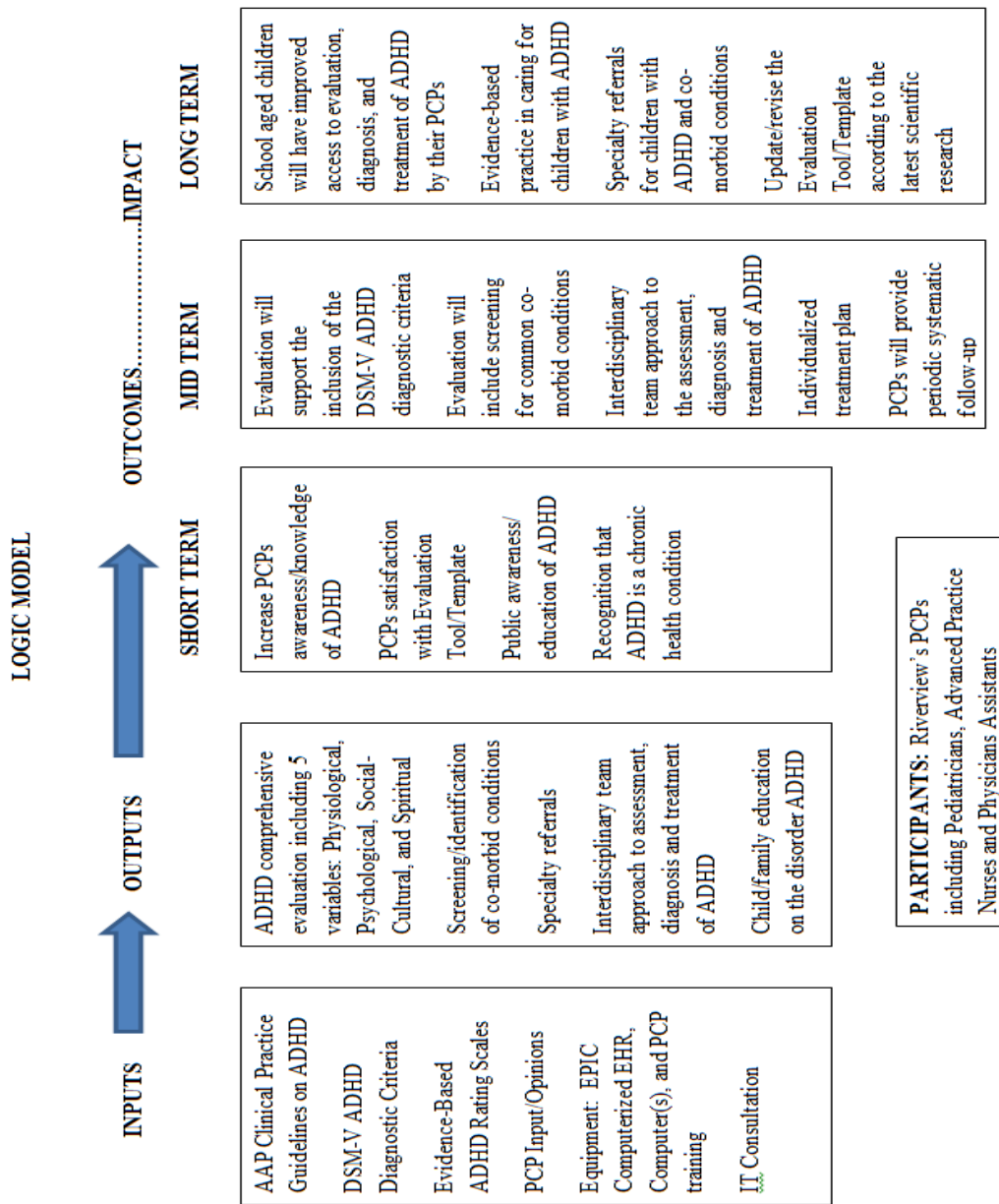
ADHD: Clinical Practice Guidelines for the Diagnosis, Evaluation and Treatment of Attention-Deficit/Hyperactivity Disorder in Children and Adolescents

Summary of key action statements:

1. The primary care clinician should initiate an evaluation for ADHD for any child 4 through 18 years of age who presents with academic or behavioral problems and symptoms of inattention, hyperactivity, or impulsivity.
2. To make a diagnosis of ADHD, the primary care clinician should determine that Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition criteria have been met (including documentation of impairment in more than 1 major setting); information should be obtained primarily from reports from parents or guardian, teachers, and other school and mental health clinicians involved in the child's care. The primary care clinician should also rule out any alternative cause.
3. In the evaluation of a child for ADHD, the primary care clinician should include assessment for other conditions or behavioral (eg, anxiety, depression, oppositional defiant, and conduct disorders), developmental (eg, learning and language disorders or other neurodevelopmental disorders), and physical (eg, tics, sleep apnea) conditions.
4. The primary care clinician should recognize ADHD as a chronic condition and, therefore, consider children and adolescents with ADHD as children and youth with special health care needs should follow the principles of the chronic care model and the medical home.

5. Recommendations for treatment of children and youth with ADHD vary depending on the patient's age.
 - a. For preschool-aged children (4-5 years of age), the primary care clinician should prescribe evidence-based parent- and/or teacher-administered behavior therapy as the first line of treatment and may prescribe methylphenidate if the behavior interventions do not provide significant improvement and there is moderate-to-severe continuing disturbance in the child's function. In areas where evidence-based behavioral treatments are not available, the clinician needs to weigh the risks of starting medications at an early age against the harm of delaying diagnosis and treatment.
 - b. For elementary school-aged children (6-11 years of age), the primary care clinician should prescribe US Food and Drug Administration-approved medication for ADHD and/or evidence-based parent- and/or teacher-administered behavior therapy as treatment for ADHD, preferably both. The evidence is particularly strong for stimulant medications and sufficient but less strong for atomoxetine, extended-release guanfacine, and extended-release clonidine (in that order). The school environment, program, or placement is a part of any treatment plan.
 - c. For adolescents (12-18 years of age), the primary care clinician should prescribe Food and Drug Administration-approved medication for ADHD with the assent of the adolescent and may prescribe behavior therapy as treatment for ADHD, preferably both.
6. The primary care clinician should titrate doses of medication for ADHD to achieve maximum benefit with minimum adverse effects.

APPENDIX C. LOGIC MODEL



APPENDIX D. DATA COLLECTION TOOL FOR THE ADHD EVALUATION

TOOL/TEMPLATE

	MR#	MR#	MR#	MR#	MR#
Evaluation Tool/Template was used in the documentation of today's clinic encounter	Y/N	Y/N	Y/N	Y/N	Y/N
Documentation supports the use of rating scale(s)	Y/N	Y/N	Y/N	Y/N	Y/N
Documentation reflects assessing for the presence of DSM-V symptoms in more than one setting	Y/N	Y/N	Y/N	Y/N	Y/N
Documentation reflects screening for common co-morbid conditions	Y/N	Y/N	Y/N	Y/N	Y/N
Documentation reflects an interdisciplinary team approach to the assessment, diagnosis and treatment of ADHD	Y/N	Y/N	Y/N	Y/N	Y/N
Plan of care documents targeted treatment outcome	Y/N	Y/N	Y/N	Y/N	Y/N
Plan of care provides a written treatment plan of care including patient education	Y/N	Y/N	Y/N	Y/N	Y/N

Appropriate follow-up recommended (eg. initial assessment follow-up suggested within 2-4 weeks and maintenance follow-up suggested a minimum of every 3-4 months).	Y/N	Y/N	Y/N	Y/N	Y/N
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APPENDIX E. RIVERVIEW'S PRIMARY CARE PROVIDER SURVEY OF THE
ADHD EVALUATION TOOL/TEMPLATE

As a Primary Care provider your participation in completing this survey is optional. Your feedback is highly encouraged in the promotion of evidence-based practice in servicing children with ADHD in Riverview's clinical practice setting. Upon completion, please return survey to the designated secured drop box located at Riverview's family practice clinic.

1= strongly agree

2= agree

3= neutral

4= disagree

5= strongly disagree

1. The ADHD evaluation tool/template is easy to access within the electronic health record?

1 2 3 4 5

2. The ADHD evaluation tool/template promotes and interdisciplinary team approach to the assessment, diagnosis and treatment of children with ADHD?

1 2 3 4 5

3. The ADHD evaluation tool/template promotes documentation of evidence-based practice?

1 2 3 4 5

4. The ADHD evaluation tool/template promotes screening for common comorbid conditions?

1 2 3 4 5

5. The ADHD evaluation tool/template is clear and concise and improves the work flow in the family practice setting?

1 2 3 4 5

6. As a primary care provider, I am comfortable in using the ADHD evaluation tool/template?

1 2 3 4 5

APPENDIX F. RIVERVIEW HEALTH CONSENT FOR CLINICAL PRACTICE
IMPROVEMENT PROJECT



Institutional Review Board
Research 1
NDSU Dept 4000
PO Box 6050
Fargo ND 58108-6050

December 13, 2013

RE: Consent for Clinical Practice Improvement Project – Jason Nupdal

Dear Review Board:

We have reviewed the request by RiverView employee, Jason Nupdal, FNP, to conduct his clinical practice improvement project:

“LINKING PRACTICE GUIDELINES TO AN ELECTRONIC HEALTH RECORD TO GUIDE THE PRIMARY CARE PROVIDER IN CARING FOR CHILDREN WITH ADHD”

Jason has been granted permission by RiverView Health to complete this project at his practice site here, during the course of his clinical work with patients.

We completely support Jason in this project and his pursuit of his advanced degree.

Best Regards,

Carrie Michalski
President & CEO

323 South Minnesota Street | Crookston, MN 56716 | p: 218.281.9200 | f: 218.281.9222
www.riverviewhealth.org

APPENDIX G. RIVERVIEW PRIMARY CARE PROVIDER TRAINING MODULE: ADHD EVALUATION TOOL/TEMPLATE

The ADHD evaluation tool was designed to aid in the documentation of assessment, diagnosis, and treatment of children age 4-18. When utilized, this tool assures the application of the DSM-V ADHD diagnostic criteria as well as adherence with the American Academy of Pediatrics' Clinical Practice Guidelines in the assessment, diagnosis and treatment of children with ADHD.

The ADHD evaluation tool exists within the electronic health record as a smart phrase and in its current form is meant to be used during an initial evaluation for ADHD and follow-up visits. The evaluation tool/template exists within the EHR note section as a smart phrase that will specifically review a child's ADHD symptoms and his/her response to treatment. There are two parts to the evaluation tool/template. The first part, titled: **.RVADHDEVAL** is used for the initial assessment, diagnosis, and treatment of children presenting for an initial ADHD evaluation. Part 2, titled: **.RVADHDFUEVAL** is used for follow-up and ongoing management of a child with diagnosed ADHD.

This educational module includes the DSM-V diagnostic criteria for ADHD (appendix H) along with the AAP Clinical Practice Guidelines (appendix I). This training module also includes hard copies of the smart phrases **.RVADHDEVAL** (appendix J) and **.RVADHDFUEVAL** evaluation tool/templates (appendix K).

APPENDIX H. DSM-V DIAGNOSTIC CRITERIA FOR ATTENTION DEFICIT
HYPERACTIVITY DISORDER

(American Psychiatric Association [DSM-V], 2013)

F. A persistent pattern of inattention and/or hyperactivity-impulsivity that interferes with functioning or development, as characterized by (1) and/or (2):

3. Inattention: Six (or more) of the following symptoms have persisted for at least six months to a degree that is inconsistent with developmental level and that negatively impacts directly on social and academic/occupational activities.

Note: The symptoms are not solely a manifestation of oppositional behavior, defiance, hostility, or failure to understand tasks or instructions. For older adolescents and adults (age 17 and older), at least five of the symptoms are required.

- j. Often fails to give close attention to details or makes careless mistakes in schoolwork, at work, or during other activities (e.g., overlooks or misses details, work is inaccurate).
- k. Often has difficulty sustaining attention in tasks or play activities (e.g. has difficulty remaining focused during lecture, conversations, or lengthy reading).
- l. Often does not seem to listen when spoken to directly (e.g., mind seems elsewhere, even in the absence of any obvious distraction).
- m. Often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (e.g., starts tasks but quickly loses focus and is easily sidetracked).

- n. Often has difficulty organizing tasks and activities (e.g., difficulty managing sequential tasks; difficulty keeping materials and belongings in order; messy, disorganized work; has poor time management; fails to meet deadlines).
- o. Often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental efforts (e.g., schoolwork, homework; for older adolescents and adults, preparing reports, completing forms, reviewing lengthy papers).
- p. Often loses things necessary for tasks or activities (e.g., school materials, pencils, books, tools, wallets, keys, paperwork, eyeglasses, mobile phones).
- q. Is often easily distracted by extraneous stimuli (for older adolescents and adults, may include unrelated thoughts).
- r. Is often forgetful in daily activities (e.g., doing chores, running errands; for older adolescents and adults, returning calls, paying bills, keeping appointments).

4. Hyperactivity and impulsivity: Six (or more) of the following symptoms have persisted for at least 6 months to a degree that is inconsistent with developmental level and that negatively impacts directly on social or academic/occupational activities.

Note: The symptoms are not solely a manifestation of oppositional behavior, defiance, hostility, or a failure to understand tasks or instructions. For older adolescents and adults (ages 17 and older), at least five symptoms are required.

- j. Often fidgets with or taps hands or feet or squirms in seat.
- k. Often leaves seat in situations when remaining seated is expected (e.g., leaves his or her place in the classroom, in the office, or other workplace, or in other situations that require remaining in place).

- l. Often runs about or climbs in situations where it is inappropriate. (**Note:** in adolescents or adults, may be limited to feelings of restless).
 - m. Often unable to play or engage in leisure activities quietly.
 - n. Is often “on the go,” acting as if “driven by a motor” (e.g., is unable to be or uncomfortable being still for extended time, as in restaurants, meetings; may be experienced by others as being restless or difficult to keep up with).
 - o. Often talks excessively.
 - p. Often blurts out answers before a question has been completed (e.g., completes people’s sentences; cannot wait for turn in conversation).
 - q. Often has difficulty waiting his or her turn (e.g., while waiting in line).
 - r. Often interrupts or intrudes on others (e.g., butts into conversations, games, or activities; may start using other people’s things without asking or receiving permission; for adolescents and adults, may intrude into or take over what others are doing).
- G. Several inattentive or hyperactive-impulsive symptoms were present prior to the age of 12 years.
- H. Several of the inattentive or hyperactive-impulsive symptoms are present in two or more settings (e.g., at home, school, work; with friends or relatives; in other activities).
- I. There is clear evidence that the symptoms interfere with, or reduce the quality of, social, academic, or occupational functioning.
- J. The symptoms do not occur exclusively during the course of a schizophrenia or other psychiatric disorder and are not better explained by another mental disorder (e.g., mood

disorder, anxiety disorder, dissociative disorder, personality disorder, substance intoxication or withdrawal).

Specify whether:

314.01 (F90.2) Combined presentation: If both Criterion A1 (inattention) and Criterion A2 (hyperactive-impulsivity) are met for the past 6 months.

314.00 (F90.0) Predominantly inattentive presentation: If Criterion A1 (inattention is met but Criterion A2 (hyperactivity-impulsivity) is not met for the past 6 months.

314.01 (F90.1) Predominantly hyperactive-impulsive presentation: If Criterion A2 (hyperactivity-impulsivity) is met and Criterion A1 (inattention) is not met for the past 6 months.

Specify if:

In partial remission: When full criteria were previously met, fewer than the full criteria have been met for the last 6 months, and the symptoms still result in impairment in social, academic, or occupational functioning.

Specify Current Severity:

Mild: Few, if any, symptoms in excess of those required to make the diagnosis are present, and symptoms result in no more than minor impairments in social or occupational functioning.

Moderate: Symptoms or functional impairment between “mild” and “severe” are present.

Severe: Many symptoms in excess of those required to make the diagnosis, or several symptoms that are particularly severe, are present, or the symptoms result in marked impairment in social or occupational functioning.

APPENDIX I. AMERICAN ACADEMY OF PEDIATRICS CLINICAL PRACTICE GUIDELINES

ADHD: Clinical Practice Guidelines for the Diagnosis, Evaluation and Treatment of Attention- Deficit/Hyperactivity Disorder in Children and Adolescents

Summary of key action statements:

1. The primary care clinician should initiate an evaluation for ADHD for any child 4 through 18 years of age who presents with academic or behavioral problems and symptoms of inattention, hyperactivity, or impulsivity.
2. To make a diagnosis of ADHD, the primary care clinician should determine that the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition criteria have been met (including documentation of impairment in more than 1 major setting); information should be obtained primarily from reports from parents or guardian, teachers, and other school and mental health clinicians involved in the child's care. The primary care clinician should also rule out any alternative cause.
3. In the evaluation of a child for ADHD, the primary care clinician should include assessment for other conditions or behavioral (eg, anxiety, depression, oppositional defiant, and conduct disorders), developmental (eg, learning and language disorders or other neurodevelopmental disorders), and physical (eg, tics, sleep apnea) conditions.
4. The primary care clinician should recognize ADHD as a chronic condition and, therefore, consider children and adolescents with ADHD as children and youth with special health care needs should follow the principles of the chronic care model and the medical home.
5. Recommendations for treatment of children and youth with ADHD vary depending on the patient's age.

- a. For preschool-aged children (4-5 years of age), the primary care clinician should prescribe evidence-based parent- and/or teacher-administered behavior therapy as the first line of treatment and may prescribe methylphenidate if the behavior interventions do not provide significant improvement and there is moderate-to-severe continuing disturbance in the child's function. In areas where evidence-based behavioral treatments are not available, the clinician needs to weigh the risks of starting medications at an early age against the harm of delaying diagnosis and treatment.
 - b. For elementary school-aged children (6-11 years of age), the primary care clinician should prescribe US Food and Drug Administration-approved medication for ADHD and/or evidence-based parent- and/or teacher-administered behavior therapy as treatment for ADHD, preferably both. The evidence is particularly strong for stimulant medications and sufficient but less strong for atomoxetine, extended-release guanfacine, and extended-release clonidine (in that order). The school environment, program, or placement is a part of any treatment plan.
 - c. For adolescents (12-18 years of age), the primary care clinician should prescribe Food and Drug Administration-approved medication for ADHD with the assent of the adolescent and may prescribe behavior therapy as treatment for ADHD, preferably both.
6. The primary care clinician should titrate doses of medication for ADHD to achieve maximum benefit with minimum adverse effects.

APPENDIX J. RIVERVIEW INITIAL ADHD EVALUATION (.RVADHDEVAL)

IMPRESSION: **ADHD (Attention Deficit Hyperactivity Disorder)**
ADHD (Attention Deficit Hyperactivity Disorder), Combined Type
ADHD (Attention Deficit Hyperactivity Disorder), Inattentive
ADHD (Attention Deficit Hyperactivity Disorder), Hyperactive-Impulsive

PLAN: Counseling was given on academic/study skills, drug potential side effects, and behavior at school and home. Patient was provided with a written ADHD Management Plan.

Management: ***

Medication: ***

Titration Follow-up Plan: ***

Behavioral Counseling: ***

School: ***

Other Specialist Referral: ***

Follow-up office visit scheduled for ***

Targeted outcome/treatment goal (specific criteria, eg. homework done, decrease school disciplinary notes) ***

*** Minutes spent face-to-face with the patient. Over 50 percent of the visit was spent in counseling the patient.

INFORMATION OBTAINED: Parent
 Patient
 Teacher
 Other ***

CHIEF CONCERN(S): ***

HPI: ***

EDUCATIONAL BACKGROUND:

School: ***

Grade: ***

Favorite subject: ***

Least favorite subject: ***

504/IEP: Y/N

Speech/OT: Y/N

Para Services: Y/N

Problem areas:

- Math
- Reading/English
- Spelling
- Science
- Phy Ed.
- Homework
- Chores
- Peer Relationships

SIGNIFICANT PAST MEDICAL HISTORY:

Birth History: ***

Health History: ***

Developmental/Behavioral History: ***

Pertinent Family History: ***

Psycho-social Stressors (past/present): ***

ADHD DIAGNOSTIC ASSESSMENT:

Rating Scales Used: Y/N (Yes) Scale used: NICHQ Vanderbilt-Parent
NICHQ Vanderbilt-Teacher
Other ***

PARENT REPORT

Inattentive - total number of questions scored 2 or 3 in questions 1-9: /9

Hyperactive/Impulsive - total number of questions scored 2 or 3 in questions 10-18 /9

Total Symptoms Score for questions 1-18: /54

SCREENING FOR COMORBIDITIES

From Parent NICHQ Vanderbilt:

- /8 **Oppositional-Defiant Disorder** is screened by 4 of 8 symptoms (scores of 2 or 3 are positive) (questions 19 through 26) AND a score of 4 or 5 on any of the 8 Performance Section items.
- /14 **Conduct Disorder** is screened by 3 of 14 symptoms (scores of 2 or 3 are positive) (questions 27 through 40) AND a score of 4 or 5 on any of the 8 Performance Section items.
- /7 **Anxiety/Depression** are screened by 3 of 7 symptoms (scores of 2 or 3 are positive) (question 41 through 47) AND a score of 4 or 5 on any of the 8 Performance Section items.

Performance Impairment questions 48-55; scores of 4 or 5 are positive /8
Average Performance Score: ***

TEACHER REPORT

Number of teacher reports: 1
2
3
4

Inattentive - number of questions scores of 2 or 3 in questions 1-9: /9
Hyperactive/Impulsive - number of questions scores of 2 or 3 in questions 10-18: /9
Total Symptom Score for questions 1-18: /54

SCREENING FOR COMORBIDITIES

From Teacher NICHQ Vanderbilt: Scores of 2 or 3 on a single item reflect Often-occurring behaviors.

- /10 **Oppositional-Defiant/Conduct Disorder** are screened by 3 of 10 items (scores of 2 or 3 are positive) (question 19 through 28) AND a score of 4 or 5 on any of the 8 Performance Section items.
- /7 **Anxiety/Depression** are screened by 3 of 7 symptoms (scores of 2 or 3 are positive) (question 29 through 35) AND a score of 4 or 5 on any of the 8 Performance Section items.

Performance Impairment – total number of questions scored 4 or 5 in questions 36-43: /8

Average Performance Score: ***

Y/N Some hyperactive-impulsive or inattention symptoms that caused impairment were Present before the age of 7 years.

Y/N Some impairment from the symptoms is present in two or more settings (e.g., at school, work, or at home).

Y/N There must be clear evidence of clinically significant impairment in social, academic, or occupational functioning.

Y/N The symptoms do not occur exclusively during the course of a Pervasive Developmental Disorder, Schizophrenia, or other Psychotic Disorder and are not better accounted for by another mental health disorder (e.g. Mood Disorder, Anxiety Disorder, Dissociative Disorder, or Personality Disorder)

From Other Sources:

Mental health problems/ Learning disabilities ***

Other medical conditions ***

Assessment:

Y/N ADHD, INATTENTIVE subtype requires 6 out of 9 symptoms (scores of 2 or 3 are positive) on items 1 through 9 AND a performance problem (scores of 4 or 5) in any of the items on the Performance Section for both the Parent and Teacher Assessment Scales.

Y/N ADHD, HYPERACTIVE-IMPULSIVE subtype requires 6 out of 9 symptoms (scores of 2 or 3 are positive) on items 10 through 18 AND a performance problem (scores of 4 or 5) in any of the items on the Performance Section for both the Parent and Teacher Assessment Scales.

Y/N ADHD COMBINED inattention/hyperactivity-impulsive requires the above criteria On both Inattentive and Hyperactive/Impulsive subtypes.

Y/N ADHD not otherwise specified.

Y/N Does not meet criteria for ADHD.

****See scanned document under media for full disclosure of Vanderbilt Assessment Scale.**

APPENDIX K. RIVERVIEW ADHD FOLLOW-UP EVALUATION/TEMPLATE
(.RVADHDFUEVAL)

IMPRESSION: **ADHD (Attention Deficit Hyperactivity Disorder)**

ADHD, combined Type

ADHD, Inattentive

ADHD, Hyperactive-Impulsive

PLAN: Counseling was provided on academic/study skills, drug potential side effects, and behavior at school and home. Patient was provided a written ADHD medication plan.

Management: ***

Recommended follow-up: ***

*** Minutes spent face-to-face with patient. Over 50% of the visit was spent counseling the patient.

CHIEF COMPLAINT: @CHIEF COMPLAINT@ (This will pull from the chart)

HPI: ***

Child is currently on ***. Effects of the medication are ***. Parental concerns ***. Child's perception of current treatment ***.

EDUCATIONAL BACKGROUND:

School: ***

Grade: **1,2,3,4,5,6,7,8,9,10,11,12**

Y/N Significant past medical history reviewed/Updated (health history, developmental/behavioral, and psycho-social stressors).

ADHD DIAGNOSTIC ASSESSMENT:

Rating Scales Used: Y/N (Yes) Scale used: NICHQ Vanderbilt-Parent
NICHQ Vanderbilt-Teacher
Other ***

Summary of rating scales for today's review. Scoring is reflective of current treatment.

NICHQ Vanderbilt Assessment Scale – Parent Informant

Total # of questions scored 2 or 3 in questions 1-9: /9

Total # of questions scored 2 or 3 in questions 10-18: /9

Total Symptom score for questions 1-18: /54

Total # of question scored 2 or 3 in questions 19-26: /8

Total # of questions scored 2 or 3 in questions 27-40: /14

Total # of questions scored 2 or 3 in questions 41-47: /7

Total # of questions scored 2 or 3 in questions 48-55: /8

Average Performance Score: ***

TEACHER REPORT

Number of teacher reports: 1
2
3
4

Total # of questions scored 2 or 3 in questions 1-9: /9

Total # of questions scored 2 or 3 in questions 10-18: /9

Total Symptom score for questions 1-18: /54

Total # of question scored 2 or 3 in questions 19-28: /10

Total # of questions scored 2 or 3 in questions 29-35: /7

Total # of questions scored 2 or 3 in questions 36-43: /8

Average Performance Score: ***

****See scanned document under media for full disclosure of Vanderbilt Assessment Scale.**

APPENDIX L. EXECUTIVE SUMMARY

Results of the retrospective chart audit revealed a higher rate in documentation supportive of evidence-based practice when the evaluation tool/template was used. Results of the PCP survey reflect that the tool contained appropriate content in the documentation of evidence-based practice. PCP's of Riverview felt that the evaluation tool/template was easy to access within the electronic medical record. The template, when used, promotes an interdisciplinary team approach in the assessment, diagnosis and treatment of the child with ADHD. When used, the tool provided documentation supportive of the assessment of common co-morbid conditions often associated with ADHD.

The primary focus of this clinical improvement project was to implement ADHD clinical practice guidelines in a family practice setting. An evaluation tool/template was created embedding the DSM-V ADHD diagnostic criteria and the American Academy of Pediatrics clinical practice guidelines into the electronic health record to guide the primary care provider in the assessment, diagnosis and treatment of ADHD for children ages 4-18 in the family practice clinical setting. The evaluation tool/template was created as a "smart phrase," a software component of EPIC's electronic medical record. A "smart phrase" allows prompts and drop down menus, which guide the primary care provider (PCP's) in the documentation of a comprehensive assessment, diagnosis, and treatment of ADHD.

The practice improvement project took place at Riverview Health Clinic in Crookston, MN. Riverview is a rural healthcare facility located in northern Minnesota. Family practice services are provided by two family practice doctors, five advanced practice nurses and two physician assistants. There is also a psychologist that provides supportive mental health services on a weekly basis.

Following the creation of the evaluation tool/template, an educational focused form was held for Riverview PCP's in conjunction with Riverview's January monthly provider meeting. The project director provided PCP's an overview of the clinical practice improvement project including an educational module that contained a hard copy of the American Academy of Pediatrics Clinical Practice Guidelines and the DSM-V ADHD diagnostic criteria, along with a hard copy of the evaluation tool/templates with directions on accessing and using the tool. The evaluation tool was launched and utilized in the PCP clinical setting for a six-week period.

Following the six-week study, a retrospective chart audit was performed on site by the project director. Data was collected in accordance with the data collection tool. The data collection tool was created with inclusion of the American Academy of Pediatrics (AAP) Clinical Practice Guidelines (CPG) and the DSM-V ADHD diagnostic criteria. Additionally, PCP's were surveyed using a five point likert survey. The survey questions contained criteria adopted from the AAP CLG and the DSM-V ADHD diagnostic criteria to assure evidence based-practice. Data was then analyzed using inferential statistics.

During the six-week study there was 81 children ages 4-18 that accessed services for ADHD at Riverview Clinics. A retrospective chart audit was performed to acquire data as outlined in the data collection tool. Of the 81 ADHD clinic encounters, 63% of these encounters documented utilization of the evaluation tool/template in the assessment, diagnosis and treatment of ADHD (n=51). Documentation supporting the use of ADHD rating scales was 90% (n=46) with use of the evaluation tool/template and 17% (n=5) when evaluation tool/template was not used. Assessment for the presence of DSM-V symptoms in more than one setting was documented 88% with evaluation tool/template use (n=45) and 83% (n=25) in visits without its use.

Table L1

EHR Documentation of ADHD Evaluation Tool/Template

EHR Documentation	ADHD Clinic Encounter with use of the evaluation tool/template (n=51)	ADHD Clinic Encounter without use of evaluation tool/template (n=30)
Use of ADHD Rating Scales	46/51 90%	5/30 17%
Assessing presence of ADHD DSM-V symptoms	45/51 88%	25/30 83%
Screening for co-morbid conditions	46/51 90%	7/30 23%
Documentation supports an interdisciplinary team approach	34/51 67%	9/30 30%
Plan of care documents target treatment outcomes	51/51 100%	28/30 93%
Presence of written treatment plan with patient education	51/51 100%	30/30 100%
Recommendation for appropriate follow-up	51/51 100%	30/30 100%

Co-morbid condition screening was documented in 90% of encounters that utilized the evaluation tool/template (n=46) and 23% of visits without the evaluation tool/template use (n=7). Documentation supporting an interdisciplinary team approach to the assessment, diagnosis, and treatment of ADHD was present 67% with evaluation tool/template (n=34) and 30% of visits without tool/template use (n=9).

The evaluation tool/template use provided documentation supportive of targeted treatment outcome 100% (n=51) while encounters without evaluation tool/template was 93% (n=28). There was documentation supporting that the plan of care provided a written treatment plan and appropriate follow-up recommended (eg. initial assessment follow-up recommended within 2-4

weeks and maintenance follow-up recommended a minimum of every 3-4 months) 100% of encounters with or without evaluation tool/template use (n=81).

A five point likert scale survey was dispersed to Riverview's 8 primary care providers following the six-week evaluation tool/template launching with a response rate of 75% (n=6). The likert scale included six questions pertaining to the evaluation tool/template (Appendix E).

Question one asked if the ADHD evaluation tool/template was easy to access within the electronic health record. There were 5 strongly agree (83.3%) and 1 agree (N=6). Question two asked if the ADHD tool/template promotes an interdisciplinary team approach to the assessment, diagnosis, and treatment of children with ADHD. All 6 responses strongly agreed. Question 3 asked if the evaluation tool/template promotes documentation of evidence-based practice. Again, all 6 responded strongly agreed.

Table L2

Primary Care Providers Likerts Scale Survey

PCPs Survey Questions	1=Strongly Agree	2=Agree	3=Neutral	4=Disagree	5=Strongly Disagree
Tool/ template is easy to access in the EHR	83.3%	16.7%	0%	0%	0%
Promotes an interdisciplinary team approach	100%	0%	0%	0%	0%
Promotes evidence-based practice	100%	0%	0%	0%	0%
Promotes screening for co-morbid conditions	83.3%	16.7%	0%	0%	0%
Tool/template is clear/concise and improves workflow	66.6%	33.3%	0%	0%	0%
PCP comfort in using the tool/ template	100%	0%	0%	0%	0%

Question four asked if the evaluation tool/template promoted screening for common co-morbid conditions. Of the 6 respondents, 5 strongly agreed (83.3%) and 1 agreed. Question five asked if the evaluation tool/template is clear and concise and improves work flow in the family practice setting. There were 4 respondents whom strongly agreed (66.6%) and 2 agreed (33.3%). The final question asked if the primary care provider was comfortable in using the ADHD evaluation tool/template. All 6 responded strongly agreed.

It is recommended that the process be implemented at Riverview Clinic. When used, the ADHD Evaluation Tool/Template provided a higher level of documentation supportive of evidence-based practice in caring for ADHD children ages 4-18 in the primary care provider setting. A post project focused forum could be planned for Riverview's PCPs in the dissemination of project outcome. The post project forum would allow for additional education on the ADHD evaluation tool/template and aid in further discussion. Post project form PCPs feedback may result in evaluation tool/template revisions to further improve workflow and aid in higher use of this tool thereby promoting evidence based-practice.

Dissemination of project outcome could be presented via power point presentations to area family practice clinics. Project outcome could also be discussed with EPIC IT representatives allowing them to provide the Evaluation Tool/Template to other Family Practice Clinics in which the contract with. Broadening the use of this evaluation tool/template to surrounding clinics will further promote evidence- based practice in servicing the population of children with ADHD, thereby promoting optimal child outcome.

Limitations of this study are that it took place in a single setting with limited primary care providers. The study length of duration was only six weeks. Future research could be conducted

in multiple family practice settings while expanding the duration of time studied using a larger sample size while evaluating more PCPs.