IMPROVING LIPID SCREENING AND MANAGEMENT IN PEDIATRIC PRIMARY CARE THROUGH A PROVIDER EDUCATION AND REMINDER PROGRAM

A Doctor of Nursing Practice Project Report

by

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BS, Mount Carmel College of Nursing, 2000
MS, Wright State University, 2010

Submitted in Partial Fulfillment of the Requirements for the Degree of

DOCTOR OF NURSING PRACTICE

Texas A&M University-Corpus Christi
Corpus Christi, Texas

August, 2019

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This Doctor of Nursing Practice Project Report meets the standards for scope and quality of Texas A&M University-Corpus Christi and is hereby approved.

Jessica Peck, DNP, APRN, CPNP-PC, CNE, CNL, FAANP
Chair

Theresa Garcia, PhD, RN
Project Advisor/Committee Member

Yolanda Keys, DHA, MSN, RN, NEA-BC, EDAC
Content Expert/Committee Member

August, 2019

DEDICATION

I would like to dedicate this work to my Mother, Sally Hattaway, who always believes in me.

ACKNOWLEDGEMENTS

I would like to thank my committee chair, Dr. Peck and my committee members, Dr. Garcia, Dr. Keys and Dr. Wood for their guidance and support throughout the course of this research.

Thanks also go to my friends and colleagues and the department faculty and staff for making my time at Texas A&M University-Corpus Christi an enjoyable experience. I also want to extend my gratitude to family for their love, support and encouragement.

Finally, I want to thank Christine Bancroft for the many hours she worked with me to help make all of the data collection and review possible. I could not have done this without you.

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ABSTRACT

The National Heart Lung and Blood Institute (NHLBI) recommends universal lipid screening (ULS) for 9-11-year-old children. Limited available data suggest less than 50% of primary practice providers are using ULS guidelines (ULSG) appropriately. Insufficient implementation of ULS completion contributes to a failure to identify children aged 9-11 with dyslipidemia and can contribute to early cardiovascular disease. This Quality Improvement (QI) project implemented a provider-focused education intervention and retrospective chart review to increase completion of ULS in children aged 9-11 years old and to improve provider management in a pediatric primary care clinic in Central Texas. A one-group pre-test/post-test design was used. Participants included five physicians, 20 nurse practitioners (NPs), and five physician assistants (PAs). Chart review was conducted on all children aged 9-11 years who presented for well-child checks both three months prior to the intervention (n=911) and three months post-intervention (n=1045). A pre-and post-intervention provider survey was used to measure changes in lipid screening provider knowledge and practices. Providers' knowledge of and completion of lipid screening increased from 70% to 89%. Utilization of educational sessions increased provider knowledge of ULSG and increased the number of 9-11 year-old children screened for dyslipidemia in this clinic.

Improving Lipid Screening and Management in Pediatric Primary Care Through a Provider Education and Reminder Program

Introduction

One in three children has a lipid disorder, usually a cholesterol level over 200mg/dl (Turner, 2014), which can increase the likelihood of developing cardiovascular disease (CVD) later in life. Dyslipidemia is thought to be a significant factor for the development of atherosclerotic heart disease. Clinical practice guidelines issued through the US Preventative Service Task Force (USPSTF), supported by the American Academy of Pediatrics (AAP), recommend universal lipid screening (ULS) for children nine to eleven years of age. Limited available data suggest less than 50% of primary practice providers are using ULS guidelines (ULSG) appropriately (Dixon, Kornblum, Steffen, Zhou & Steinberger, 2014; Kern, Crow, Williams, Boies, Gahagan & Rhee, 2017). Inadequate implementation of ULS reduces the ability of providers to identify lipid abnormalities early in life and potentially prevent cardiovascular disease and resulting sequelae. This Quality Improvement (QI) project aimed to assess and improve pediatric provider knowledge and management practices related to ULS in 9-11-year-old children through provider-directed education and a ULS reminder protocol.

Dyslipidemia is defined as total cholesterol >200mg/dl, triglycerides >100mg/dg, high density level cholesterol <40mg/dl and low-density level cholesterol >130mg/dl (Bamba, 2014). The most current guidelines issued through the National Heart, Lung and Blood Institute (NHLBI), supported by the AAP, recommends screening for all children nine to eleven years old. (National Heart Lung and Blood Institute [NHLBI],2012). These screening guidelines were adopted by Texas Health and Human Services [THHS] (THHS, 2012) as part of routine well-child exams. ULS is likely to identify children with lipid abnormalities and assist in the

prevention of CVD, the leading cause of morbidity and mortality in industrialized countries (Chacal, 2014). Dyslipidemia occurs more frequently than congenital structural disease, heart rhythm disorders, heart failure, and most other conditions managed by pediatric cardiologists. Dyslipidemia affects about 1 in 500 people in the United States (US) (Chacal, 2014). Left undiagnosed and untreated, over their lifetimes about 50% of men and 25% of women with dyslipidemia will experience a significant adverse medical event, such as peripheral arterial disease or myocardial infarction, by age 50 (Hardin, 2012).

Dyslipidemia is thought to be a significant factor for the development of atherosclerotic heart disease (Chacal, 2014). There is strong evidence that atherosclerosis, which leads to CVD, originates in childhood, and that progression may be prevented if identified and treated during childhood and adolescence (Kern et al., 2017). Autopsy results performed on children as young as five years showed changes to the coronary arteries consistent with cardiovascular disease (Berenson et al., 1998). Costs related to cardiovascular disease are estimated at $2 billion annually but can be mitigated with early intervention (Centers for Disease Control [CDC], 2016). Often, providers do not follow ULSG and screenings are not completed. Inadequate screening leaves many children at risk for undiagnosed and untreated dyslipidemia and potential CVD. Children identified with dyslipidemia need to be educated on lifestyle modifications (CDC, 2010) and monitored to decrease their risk of developing cardiovascular disease. Across the United States (US) costs of cardiovascular disease are estimated at $555 billion (CDC, 2016); in Texas these costs are estimated at $9 billion (Texas Department of Health and Human Services, 2016)

This QI project was undertaken after a retrospective chart review completed in a pediatric primary care clinic in Central Texas found a 70% completion rate of ULS by providers. The

purpose of this project was to increase the ULS rates in this central Texas pediatric clinic system through a program including provider education on ULSG management practices and a reminder system. The practice question that guided this project was: In a Central Texas primary care pediatric clinic system, does a provider targeted ULS education program improve ULS rates and provider management practices, according to ULSG, for pediatric patients with dyslipidemia?

The QI project incorporates the DNP Essentials VI: Interprofessional Collaboration for Improved Patient and Population Health Outcomes and VII: Clinical Prevention and Population Health for Improving the Nation's Health. This project required interprofessional collaboration to complete all necessary steps. This project identifies inadequate screening processes which if improved will identify children with dyslipidemia. Early identification can help this population improve their health and prevent long term complications.

Review of the Literature

Research evidence has shown a gap in practice related to provider implementation of recommended ULSG for screening children. DeFerranti et al. (2015) assessed pediatricians' practices, attitudes, and barriers regarding screening for and treatment of pediatric dyslipidemia. The study was a survey of pediatricians who were members of the AAP (n=614). The study found despite published recommendations, ULS was not completed routinely: 68% of the physicians surveyed reported they rarely screened "healthy" 9-11-year olds, 61% of pediatricians completed screening based on family cardiovascular history and 82% of the providers screened based on patient obesity. Just over half (58%) of providers surveyed agreed with the current ULSG, and 23% felt screening was a low priority (de Ferranti et al., 2015). Dixon and colleagues (2014) assessed implementation of ULSG in pediatric providers. This study used an online survey sent to 1488 pediatric primary care providers, including pediatricians, Advanced Practice

Registered Nurses (APRNs) and Physician Assistants (PAs) in Minnesota. Of those responding to the survey (n=548), 74% indicated lipid screening would reduce further cardiovascular risk, 50% completed selective screening, 34% did not perform any lipid screening, and only 16% performed ULS. When looking at barriers to complete the screening, 83% surveyed reported being uncomfortable managing lipid disorders, and 53% were opposed to the use of lipid-lowering agents in children (Dixon et al., 2014).

Research evidence addressing interventions to educate providers specifically on ULSG is sparse; however, multiple studies have suggested educational programs focused on increasing provider knowledge regarding clinical practice guidelines increase provider application of those guidelines (Blank, Chambers, Hollingsworth, Ouziel &Wylie-Rosett, 2018). Specific to application of ULSG, Kern and colleagues (2017) conducted a QI project including review of medical records (n=356) of 9-11-year-old patients for provider completion of ULS, provider education on screening, and a post-education chart review. The pre-education chart review demonstrated a 6.2% compliance with universal lipid screening and 8.2% compliance with ULS when risk factors for dyslipidemia were present (Kern et al., 2017). Providers were educated on recommended ULSG established by NHLBI, and reminders were placed in the patient record. A retrospective chart review completed 12 months after the education program and placement of chart reminders yielded an 84% completion of ULS.

Conceptual Framework

The Change Theory, created by Kurt Lewin for use in social psychology, is a practical model for the implementation of change. Lewin theorized there are two forces at work in opposite directions when attempting a change: driving and restraining forces. Driving forces assist in the facilitation of change by motivating individuals toward the achievement of a goal

(Kritsonis, 2005). Restraining forces impact the resistance of change, decreasing the movement toward the goal. Lewin stated these forces must be analyzed and created a three-step model to help shift the balance of force in the direction of the planned change (Kritsonis, 2005).

The first step in Lewin's model is to unfreeze the situation. This is where a problem is identified, and a plan is put in motion to change the problem. Examples of unfreezing include motivating participants by building trust, creating recognition for change, brainstorming about solutions, and preparing them for change (Kritsonis, 2005). The second step is movement. During this step, it is necessary to move the target to a new level of equilibrium. Steps to complete this include encouraging the participant to view the problem from a fresh perspective, working together for new relevant information, and supporting the needed change. Finally, the last step is refreezing. This takes place after implementation of change and involves integration of the new process and implemented changes (Kritsonis, 2005). See Appendix 1 for a representation of how the framework guided the steps of this QI project.

Methods

Project Design and Aims

This QI project used a one-group, pre-test/post-test design and a pre-and post-intervention retrospective chart review. The specific aims of the project were to: (1) increase provider knowledge and adherence to ULSG from pre-intervention to post-intervention; and; (2) to increase the number of children 9-11 years old who receive ULS, as well as dietary and physical activity education.

Setting

This QI implementation took place in a pediatric primary care practice with five locations within Austin and Round Rock, Texas. The practice employed five physicians, 20 NPs and five PAs. The clinics provided well child and episodic care for children from birth to 19 years of age.

On average, there were 100,000 patient visits annually. Most of the patient population was Hispanic (90%), and the other 10% were Caucasian, African American or Asian American. The primary payer source for the clinic clients is Texas Medicaid or Children's Health Insurance Program (CHIP). Approximately 90% of the children treated in these clinics are from disadvantaged socioeconomic backgrounds (Please see Facility Letter of Support, Appendix 2).

Sample

This project was reviewed by the Office of Research Compliance at Texas A&M University-Corpus Christi and received a Determination of Non-Human Subjects and permission to proceed with the QI project (Appendix 3). Permission to collect protected healthcare information (PHI) for QI purposes was obtained from the clinic Medical Director (Appendix 2). Only de-identified data were used to conduct the analysis and results were provided in aggregate. Provider participants for this project were recruited from all direct care providers working at the five pediatric clinics, excluding the Project Director (PD. Participants included five physicians, ten nurse practitioners (NPs), and five physician assistants (PAs) (n=29).

The pre-intervention chart review included children aged 9-11 years old seen for well-child checks between February 15-May 15, 2018; post-intervention chart review included children aged 9-11 years seen for well child checks between February 15-May15, 2019. Children seen by the PD were also excluded to decrease bias.

Intervention

The intervention for this project included: (1) an educational program for providers consisting of 30-minute online sessions, using Zoom™ face-to-face technology to review ULSG and evidence to support the guidelines; and (2) visual aid reminders in appropriate charts and posted in provider work areas. One month before the educational sessions, providers were sent

emails identifying dates and times for each of two sessions. Additional reminder emails, as well as electronic calendar invitations were sent to providers two weeks before each online session. The educational sessions were also recorded and available to providers to view on their own time if unable to attend the scheduled sessions. The educational sessions consisted of a review of ULSG, self-perception of current screening practices per the pre-intervention survey, and actual screening practices per the pre-intervention chart review.

Education also included discussion of the clinics' existing tools to remind providers to counsel patients on healthy behaviors (check box) and the availability of community resources relative to dyslipidemia (new dietary consult available). In addition, providers were informed of new visual aid reminders added as part of the QI project. These included: (1) Current ULSG recommendations by age group on laminated flyers placed in the providers' workstation (Appendix 4); (2) chart reminders added to all patients visiting the clinic between the ages of 9 – 11 years in the form of a laminated tab (Appendix 5) reminding providers this patient needed a lipid screen; (3) a stamp or sticker the (Appendix 6) provider could place on the lab result or in their well-child visit documentation, which included a script to assist non-providers in communicating a uniform message to patients on healthy behaviors when labs indicated dyslipidemia and assisted providers to include more detailed counseling documentation.

Data Collection

To begin the project and recruit providers, in January 2019 all providers were sent an introductory email. A second email was sent one week later with additional explanation and a link to the pre-intervention provider survey (Appendix 7). A reminder email was sent to all providers one week later to encourage completion of the pre-intervention survey.

A three-month pre-intervention chart review from February 15-May 15, 2018, and a 3-month post-intervention chart review from February 15-May15, 2019 was completed for children who presented to the clinic for a 9-11-year-old well-child visit. Data collected from the medical record included multiple points such as demographic variables, growth parameters, lipid-related laboratory results, and patient education/counseling/follow-up documentation (See Appendix 6.) Three months post-education session, providers were sent an email to complete the post-intervention provider survey. An additional reminder email was sent to all providers one week later to encourage completion of the post provider survey.

Measurement Tools

Direct care providers in the pediatric clinic were given an anonymous survey, pre- and post-intervention. This survey, a provider survey used by Stipelman, Young, Hemond, Brown, and Mihalopolous (2017), consisted of six questions including: current practice, credentials, years in practice, familiarity with ULSG, ordering methods of lipid profiles or total cholesterol levels, and comfort level with evaluating and/or managing children with abnormal lipid levels. Questions were all multiple choice and two questions provided the opportunity for brief write-in responses. Once completed, all information obtained was used to identify knowledge gaps on ULSG. This survey was sent to 316 physicians previously as part of the Stipelman et al., study. Reliability and validity of this tool have not been established. No other tools were found in the literature to obtain ULSG practice information.

Data Management

All patient charts reviewed were assigned an alphanumeric code based on patient's last name and clinical location. Data collected did not include any personal identifiable information.

Data collected was only reported in aggregate. All information collected was stored on an encrypted, password-protected computer, to which only the PD had access.

Data Analysis

Survey responses pre- and post-intervention were compared using descriptive statistics. Pre-intervention responses were used to enhance the discussion in the education sessions. Medical record review demographic data was analyzed using descriptive statistics. Chi-square analysis was used to determine whether there was a significant increase in the number of children receiving ULS (i.e. lipid panel including total cholesterol, triglycerides, HDL, and LDL levels ordered) pre-intervention when compared to post-intervention. Descriptive statistics were used to compare dietary and physical activity counseling/education documentation by providers pre and post-intervention.

Evaluation Framework

This QI project was evaluated using the Plan, Do, Study, Act (PDSA) Model (Appendix H). This starts with developing a plan to test the change (Plan), carrying of the shift (Do), observing and learning from the consequences (Study) and determining what modifications should be made (Act) (Institute of for Healthcare Improvement [IHI], 2018). During the plan phase providers were given the pre-survey identifying baseline knowledge of universal lipid screening as well as current practice and attitudes related to evaluation, management, and follow-up. Data was collected, and the change was implemented. Providers were then given education on universal lipid screening guidelines as well as treatment recommendation and resources for patients and their families. During the study phase, charts were reviewed post-intervention. During the Act phase, potential changes to the education sessions were considered during the review of the project. See Appendix 9 for a visual depiction of this process.

Results

Of 29 direct care providers surveyed, 26 (89%) completed the pre-intervention survey, and 24 (82%) completed the post-intervention survey. The providers who completed the pre-intervention survey included three physicians (11.5%), six pediatric nurse practitioners (38.5%), ten family nurse practitioners (23.1%) and seven physician assistants (26.9%). Their mean years of practice experience was 10.9 years, with a range of 6 months to 37 years. Please see demographic chart for providers in Table 1. The pre-intervention chart review included the records of 911 children and post-intervention included 1045 children. Please see the demographic table in Table 9 for complete demographic comparisons between the pre- and post-intervention children's records reviewed.

Provider surveys measuring perceptions of provider ULSG practice revealed most providers stated they were aware of the ULSG and tried to follow them both pre-intervention 88.5% and post-intervention 91.7%. The majority of providers stated they ordered lipid screening on all children pre-intervention (73.1%) and post-intervention (79.2%). In assessing management of children with abnormal lipid screening pre-intervention, 38.4% of providers stated they would manage the child themselves and 58.3% reported the same, post-intervention. Most providers reported they were "somewhat comfortable" with evaluating abnormal lipid screening pre-intervention 58.33% while post intervention, the majority (62.5%) reported they were "very comfortable". Please see Table 2 and 3 for a graphic representation of provider responses pre-intervention compared to post-intervention.

Pre-intervention chart review results showed provider documentation of diet and activity education 89% of the time. This education was in the form of a check box on the well child examination form. Post-intervention chart review results showed provider documentation of diet

and activity education 99%, 99%, and 99% at 1-month, 2-month and 3-month respectively. Post-intervention education was documented using a scripted tool (stamp/sticker). Please see Table 5 and 6 for a graphic representation of these results.

Retrospective chart review results comparing the number of children who received ULS pre-intervention to the number who received ULS post-intervention revealed a statistically significant difference in appropriate lipid screening across time intervals: χ^2 (3) =74.79, p=.000, V=.196, indicative of a small effect size. Within this model, about 70% of participants received appropriate screening compared to 85%, 86%, and 89% at 1-month, 2-month and 3-month respectively. See Appendix Table 6,7, & 8 for graphic representation.

Discussion

The provider survey results identified the importance of an assessment tool to measure baseline education on ULSG. Providers' knowledge and utilization of ULSG increased post-intervention. The number of children screened increased with statistical as well as clinical significance. Similarly, to the results from Kern et al., (2017), creation and implementation of a provider education program increased completion of ULS according to the guidelines. Utilization of Lewin's Change Theory as well as The Plan, Do, Study, Act model for implementation were successful in helping this team make the necessary changes and continue the QI process.

The budget for this QI project was $1,200, which included the clinic's cost to block provider schedules to complete the education session, handouts for the educational sessions, and printing chart reminder cards and visual aids. This will be an ongoing cost for the clinic six months after diagnosis. These education sessions and follow-up appointments have an expected revenue of $56,400 annually.

Results from this QI project support that provider education increased knowledge base, comfort levels and screening practices of pediatric providers in this central Texas clinic. To continue the QI initiative, chart reviews will need to be completed quarterly to monitor ongoing screening practices. On-going education for providers will need to be implemented to sustain and increase screening results.

Limitations

This QI project had some limitations. Some parents (n=66) opted to refuse screening for a variety of reasons including time scheduling and personal choice. Three of the 29 providers did not participate in the education session, but their charts were part of the retrospective chart review, making it difficult to determine what impact, if any, this had on the results. Another limitation was that the Stipelman survey tool used does not have established validity or reliability.

Conclusions

ULSG guidelines remain highly debated; as many providers believe dyslipidemia screening in children is unnecessary. However, children who were considered low-risk are being identified as having dyslipidemia. Studies have shown healthcare providers are inconsistently following current recommendations for ULS. Creation and implementation of this provider focused education program helped this clinic bridge knowledge gaps as well as helped providers become familiar with current recommendations. This increased knowledge led to increased compliance with screening recommendations from 70 to 89%. Children educated using an education and physical activity script allowed for consistency in the information given. If more children are identified with a diagnosis of dyslipidemia, early interventions can be put in place to decrease morbidity and mortality related to dyslipidemia.

Funding

Carousel Pediatrics did not provide funding for this QI project. Institutional support allowed participants to complete the survey and educational session during providers' scheduled workday.

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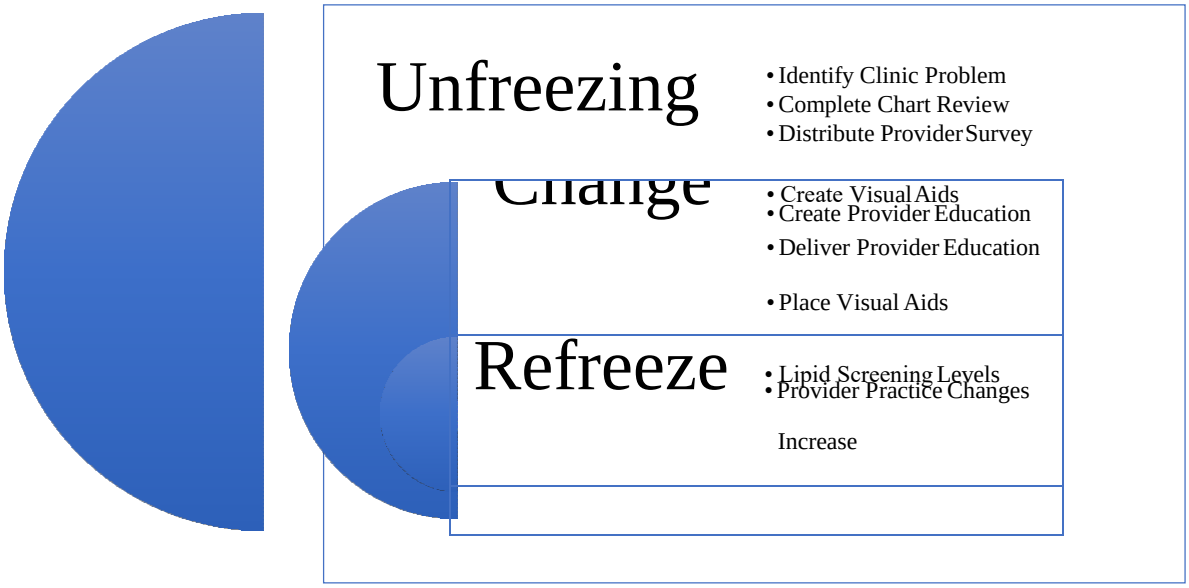
APPENDIX 1: Conceptual Framework



APPENDIX 2: Medical Director Letter of Support

October 11, 2018

Dr. Yolanda Keys
Associate Dean for Academic Programs
College of Nursing and Health Sciences
Texas A&M University – Corpus Christi
6300 Ocean Drive
Corpus Christi, TX 78412

Dear Dr. Keys,

The purpose of this letter is to provide Stephanie Patel, a Doctor of Nursing Practice student at Texas A&M University College of Nursing and Health Sciences, support in conducting a quality improvement project at *Carousel Pediatrics*. The project, Improving Pediatric Dyslipidemia Screening Processes in a Primary Care Clinic entails surveying current medical providers about their current Universal Lipid Screening Process, delivering an education program to medical staff, completing per and post intervention chart reviews.

The purpose of this project is to improving screening processes for Universal Lipid Screening. Carousel Pediatrics was selected for this project because a need in consistence with Universal Lipid Screening was identified. Stephanie Patel is employed at this institution and has an interest in improving care at this facility.

I, Dr. Glen Wood, Medical Director at Carousel Pediatrics, do hereby fully support Stephanie Patel in the conduct of this quality improvement project, Improving Pediatric Dyslipidemia Screening Processes in a Primary Care Clinic Improving Pediatric Dyslipidemia Screening Processes in a Primary Care Clinic at Carousel Pediatrics.

Sincerely,

Dr. Glenn Wood, Medical Director

APPENDIX 3: IRB Non-Human Subjects Determination

TEXAS A&M UNIVERSITY CORPUS CHRISTI

OFFICE OF RESEARCH COMPLIANCE
Division of Research, Commercialization and Outreach
6300 OCEAN DRIVE, UNIT 5844
CORPUS CHRISTI, TEXAS 78412
O 361.825.2497

Human Subjects Protection Program | Institutional Review Board

DATE: January 2, 2019

TO: Jessica Peck, Nursing and Health Sciences

CC: Stephanie Patel, Student

FROM: Office of Research Compliance

SUBJECT: Not Human Subjects Determination

Activities meeting the DHHS definition of research or the FDA definition of clinical investigation and involves one or more human subjects are subject to IRB review and approval.

On January 2, 2019, the Texas A&M University-Corpus Christi Institutional Review Board reviewed the following submission:

Type of Review:	Not Human Subjects Determination
Title:	Improving Pediatric Dyslipidemia Screening and Follow Up in Pediatric Primary Care
Project Lead:	Jessica Peck
IRB ID:	NHS 53-18
Funding Source:	None
Documents Reviewed:	Patel Form Not Human Subjects Research Request Template Quality Improvement Project (Patel 12-20-18)

Texas A&M University-Corpus Christi Office of Research Compliance determined that the proposed activity does not meet the DHHS definition of research or the FDA definition of a clinical investigation.

Therefore, **this project does not require IRB approval**. You may proceed with this project.

This determination applies only to the activities described in the documents reviewed. **Any planned changes require submission to the IRB to ensure that the research continues to meet criteria for a non-human subject research determination.**

Please do not hesitate to contact me with any questions at irb@tamucc.edu or 361-825-2497.

Respectfully,

Rebecca Ballard, JD, MA, CIP

Digitally signed by Rebecca Ballard, JD, MA, CIP
Date: 2019.01.02 10:52:53 -06'00'

Rebecca Ballard, JD, MA, CIP
Director, Research Compliance
Division of Research, Commercialization and Outreach

APPENDIX 4: Provider Visual Aid

Lipid Screening in Children and Adolescents

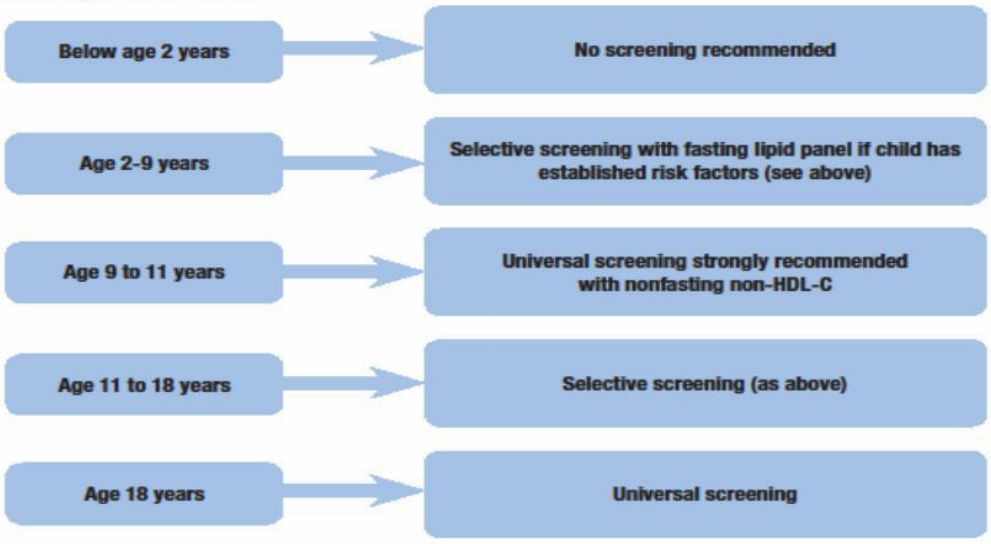
Ischemic cardiovascular disease (CVD), including coronary heart disease and stroke, is characterized by reduced blood flow to the heart. It is the most common cause of mortality in the world. With rising rates of obesity, type 2 diabetes, atherosclerosis and other known risk factors for CVD, it is increasingly important to identify at-risk populations to prevent the development of future CVD events with effective management.

In 2011, the National Heart, Lung, and Blood Institute (NHLBI) Expert Panel published updated guidelines for cardiovascular health and CVD risk reduction in youth. One of the main points of these guidelines is the strong recommendation for universal lipid screening for patients who are between 9 and 11 years of age and a second universal screening is performed between 17 and 21 years of age.

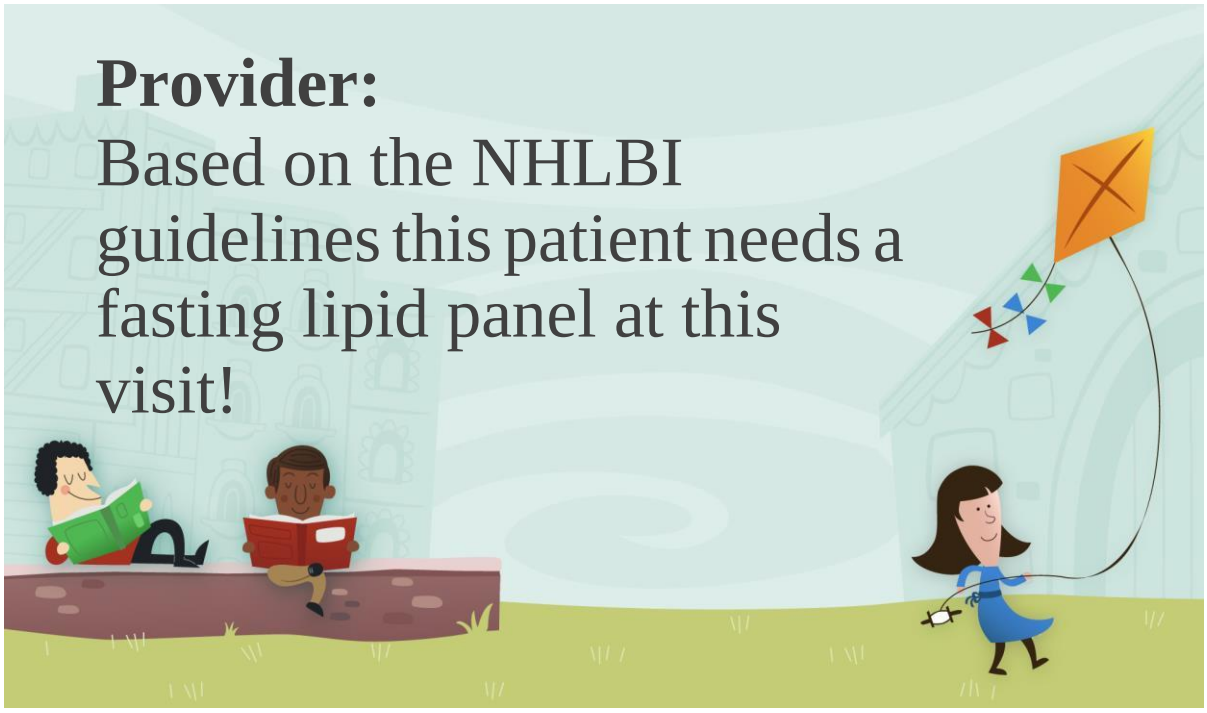
However, targeted (selective) screening should be done starting at age 2 years old if the patient has established risk factors, including:

- Parent with known dyslipidemia
- Family history of early CVD
- Hypertension
- Obesity
- Tobacco use
- Diabetes (type 1 and type 2)
- Kidney disease
- Heart transplant
- Kawasaki disease
- Chronic inflammatory disease
- HIV
- Nephrotic syndrome

Screening Recommendations



APPENDIX 5: Chart Tab Reminder



APPENDIX 6: Diet and Physical Activity Chart Sticker

Healthy Diet: E**at:** a variety of fruits and vegetables, whole grains, low fat dairy products, chicken or turkey without skin, lean beef, nuts and legumes. Increase water intake.
Avoid: Chips, cookies, processes foods, fried foods.
Physical Activity: Have at least 1 hr. of aerobic physical activity at least three times a week. No more than 2 hours of screen time a day.
Follow-Up: In six months for lab check.

APPENDIX 7: Provider Survey

Dear Colleague:
We are trying to gain a better understanding of whether primary care providers are screening children between the ages of 9-11 for dyslipidemia (elevated cholesterol, elevated LDL-cholesterol, low HDL-cholesterol or elevated triglycerides).
Please take a few minutes (it should be less than 5) to answer the following survey.
Thank you!

Do you currently provide primary care for children?	Yes No
How many years have you been in practice?	
What are your credentials?	
1.Do you currently order a lipid panel or total cholesterol on children who you are seeing for a Well Child Visit aged 9,10 or 11?	A. Order in all B. Order on none C. Order on some
2. How familiar are you with the recommendations for screening for dyslipidemia published by the American Academy of Pediatrics in 2011 (Pediatrics.2011;128 follow them (suppl 5): S213-S256) and by the National Heart Lung Blood Institute (NHLBI) (www.nhlbi.nih.gov/guidelines.cvd_ped.index.htm)?	A.I have never heard of them B.I have heard of them but am not familiar with the recommendations C. I am aware of the recommendations, but I don't follow them D. I am aware of the recommendations and try to follow them E. Other (please describe)
3. How comfortable are you in evaluating children who have an abnormal lipid screen?	A. Very comfortable B. Somewhat comfortable C. Not comfortable
4. 4. How comfortable are you in managing children who have abnormal lipids?	A. Very comfortable B. Somewhat comfortable C. Not comfortable
5, Have you ever initiated treatment of a child with elevated lipids with a medication	Yes No
6. If you were to identify a child with an abnormal lipid test that would you do?	A. Evaluate, manage and follow them B. Refer to consultant C. Other

Steipleman et al. (2017)

APPENDIX 8: Data Collection Tool

Age													
Weight													
Weight % for Age													
BMI													
BMI% for Age													
BP													
Patient Screened Appropriately													
Triglyceride Level													
Cholesterol Level													
LDL Level													
HDL Level													
Diet Education													
Physical Activity Education													
Follow Up Visit Recommended													
Provider Type													

APPENDIX 9: Evaluation Framework

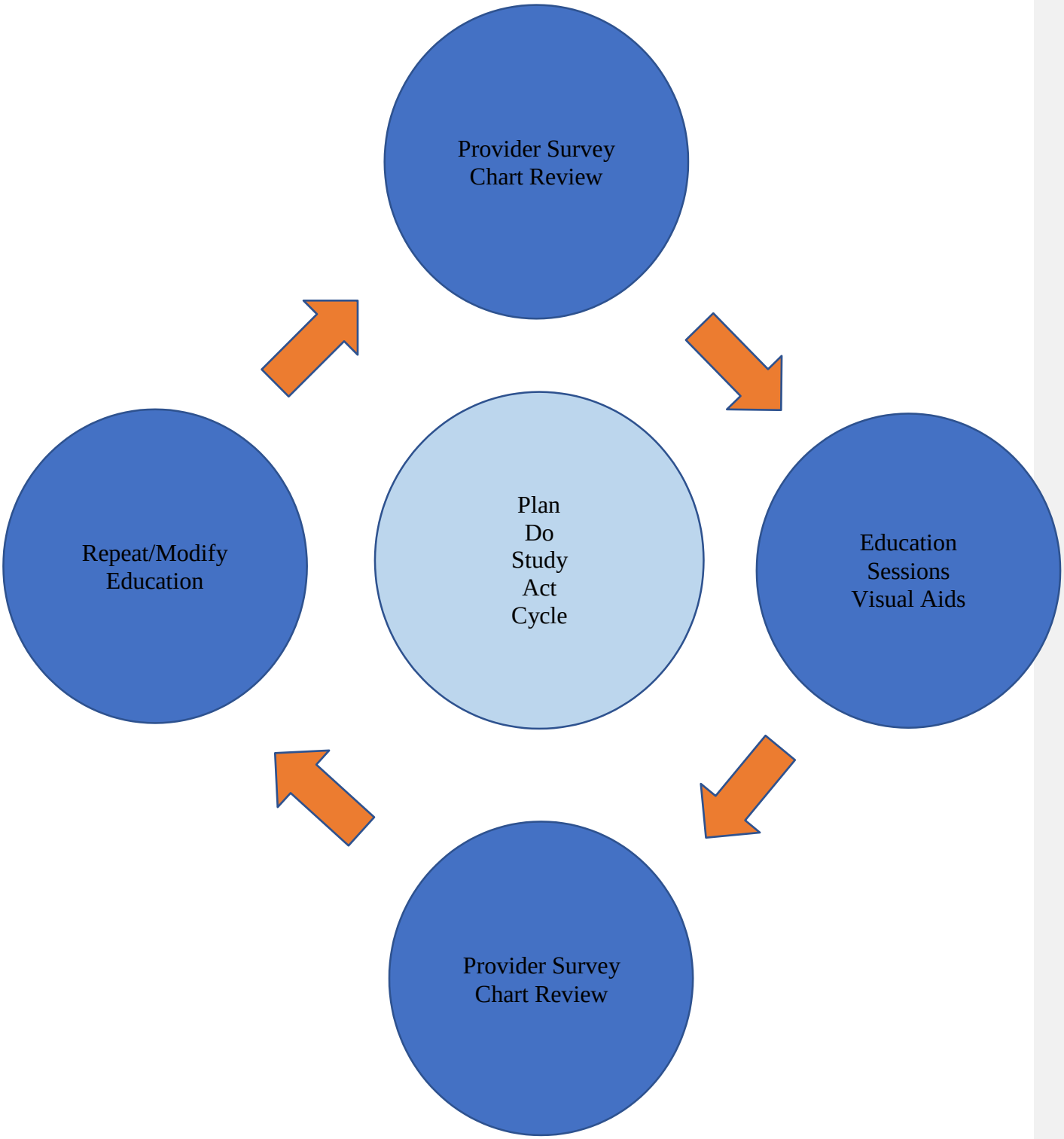
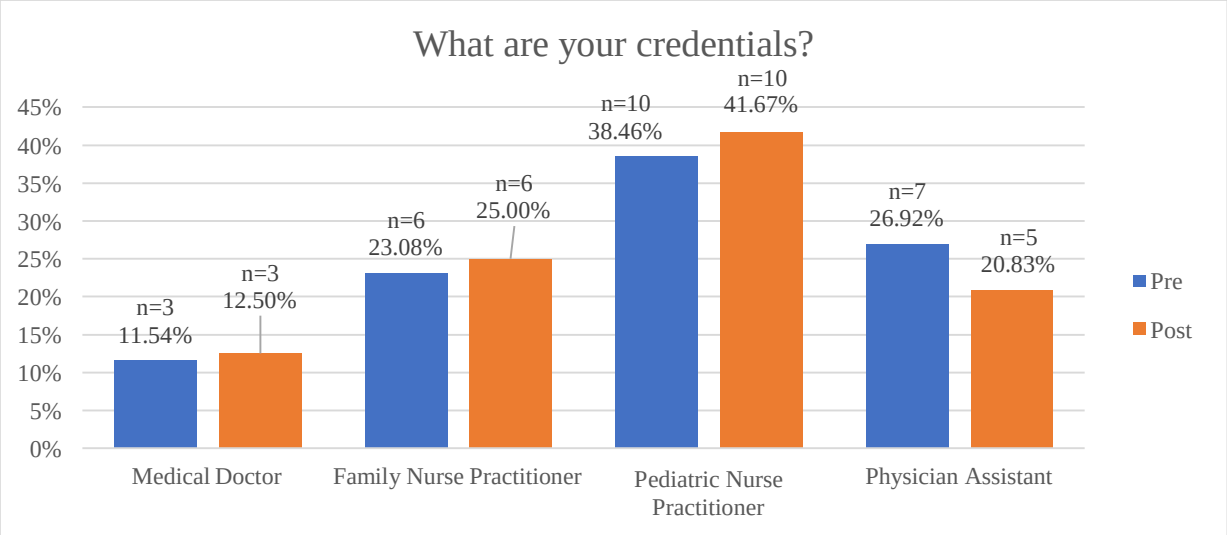


Table 1 Provider Demographics



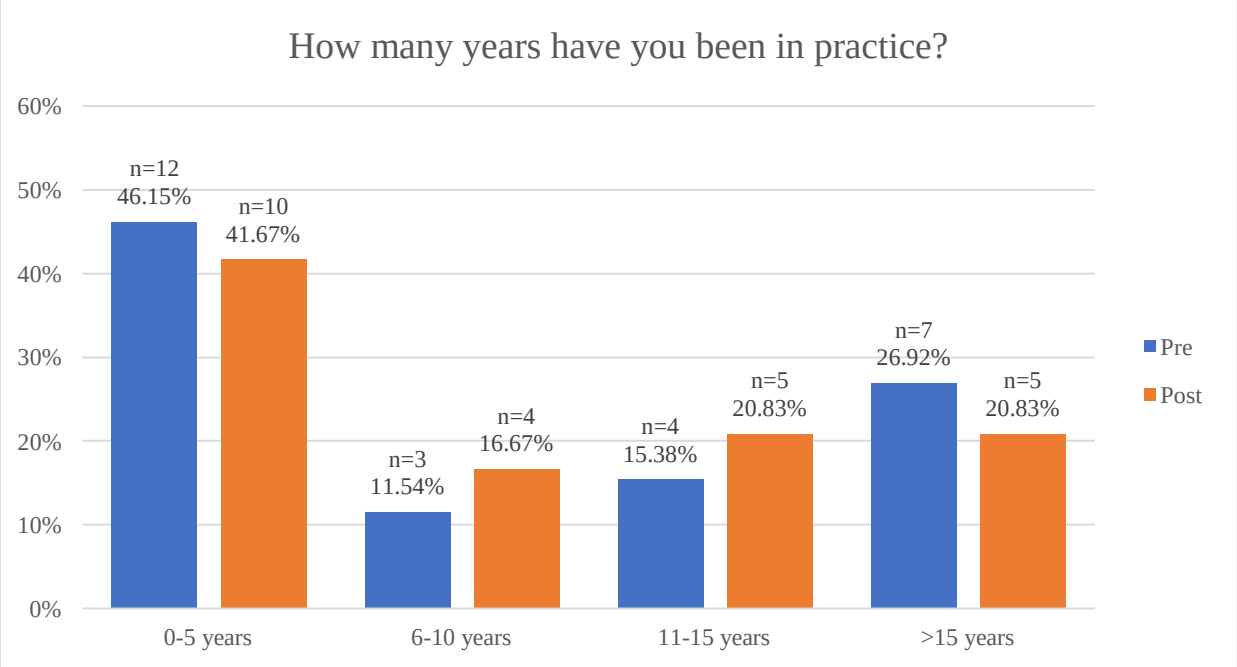


Table 2 Provider Survey Responses

		I have never heard of them	I have heard of them but am not familiar with the recommendations	I am aware of them but don't follow them	I am aware of the recommendations and try to follow them
How familiar are you with the recommendations for screening for dyslipidemia published by the American Academy of Pediatrics in 2011 and by the National Heart Blood Institute?	Pre	1	2	0	23
	Post	0	2	0	22

		Order on all	Order on some	Order on None	Total
Do you currently order a lipid profile or total cholesterol on children who you are seeing for a Well Child Visit at age 9,10 or 11?	Pre	19	0	7	26
	Post	19	5	0	24

Table 3 Provider Survey Responses Continued

		Evaluate manage and follow them myself	Refer to consultant	Something Else	Total
If you were to identify a child with an abnormal lipid test, what would you do?	Pre	10	6	10	26
	Post	14	10	0	24

		Very Comfortable	Somewhat Comfortable	Not Comfortable	Total
How comfortable are you in evaluating children who have an abnormal lipid screen?	Pre	10	14	0	24
	Post	15	9	0	24

Table 4 Chart Review of Provider Documentation of Dietary Education

Diet Education:	Pre	1 Month Post	2 Month Post	3 Month Post	Total
Yes	839	348	367	312	1866
No	72	0	1	0	73
Total	911	348	368	312	1939

Table 5 Activity Education Pre and Post Intervention

Activity Education:	Pre	1 Month Post	2 Month Post	3 Month Post	Total
Yes	811	348	367	312	1838
No	99	1	1	0	101
Total	910	349	368	312	1939

Table 6 Child Screened Appropriately Time Cross tabulation

		Time				
		PRE	1 MONTH POST	2 MONTH POST	3 MONTH POST	Total
Child Screened This Visit	YES	645	301	317	286	1549
	NO	266	53	53	35	407
Total		911	354	370	321	1956

Table 7 Chi-Square Tests Child Screened Appropriately Pre and Post Intervention

	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	74.790[a]	3	.000
Likelihood Ratio	76.155	3	.000
Linear-by-Linear Association	63.744	1	.000
N of Valid Cases	1956		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 66.79.

Table 8 Phi and Cramer V Children Screened Appropriately

		Value	Approximate Significance
Nominal by Nominal	Phi	.196	.000
	Cramer's V	.196	.000
N of Valid Cases		1956	

Table 9 Children Chart Sample Demographics

	Pre-Intervention		Post- Intervention	
Chart Sample Demographic	n=	Percentage	n=	Percentage
Number of Children Evaluated	911		1045	
Male Percentage	475	52.1%	545	52.2%
Female Percentage	436	47.9%	500	47.8%
BMI <5%	12	1.3%	10	1.0%
BMI 5-85%	552	60.6%	599	57.3%
BMI 86-95%	127	13.9%	164	15.7%
BMI >95%	220	24.1%	258	24.7%
Total Lab Results Obtained	549	60.3%	682	65.3%
Cholesterol < 200 mg/dl	523	95.3%	655	96.0%
Cholesterol >200 mg/dl	26	4.7%	27	4.0%
Triglycerides < 100 mg/dl (9) <130 mg/dl (10&11)	393	71.6%	511	74.9%
Triglycerides > 100 mg/dl (9) >130 mg/dl (10&11 yrs. old)	132	28.4%	144	25.1%
HDL > 40 mg/dl	470	85.6%	595	87.2%
HDL < 40 mg/dl	79	14.4%	87	12.8%
LDL < 130 mg/dl	533	97.1%	667	97.8%
LDL >130 mg/dl	16	2.9%	15	2.2%