Touro University Nevada

Recruitment Methods	Providers have been recruited by asking them to participate in the QI project. Since there is no harm to the patients, they will be recruited via chart audits by ICD 10 diagnosis codes.
Instruments/Tools (Validity/Reliability)	For the asthma education pre/post test I plan to make a pre/post asthma education test and review it with a content expert (pulmonologist) for validity/reliability. For the standardized, clinic-specific WAAP I plan to find a template online and modify it for my clinic and review it with a content expert (pulmonologist) for validity/reliability. For data collection pre/post WAAP I plan to make a chart review tool in which the number of patients who received or did not receive a WAAP is recorded pre/post implementation.
Proposed Descriptive Statistics and Statistical Test(s)	For pre/post asthma education **Descriptive Statistics**- mean of all scores pre/post, with percent improvement/decrease and or total score improvement/decrease **Statistical Tests**- Paired T-Test For pre/post implementation of standardized, site-specific WAAP **Descriptive Statistics**- Percentage of children receiving WAAP pre/post implementation **Statistical Tests**- Paired T-Test

After your instructor has approved the draft, email your completed form to your instructor and Dr Murukutla- Manognya.Murukutla@tun.touro.edu

Allow Dr Murukutla a minimum of 1 week to send feedback. If you have not received at least acknowledgment of receipt within one week, you should follow up to make sure the email came through.

Appendix L

Statistics Plan Worksheet

Touro University Nevada

DNP Project: Statistics Plan Worksheet

Please provide a brief description of each section. Attach supporting documents (instruments) to the end of this form as appendices.

Name: Joshua Harrold
Date: 11/24/2020

Section	Description
Project Title	Promoting Asthma Action Plans in a Pediatric Primary Care Clinic: A Quality Improvement Project
Project Purpose	Increase compliance with GINA and NHLBI guidelines of providing a written asthma action plan to all pediatric patients at all asthma visits.
Project Question	Will a quality improvement project consisting of asthma education for pediatric primary care providers paired with use of a standardized, site specific asthma action plan increase asthma knowledge in providers and the percentage of pediatric asthma patients receiving a written AAP at their asthma visits during a four week time period?
Project Design (general description how treatments are assigned/observational/repeated measures of X # of people, etc.)	4 pediatric primary care providers will be given an asthma education briefing with pre/post tests. They will be chosen at the project site by agreeing to partake in the QI project. A standardized, clinic-specific written asthma action plan template will be developed for use by providers. The number of pediatric asthma patients receiving asthma action plans at their asthma visits will be measured before and after implementation of the above interventions. Pediatric patients included in the project will be chosen based on ICD10 diagnoses via chart audits pre/post implementation.
Population of Interest	4 pediatric primary care providers- 2 MD's; 2 APRN's
Variables	Independent Variable(s) – Asthma education briefing; Implementation of a standardized clinic-specific WAAP template. Dependent Variable(s) – Scores on pre/post tests; number of pediatric patients receiving a WAAP at their asthma visits Relevant Constant(s)- The clinic, providers, and patient population.
Sample Size	4 providers for the pre/post test and asthma Chart meeting inclusion criteria for pre/post implementation of WAAP

Appendix K

Content Validity Index Table

Item	Expert 1	Expert 2	Expert 3	Mean	I-CVIs	CVR
1	4	4	4	4.0	1.0	1.0
2	4	4	4	4.0	1.0	1.0
3	4	4	4	4.0	1.0	1.0
4	4	4	4	4.0	1.0	1.0
5	4	4	4	4.0	1.0	1.0
6	4	4	4	4.0	1.0	1.0
7	4	4	4	4.0	1.0	1.0
8	4	4	4	4.0	1.0	1.0
9	4	4	4	4.0	1.0	1.0
10	4	4	4	4.0	1.0	1.0

To obtain content validity index for relevancy and clarity of each item (I-CVIs), the number of those judging the item as relevant or clear (rating 3 or 4) was divided by the number of content experts (Zamanzadeh, 2015). The I-CVI expresses the proportion of agreement on the relevancy of each item, which is between zero and one (Zamanzadeh, 2015).

Content Validity Ration (CVR) ranges from 1 to -1, with a higher score indicating further agreement of panel members on the necessity of an item in an instrument (Zamanzadeh , 2015). To obtain the content validity ratio the formula is CVR = (N_e - N/2)/(N/2), where N_e is the number of panelists indicating an item is “essential” and N is the total number of panelists (Zamanzadeh, 2015).

n) Ten years old o) Five years old p) Now	
8) How often should a child with moderate persistent asthma receive a new asthma action plan? m) At the beginning of each school year n) At every follow-up asthma visit o) Only if changes are made to the asthma action plan p) Only if the parent asks for one	4
9) As part of asthma self-management education you should do all of the following except m) Provide an asthma action plan n) Explain how to avoid triggers o) Review proper inhaler technique p) Teach how to perform CPR	4
10) According to the asthma action plan when should a family call 911 and/or seek emergency medical services? m) Ribs are showing when breathing n) Albuterol isn't helping o) Breathing hard and fast p) All of the above	4

l) Green zone m) Red zone Safe zone	
4) The green zone contains instructions for which of the following? m) Routine medications n) Management of mild acute exacerbations o) Management while seeking emergency medical care p) Stepping up to oral corticosteroids	4
5) After entering the diagnosis of asthma into e-clinical works, what are the next steps to use the asthma smart phrase? m) Select Treatment > Select New Action > Type in asthma > Make necessary adjustments > Select OK n) Select Treatment > Select Education > Type in asthma > Make necessary adjustments > Select OK o) Select Treatment > Select Browse > Type in asthma > Make necessary adjustments > select OK p) Select Treatment > Select Add Info > Type in asthma > Make necessary adjustments > Select OK	4
6) Which child does not have their asthma under control? m) Jenny uses her albuterol inhaler 20 minutes before gym class every week n) Johnny wakes up short of breath at least three times per month and it is always immediately resolved with albuterol inhalation o) Bobby wakes up wheezing once or twice a month and it is relieved with albuterol p) Ricky used his albuterol inhaler while at school four times last month	4
7) You see a 23 month old with wheezing. You suspect it is due to asthma. When should you start giving this child an asthma action plan? m) Two years old	4

Name of Rater: Dr. Ryan Yoshikawa, APRN

Experts Rating Form Instructions

Rating instructions: For each item, please indicate the following:

Please rate how relevant each item is to the overall construct of early sepsis identification and care by placing a number in the first box to the right of each item.

1 = Not relevant at all
2 = Slightly relevant
3 = Moderately relevant
4= Highly relevant

Your honest feedback is appreciated and will be used to enhance the quality of this questionnaire.

Expert Rating Form

Item	Relevance Rating
1) What is the estimated yearly financial burden of asthma in the United States? m) 100 – 200 million dollars n) 10 - 20 billion dollars o) 80 – 90 billion dollars p) 700 – 800 million dollars	4
2) Approximately how many children in the United States are diagnosed with asthma before their 18th birthday? m) 1/20 n) 1/12 o) 1/4 p) 1/8	4
3) If a child comes in with a cough and runny nose, which zone are they in according to the asthma action plan? k) Yellow zone	4

j) Ten years old k) Five years old l) Now	
8) How often should a child with moderate persistent asthma receive a new asthma action plan? i) At the beginning of each school year j) At every follow-up asthma visit k) Only if changes are made to the asthma action plan l) Only if the parent asks for one	4
9) As part of asthma self-management education you should do all of the following except i) Provide an asthma action plan j) Explain how to avoid triggers k) Review proper inhaler technique l) Teach how to perform CPR	4
10) According to the asthma action plan when should a family call 911 and/or seek emergency medical services? i) Ribs are showing when breathing j) Albuterol isn't helping k) Breathing hard and fast l) All of the above	4

i) Green zone j) Red zone Safe zone	
4) The green zone contains instructions for which of the following? i) Routine medications j) Management of mild acute exacerbations k) Management while seeking emergency medical care l) Stepping up to oral corticosteroids	4
5) After entering the diagnosis of asthma into e-clinical works, what are the next steps to use the asthma smart phrase? i) Select Treatment > Select New Action > Type in asthma > Make necessary adjustments > Select OK j) Select Treatment > Select Education > Type in asthma > Make necessary adjustments > Select OK k) Select Treatment > Select Browse > Type in asthma > Make necessary adjustments > select OK l) Select Treatment > Select Add Info > Type in asthma > Make necessary adjustments > Select OK	4
6) Which child does not have their asthma under control? i) Jenny uses her albuterol inhaler 20 minutes before gym class every week j) Johnny wakes up short of breath at least three times per month and it is always immediately resolved with albuterol inhalation k) Bobby wakes up wheezing once or twice a month and it is relieved with albuterol l) Ricky used his albuterol inhaler while at school four times last month	4
7) You see a 23 month old with wheezing. You suspect it is due to asthma. When should you start giving this child an asthma action plan? i) Two years old	4

Name of Rater: Dr. Judith Carrion

Experts Rating Form Instructions

Rating instructions: For each item, please indicate the following:

Please rate how relevant each item is to the overall construct of early sepsis identification and care by placing a number in the first box to the right of each item.

1 = Not relevant at all
2 = Slightly relevant
3 = Moderately relevant
4= Highly relevant

Your honest feedback is appreciated and will be used to enhance the quality of this questionnaire.

Expert Rating Form

Item	Relevance Rating
1) What is the estimated yearly financial burden of asthma in the United States? i) 100 – 200 million dollars j) 10 - 20 billion dollars k) 80 – 90 billion dollars l) 700 – 800 million dollars	4
2) Approximately how many children in the United States are diagnosed with asthma before their 18th birthday? i) 1/20 j) 1/12 k) 1/4 l) 1/8	4
3) If a child comes in with a cough and runny nose, which zone are they in according to the asthma action plan? h) Yellow zone	4

7) You see a 23 month old with wheezing. You suspect it is due to asthma. When should you start giving this child an asthma action plan? e) Two years old f) Ten years old g) Five years old h) Now	4
8) How often should a child with moderate persistent asthma receive a new asthma action plan? e) At the beginning of each school year f) At every follow-up asthma visit g) Only if changes are made to the asthma action plan h) Only if the parent asks for one	4
9) As part of asthma self-management education you should do all of the following except e) Provide an asthma action plan f) Explain how to avoid triggers g) Review proper inhaler technique h) Teach how to perform CPR	4
10) According to the asthma action plan when should a family call 911 and/or seek emergency medical services? e) Ribs are showing when breathing f) Albuterol isn't helping g) Breathing hard and fast h) All of the above	4

3) If a child comes in with a cough and runny nose, which zone are they in according to the asthma action plan? e) Yellow zone f) Green zone g) Red zone Safe zone	4
4) The green zone contains instructions for which of the following? e) Routine medications f) Management of mild acute exacerbations g) Management while seeking emergency medical care h) Stepping up to oral corticosteroids	4
5) After entering the diagnosis of asthma into e-clinical works, what are the next steps to use the asthma smart phrase? e) Select Treatment > Select New Action > Type in asthma > Make necessary adjustments > Select OK f) Select Treatment > Select Education > Type in asthma > Make necessary adjustments > Select OK g) Select Treatment > Select Browse > Type in asthma > Make necessary adjustments > select OK h) Select Treatment > Select Add Info > Type in asthma > Make necessary adjustments > Select OK	4
6) Which child does not have their asthma under control? e) Jenny uses her albuterol inhaler 20 minutes before gym class every week f) Johnny wakes up short of breath at least three times per month and it is always immediately resolved with albuterol inhalation g) Bobby wakes up wheezing once or twice a month and it is relieved with albuterol h) Ricky used his albuterol inhaler while at school four times last month	4

Appendix J

Expert Panel Rating Forms

Name of Rater: Dr. Samantha Peckham

Experts Rating Form Instructions

Rating instructions: For each item, please indicate the following:

Please rate how relevant each item is to the overall construct of early sepsis identification and care by placing a number in the first box to the right of each item.

1 = Not relevant at all
2 = Slightly relevant
3 = Moderately relevant
4= Highly relevant

Your honest feedback is appreciated and will be used to enhance the quality of this questionnaire.

Expert Rating Form

Item	Relevance Rating
1) What is the estimated yearly financial burden of asthma in the United States? e) 100 – 200 million dollars f) 10 - 20 billion dollars g) 80 – 90 billion dollars h) 700 – 800 million dollars	4
2) Approximately how many children in the United States are diagnosed with asthma before their 18th birthday? e) 1/20 f) 1/12 g) 1/4 h) 1/8	4

Appendix I

Asthma Knowledge Test Score Review Tool

Evaluation	Measures	Provider 1	
Providers asthma knowledge	Scores 0-100 on asthma knowledge questionnaire	Pre-test	Post-test
		Provider 2	
		Pre-test	Post-test
		Provider 3	
		Pre-test	Post-test
		Provider 4	
		Pre-test	Post-test

c) Review proper inhaler technique

d) Teach how to perform CPR

Answer: D
Rationale: This is a WAAP/self-management application level question. The Global Initiative for Asthma (2020) recommends an educational program for children should contain a written asthma action plan, training about correct inhalation technique, and factors that may influence their asthma.

10) According to the asthma action plan when should a family call 911 and/or seek emergency medical services?

a) Ribs are showing when breathing

b) Albuterol isn't helping

c) Breathing hard and fast

d) All of the above

Answer: D
Rationale: This is a WAAP comprehension level question. All of these symptoms represent the child is in the red zone and should seek emergency medical care (Patel & Teach, 2019).

Answer: B
Rationale: This is an asthma control comprehension level question. The rules of two™ are from the 1991 National Asthma Education and Prevention Program to help assess if the patient's asthma is well controlled or if controller therapy is needed (NHLBI, 1991). The rules of two™ has been validated by Millard et al. (2014) to identify uncontrolled asthma just as well as the Asthma Control Test™ (ACT™) and can be used to help to determine if any changes need to be made to the treatment plan. The ACT™ is a five item survey answered by the parent or patient to assess asthma control developed by Nathan et al. (2004) who validated the tool by comparing it against a specialists rating.

7) You see a 23 month old with wheezing. You suspect it is due to asthma. When should you start giving this child an asthma action plan?

a) Two years old

b) Ten years old

c) Five years old

d) Now

Answer: D
Rationale: This is a WAAP application level question. The Global Initiative for Asthma (2020) recommends wheezy children of any age should be provided written asthma action plan when the wheeze is suspected to be due to asthma.

8) How often should a child with moderate persistent asthma receive a new asthma action plan?

a) At the beginning of each school year

b) At every follow-up asthma visit

c) Only if changes are made to the asthma action plan

d) Only if the parent asks for one

Answer: B
Rationale: This is a WAAP knowledge level question. The National Heart, Lung, and Blood Institute (2007) recommends providing a written asthma action plan at all asthma visits to be reviewed and adjusted as needed.

9) As part of asthma self-management education you should do all of the following except

a) Provide an asthma action plan

b) Explain how to avoid triggers

management of acute, mild exacerbations (Patel & Teach, 2019)

4) **The green zone contains instructions for which of the following?**

   a) Routine medications

   b) Management of mild acute exacerbations

   c) Management while seeking emergency medical care

   d) Stepping up to oral corticosteroids

   Answer: A
   Rationale: This is a WAAP knowledge level question. The American Academy of Pediatrics recommends typical asthma action plans have three zones, green, yellow, and red (Patel & Teach, 2019). The green zone provides instructions on routine medications (Patel & Teach, 2019)

5) **After entering the diagnosis of asthma into e-clinical works, what are the next steps to use the asthma smart phrase?**

   a) Select Treatment > Select New Action > Type in asthma > Make necessary adjustments > Select OK

   b) Select Treatment > Select Education > Type in asthma > Make necessary adjustments > Select OK

   c) Select Treatment > Select Browse > Type in asthma > Make necessary adjustments > select OK

   d) Select Treatment > Select Add Info > Type in asthma > Make necessary adjustments > Select OK

   Answer: C
   Rationale: This is a smart phrase application level question. This information is covered in the PowerPoint developed by the project lead (Harrold, 2020).

6) **Which child does not have their asthma under control?**

   a) Jenny uses her albuterol inhaler 20 minutes before gym class every week

   b) Johnny wakes up short of breath at least three times per month and it is always immediately resolved with albuterol inhalation

   c) Bobby wakes up wheezing once or twice a month and it is relieved with albuterol

   d) Ricky used his albuterol inhaler while at school four times last month

Choose the best answer for each of the following questions

Questions

1) **What is the estimated yearly financial burden of asthma in the United States?**
   a) 100 – 200 million dollars
   b) 10 - 20 billion dollars
   c) 80 – 90 billion dollars
   d) 700 – 800 million dollars

   Answer: C
   Rationale: This is an economic knowledge question. Nurmagambetov et al. (2018) used two-part regression models to estimate asthma-related costs per person annually from the 2008-2013 household component of the Medical Expenditure Panel Survey.

2) **Approximately how many children in the United States are diagnosed with asthma before their 18th birthday?**
   a) 1/20
   b) 1/12
   c) 1/4
   d) 1/8

   Answer: B
   Rationale: This is a prevalence knowledge question. This data was obtained from the 2018 National Health Interview Survey (NHIS, 2018).

3) **If a child comes in with a cough and runny nose, which zone are they in according to the asthma action plan?**
   a) Yellow zone
   b) Green zone
   c) Red zone
   d) Safe zone

   Answer: A
   Rationale: This is a WAAP comprehension level question. The American Academy of Pediatrics recommends typical asthma action plans have three zones, green, yellow, and red (Patel & Teach, 2019). The yellow zone provides instructions about home

Appendix H

Asthma Knowledge Questionnaire with Cover Sheet

Asthma Knowledge Questionnaire

Conducted by Joshua Harrold

Appendix G

Chart Review Tool

Evaluation	Measures	Total Number of Charts	
Providers' Compliance with Providing an Asthma Action Plan	Patients 0-17 years of age with the following ICD codes*	Pre-Implementation	Post-Implementation
		Number of Chats with Documented Provision of AAP	
		Pre-Implementation	Post-Implementation

* ICD codes include below:

1) J45.20 Mild intermittent asthma, uncomplicated. J45.21 Mild intermittent asthma, with (acute) exacerbation. J45.22 Mild intermittent asthma, with status asthmaticus. 2) J45.30 Mild persistent asthma, uncomplicated. J45.31 Mild persistent asthma, with (acute) exacerbation. J45.32 Mild persistent asthma, with status asthmaticus. 3) J45.40 Moderate persistent asthma, uncomplicated. J45.41 Moderate persistent asthma, with (acute) exacerbation. J45.42 Moderate persistent asthma, with status asthmaticus. 4) J45.50 Severe persistent asthma, uncomplicated. J45.51 Severe persistent asthma, with (acute) exacerbation. J45.52 Severe persistent asthma, with status asthmaticus. 5) J45.901 Other and unspecified asthma, with (acute) exacerbation. J45.902 Other and unspecified asthma, with status asthmaticus. J45.909 Other and unspecified asthma, uncomplicated. 6) J45.990 Exercise induced bronchospasm. J45.991 Cough variant asthma. J45.998 Other asthma.

Appendix F

Asthma Smart Phrase

Reviewed the abnormalities associated with the bronchioles in asthma (inflammation vs. muscle hyper-reactivity) and the treatment may be two-pronged to include daily inhaled steroids for prevention and bronchodilators as needed for symptoms of coughing, shortness of breath, or wheezing. Requested they keep a journal of all day and nigh time symptoms and bring it with them to their next appointment. Reviewed the rules of 2 (daytime wheezing or shortness of breath ≥ 2 times per week or night time wheezing or shortness of breath ≥ 2 times per month). Spacer/inhaler teaching performed, reviewed to brush teeth after inhaled corticosteroid administration, and to wash spacer weekly in warm soapy water. Two copies of asthma action plan provided for home and school. Return to clinic in three months, or sooner for rules of 2™. Parent verbalized understanding and agreed with plan.

Common Triggers and Ways to Avoid Them

Asthma attack can be cause by just one trigger, but other times it may be two or more triggers. Triggers are things in the environment or life circumstances that could lead to an asthma attack. Below are possible triggers and ways to minimize their effects.

Allergens

Animal Dander: (flakes of skin or dried saliva from cats, dogs, birds, rodents):

- Keep pets out of the bedroom at all times.
- Wash pets weekly including cats to decrease dandruff
- Try to limit contact to friends or relatives with pets
- Avoid bedding (pillows/quilts) made with feathers or kapok (silky fibers from silk-cotton trees

Dust Mites (fecal material):

- Wash bed sheets and blankets weekly in hot water (>130°F) or warm/cold water with detergent and bleach
- Encase pillows and mattress in dust-proof covers.
- If stuffed toys, keep them out of the bed and wash weekly.
- Do not let child sleep on fabric furniture.
- Use throw rugs instead of carpet if possible.
- Keep indoor humidity 30-50% by using dehumidifier if needed
- Damp mop hard floors weekly. Vacuum carpets more frequently. Do not use a vacuum when child is in the room or use dust mask
- Use a vacuum cleaner with a double layered or micro-filter bag or HEPA (High-Efficiency Particulate Air) filter

Cockroaches (dried droppings and remains):

- Keep food and garbage in closed containers. Never leave food out.
- Keep kitchen floor, counter and table clean.
- Try to eat only in the kitchen, never in the bedroom.
- Use poison baits, powders, paste (boric acid) or roach traps. Avoid using spray. If used, stay out of the room until the odor goes away.

Indoor Molds (anywhere there is moisture):

- Keep bathrooms and kitchens well ventilated with exhaust fans and clean regularly.
- Use central air conditioner if possible. Change filter every 2-4 weeks.
- Use dehumidifier for damp basements. Keep humidity level between 30-50%. Empty and clean unit regularly.

Pollen and Outdoor Molds (trees, grass, weeds):

- Stay indoors when pollen count is high.
- Keep windows closed and use air conditioning if possible.
- Avoid sources of molds such as fresh grass, wet leaves and garden debris.

Irritants

Tobacco Smoke (Second and Third Hand Smoke):

- No smoking in your home and car.
- Avoid tobacco smoke in all private or public places.
- If anyone in the family smokes, ask your health care provider for ways to help quit

Smoke, Strong Odors and Sprays:

- If possible, do not use a wood-burning stove, kerosene based heating elements
- Do not use perfumes, strong smelling cosmetics such as talcum powder, hair spray or nail polish.
- Do not use room deodorizes or burn candles.
- Use non-scented household products for laundry and cleaning.
- If painting or varnishing, avoid area when using products and until oder is gone.

Weather:

- Wear scarf over mouth/nose when cold or windy.
- Limit outdoor activities if extremely hot/high humidity

Colds and Infections:

- Avoid people with colds or the flu.
- Teach good hand washing technique
- Do not give your child over-the-counter cold remedies, unless you speak with his/her doctor first
- Make sure your child rests, eats a balanced diet and exercises regularly.
- Get a flu shot every year.

Exercise:

- Encourage warm up and cool down exercises
- Ask doctor what medication to take before exercising and develop an asthma control plan that allows your child to exercise, actively play or lay sports without symptoms.

Food- common allergies are:

- Food and beverages with sulfites, shellfish or fish, dairy (milk or eggs), peanuts and tree nuts (walnuts, cashews), soy and wheat.
- Your child may be tested to know what to avoid

Medications:

- Such as Aspirin and beta blockers
- Look closely at labels to see if medication is contained in bottle prior to given.

Appendix E

Written Asthma Action Plan

Asthma Action Plan

Name: _____ Date_____

Controllers (box 1) are taken to prevent symptoms. Relievers (box 2, 3) are used when symptoms occur.

1. GO - GOOD CONTROL

Child can do these activities:
- Breathing is good
- No cough or wheezing
- Can work/play
- Sleeps all night

Daily Medication

Medicine:	How much to take:	When to take it:

20 minutes before sports use this medicine:

2. CAUTION- BE CAREFUL

Child has any of these:
- Cough
- Wheeze
- Tight chest
- Wakes up at night

Take Daily Medicines and Add these Medicines

Medicine:	How much to take:	When to take it:

Call doctor if quick relief medicine is needed to treat symptoms 3 or more times a week

3. STOP- DANGER
CALL YOUR DOCTOR NOW

Child has any of these:
- Medicine not helping
- Breathing hard and fast
- Nose open wide
- Can't Walk or talk well
- Ribs are showing when breathing

Take Daily Medicines and Add these Medicines

Medicine:	How much to take:	When to take it:

911 • Can't talk or cry because of it's hard to breath • Lips are bluish • Has passed out • Struggling to breath

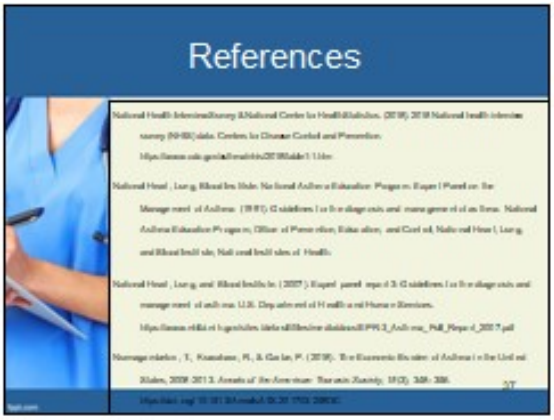
Asthma Triggers: ☐ Exercise ☐ Animals ☐ Mites ☐ Smoke ☐ Weather ☐ Colds ☐ None/Unknown ☐ Tobacco ☐ Medications ☐ Food ☐ Pollen ☐ Roaches ☐ Molds ☐ Other _____

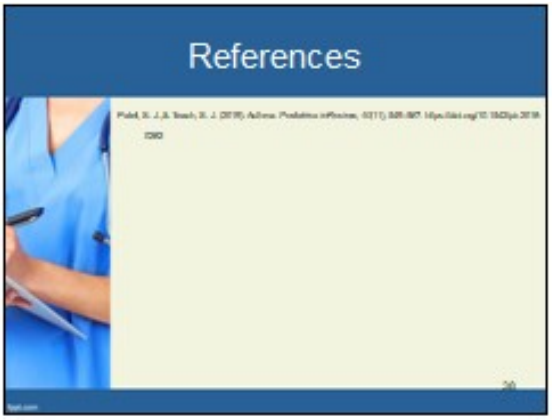
Primary Physician: _____ Action Plan Prepared By: _____ (Please sign here after printing) Date: _____

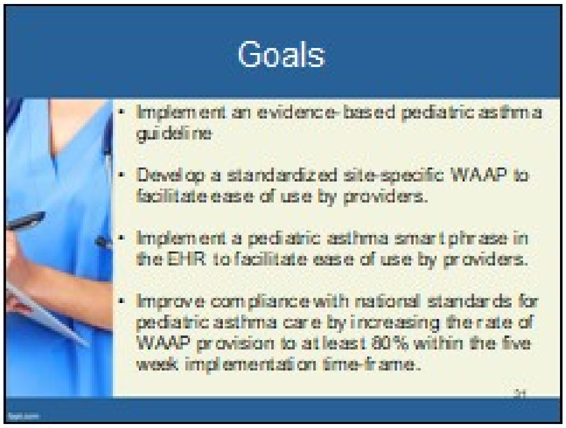
Follow up in: _____ Months Appt Date/Time: _____ at

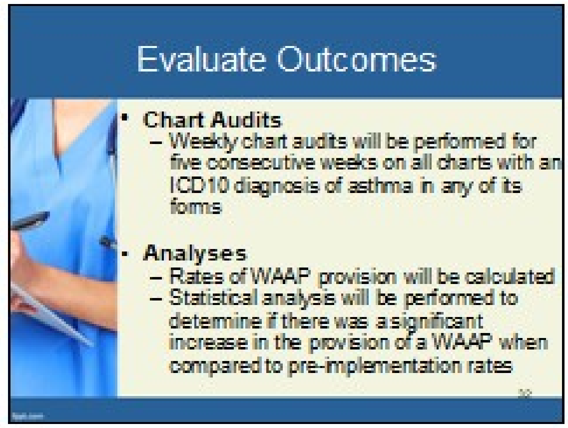
I have been provided a copy of instruction on how to use this Asthma Action Plan and ways to avoid asthma triggers.

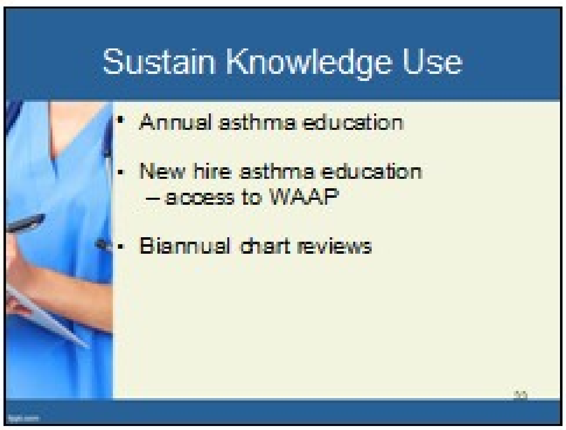
Caregiver signature: _____ (Please sign here after printing) Date: _____

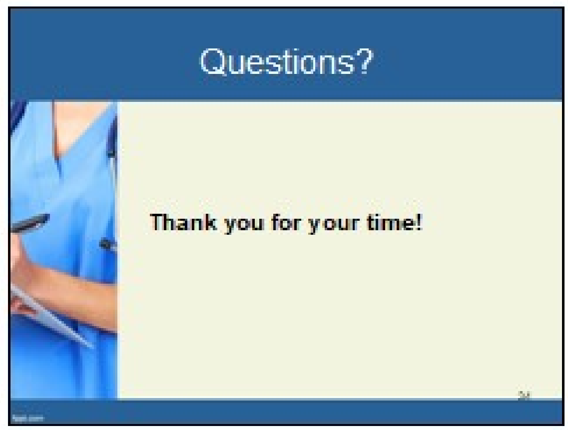

References
National Health Interview Survey (National Center for Health Statistics. (2018). 2018 National health interview survey (NHIS) data. Centers for Disease Control and Prevention. https://www.cdc.gov/nchs/nhis/2018/default.htm
National Heart, Lung, Blood Inst. Nat. Asthma Education Program Expert Panel on the Manage ment of Asthma. (1997). Guidelines for the diagnosis and management of asthma. National Asthma Education Program, Office of Prevention, Education, and Control, National Heart, Lung, and Blood Institute, National Institutes of Health.
National Heart, Lung, and Blood Institute. (2007). Expert panel report 3: Guidelines for the diagnosis and manage ment of asthma. U.S. Department of Health and Human Services. https://www.nhlbi.nih.gov/files/docs/guidelines/asthma_sum.pdf
Nurmagambetov, T., Kuwahara, R., & Garbe, P. (2018). The Economic Burden of Asthma in the United States, 2008-2013. Annals of the American Thoracic Society, 15(3), 348-356.

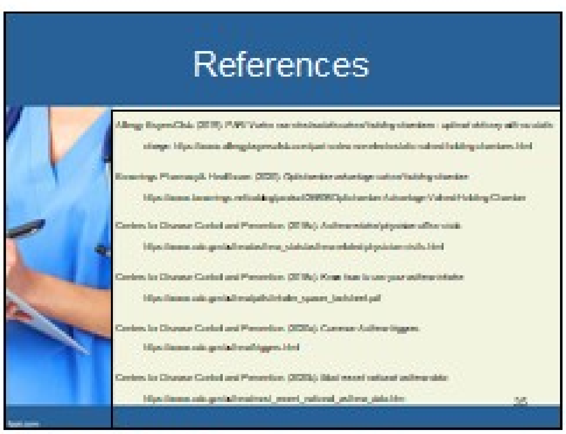

References
Patel, M. J., & Teach, S. J. (2018). Asthma. Pediatrics in Review, 42(11), 569-587. https://doi.org/10.1542/pir.2018-0060


Goals
Implement an evidence-based pediatric asthma guideline
Develop a standardized site-specific WAAP to facilitate ease of use by providers.
Implement a pediatric asthma smart phrase in the EHR to facilitate ease of use by providers.
Improve compliance with national standards for pediatric asthma care by increasing the rate of WAAP provision to at least 80% within the five week implementation time-frame.


Evaluate Outcomes
Chart Audits
– Weekly chart audits will be performed for five consecutive weeks on all charts with an ICD10 diagnosis of asthma in any of its forms
Analyses
– Rates of WAAP provision will be calculated
– Statistical analysis will be performed to determine if there was a significant increase in the provision of a WAAP when compared to pre-implementation rates


Sustain Knowledge Use
Annual asthma education
New hire asthma education
– access to WAAP
Biannual chart reviews


Questions?
Thank you for your time!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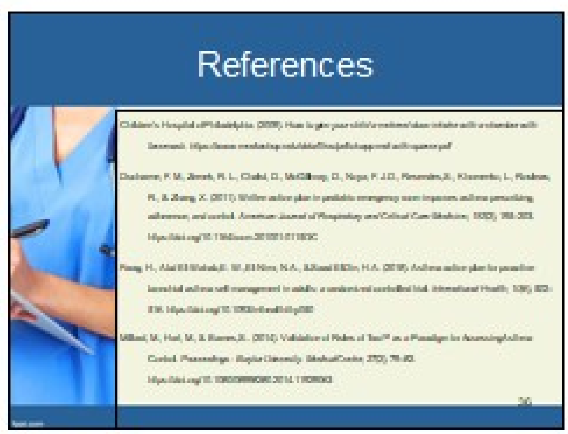
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Asthma Action Plan

- Standardized Fillable PDF
- Drop down lists with common asthma medications
- Template saved on shared clinic drive in "Asthma" folder
  - Can save individual patient's WAAP for faster updating at follow-up asthma visits
- Symptom based with pictures
- Includes common triggers and how to avoid them
- Includes date of next follow-up
- Includes clinic phone numbers and when to seek primary care versus emergency care

Assessing Asthma Control

- Assessing asthma control at each patient encounter is an essential task to determine pharmacologic requirements (Millard et al., 2014)
  - **Rules of Two™**
    - a tool to signal the need for controller therapy according to the first National Asthma Education Program (NHLBI, 1991)
      - Daytime wheezing or shortness of breath ≥ 2 times per week
      - Night time wheezing or shortness of breath ≥ 2 times per month

Asthma Smart Phrase

- Embedded into E-Clinical Works for ease of use
- Includes key components of asthma self-management education recommended by the NHLBI
  - Helps ensure providers cover all areas
- Ensures provision of a WAAP is recorded in the progress notes correctly for chart audits

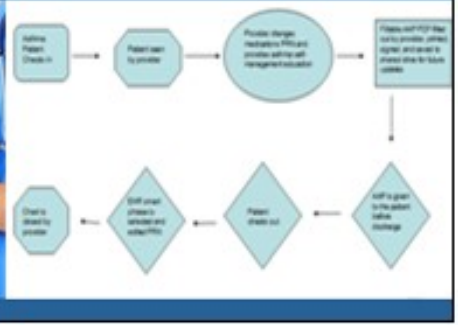
Asthma Smart Phrase

- Select an appropriate asthma diagnosis
- Go to treatment section
- Select Browse
- Type **asthma** into keywords
- Make individualized adjustments as necessary
- Select OK

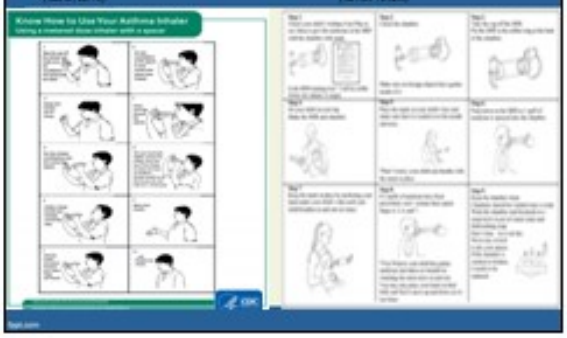
Asthma Smart Phrase

- "Reviewed the abnormalities associated with the bronchioles in asthma (inflammation vs. muscle hyper-reactivity) and the treatment may be two-pronged to include daily inhaled steroids for prevention and bronchodilators as needed for symptoms of coughing, shortness of breath, or wheezing. Requested they keep a journal of all day and nigh time symptoms and bring it with them to their next appointment. Reviewed the rules of 2 (daytime wheezing or shortness of breath ≥ 2 times per week or nighttime wheezing or shortness of breath ≥ 2 times per month). Spacer/inhaler teaching performed, reviewed to brush teeth after inhaled corticosteroid administration, and to wash spacer weekly in warm soapy water. Two copies of asthma action plan provided for home and school. Return to clinic in three months, or sooner for rules of 2™. Parent verbalized understanding and agreed with plan."

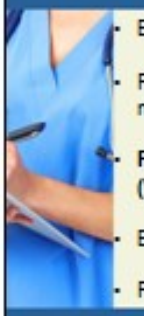
Clinic Flow



MDI Administration Technique



Asthma Self-Management Education



- Briefly review pathophysiology
- Review difference between controller medications and emergency medications
- **Provide a written asthma action plan (WAAP)**
- Explain how to avoid triggers
- Review proper inhaler technique

Why an Asthma Action Plan?

- Lakupack et al. (2017) found that providing children with a WAAP reduced ER visits, as well as school absences when compared to the previous six months before receiving a written AAP
- Farag et al. (2018) found that adults who received a WAAP experienced significantly reduced rates of ER visits, hospitalizations, ICU admissions, and days of sick leave and absenteeism when compared to a control group who only received standard asthma education without a WAAP
- Ducharme et al. (2011) found receiving a WAAP to increase adherence to inhaled corticosteroids, which can help reduce exacerbations.

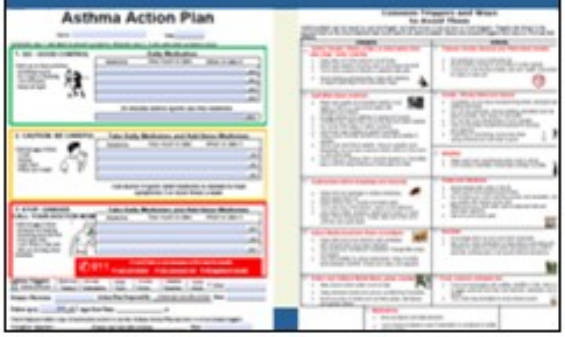
What is an Asthma Action Plan

- Written document provided to patients and their caregivers at asthma visits with specific instructions on how to manage their asthma (Patel & Teach, 2019)
  - Should be clear and include both written instructions as well as pictorial descriptions (Patel & Teach, 2019)
  - Includes any known triggers and how to help avoid these known triggers (Patel & Teach, 2019
  - Can be based on symptoms or peak expiratory flow (NHLBI, 2007)
    - Uses color-coded zones that are symptom based (NHLBI, 2007)

Asthma Zones

- **Green Zone**
  - Routine maintenance medications that should be taken daily (Patel & Teach, 2019)
    - No symptoms
- **Yellow Zone**
  - Provides instructions for self-care during a mild exacerbation (Patel & Teach, 2019)
    - cough, wheeze, tight chest, waking up at night
- **Red Zone**
  - Provides instructions for management of an acute severe exacerbation (Patel & Teach, 2019)
    - Medicine not helping, breathing hard and fast, ribs retracting

Asthma Action Plan



Treatment & Medications

- **Two major medication categories**
  - Long term controllers
  - Short term quick relief
- **Treatment goals**
  - Prevent day and nighttime symptoms
  - Maintain normal activity levels
  - Normal/near normal pulmonary function
  - Have no/minimal medication side-effects
  - Be satisfied with treatment

Quick Relief Medications

- **Short-acting beta2-agonists**
  - Bronchodilators
  - used in acute asthma episodes
    - Should relieve symptoms
- **Systemic Corticosteroids**
  - Usually prescribed 3-5 days
  - Helpful with acute inflammation

Long-Term Medications

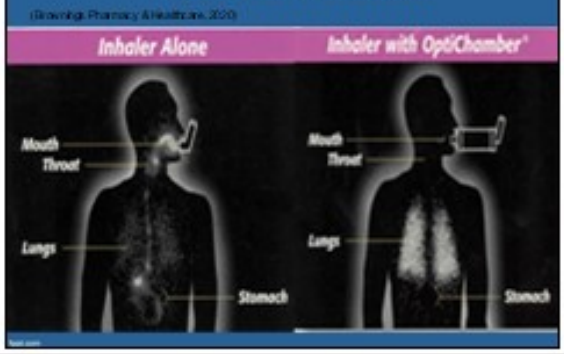
- **Inhaled Corticosteroids (ICS)**
  - First line/preferred treatment for persistent asthma
  - Decrease lung inflammation
- **Long-acting beta2-agonists**
  - Long acting bronchodilators
  - Must be used in conjunction with an ICS
  - Not to be used in place of quick relief medication
- **Leukotriene receptor antagonists**
  - anti-inflammatory & bronchodilation effects
  - Not used as monotherapy
- **Antihistamines & steroidal nasal sprays**
  - If allergies are a trigger

Medication Administration

- **Nebulizer**
  - Used with air compressor
  - Use with mouthpiece or mask
    - No published data supports blow-by technique
- **Metered Dose Inhaler (MDI)**
  - Always use with a chamber
    - one way valved
- **Dry Powder Inhaler (DPI)**
- **Injection**
- **Oral**

One Way Holding Chambers

MDI Administration



Definition

- **Asthma**
  - a complex chronic illness characterized by episodes of reversible bronchi spasm, airway constriction, and inflammation in response to infections, exercise, irritants, and aeroallergens (Patel & Teach, 2019)
  - The mainstay of pharmacologic treatment for asthma consists of rescue medications used as-needed during asthma exacerbations and controller medications used daily to prevent exacerbations (Patel & Teach, 2019)

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Pathophysiology

- Chronic airway inflammation
- Airway hyperresponsiveness
- Bronchoconstriction
  - The interaction of these features determines the clinical manifestations, severity, and response to treatment.
  - In some patients persistent changes in airway structure occur (airway remodeling)
    - Irreversible changes in airway

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Pathophysiology

Diagnosis

1. **Asthma symptoms**
   a. Coughing
   b. Wheezing
   c. Shortness of breath
   d. Chest tightness / chest pain
2. **Recurrent episodes of symptoms**
   a. often a trigger is identified
3. **Symptoms resolve with asthma treatments**
   a. Bronchodilator

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Asthma Symptom Severity Classification

- **Mild Intermittent Asthma**
  - Daytime symptoms: ≤ twice a week
  - Nighttime symptoms: ≤ twice a month night
- **Mild Persistent Asthma**
  - Daytime symptoms: > twice a week
  - Nighttime symptoms: > twice a month
- **Moderate Persistent Asthma**
  - Daytime symptoms: daily
  - Nighttime symptoms: >once a week
- **Severe Persistent Asthma**
  - continual day and nighttime symptoms (NHLBI, 2007)

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Possible Triggers & Avoidance Measures

- **Environmental tobacco smoke**
- **Pets**
- **Dust mites**
- **Exercise**
- **Aeroallergens**
- **Weather**
- **Foods**
- **Colds and infections**

(CDC, 2020a)

- Parents should quit smoking or at least smoke outside away from child
- Keep pets of out the bedroom
- Wash bedding weekly and use aeroallergen mattress / pillowcase covers
- Vacuum and wipe down baseboards regularly
- Use HEPA air filter
- Avoid any food triggers
- Warm up and cool down for exercise (may need pre-exercise SABA)
- Allergy medications PRN

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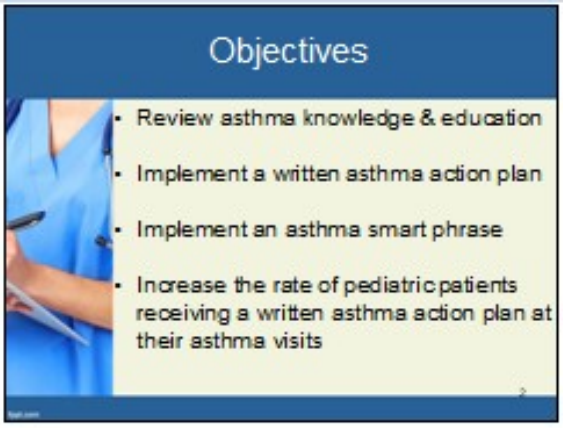
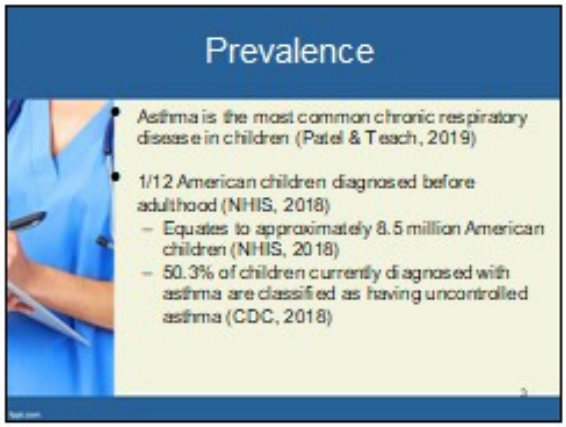
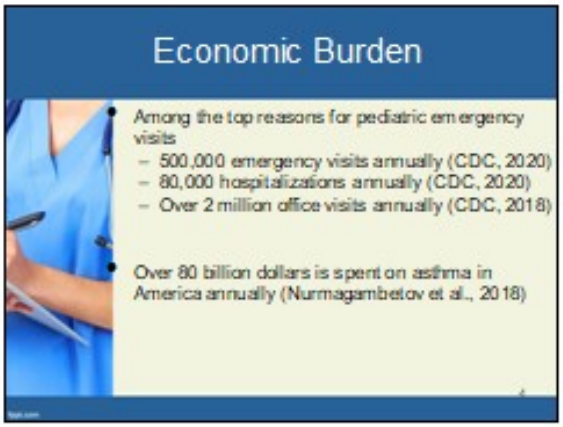
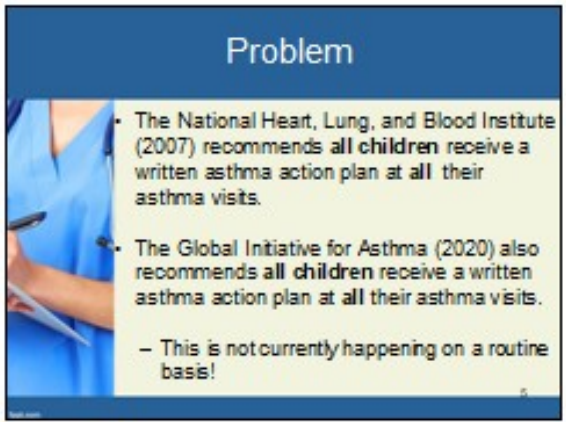
Appendix D

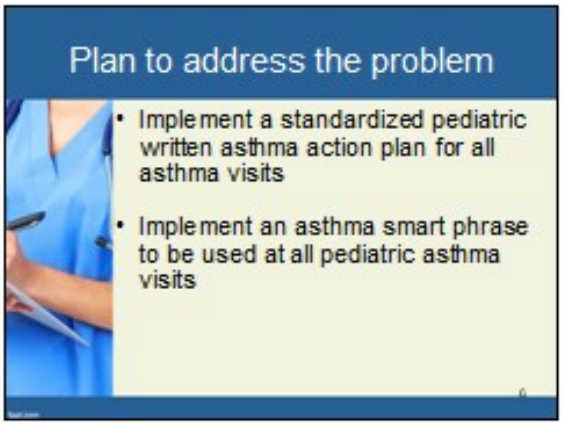
Presentation for Written AAP Implementation











Appendix C

Permission Letter

To,

Joshua Harrold

Pediatric Nurse Practitioner,

Touro University Nevada, Las Vegas, NV

December 20, 2020

Subject: Permission for Conducting Project

Dear Mr. Harrold,

I am pleased to inform you that Children's Urgent Care and Pediatric Clinic permits your project request for implementing an asthma action plan. Your initiative is appreciated, and we are will support the project to the best of our ability.

We wish you the best,

Jaganath Surpruse, MD

Owner & Medical Director

Printed Name of Academic Mentor	Date
Approval of DNP Project/practicum Course Instructor	Date
Printed Name of DNP Project/practicum Course Instructor	Date

- Make consistent progress towards completion of the DNP Scholarly project/practicum and to keep the PM and Project Team updated on their progress through submission of appropriate weekly Meditrek logs and communication with all parties on an as needed basis.
- Complete all project/practicum course assignments in a timely manner.
- Reach out to the PM with questions and for support as needed.

Responsibilities of the Academic Mentor and Project/Practicum Course Instructor

The Academic Mentor and Project/Practicum Course Instructor agree to:

- Maintain open communication with the PM and Student at all times.
- Schedule virtual meetings with the PM and Student at least once per session and as needed at other times.
- Review the weekly progress reports made by the student and identify and communicate issues that the committee must address.
- Support the student and the PM through availability and responsiveness to identified issues.

The overall DNP Project/Practicum experience is monitored and approved by the DNP Project/Practicum course instructor to meet the rigor and clinical requirements of said experience.

I agree to abide by the respective responsibilities stated above, both implicit and inferred.

Signature of PM — Date

Angela Marie Mike, DNP, CNM — 4Aug2020

Printed Name of PM — Date

Children's urgent Care & Pediatric Clinic

Project/practicum Site Name

3424 N Buffalo Drive / 1600 W Sunset Rd.

Project/practicum Site Address

702 233 0174 — 702 898 6400

Project/practicum Site Phone Number

08.14.2020

Project/practicum Site Contact Person & Email Address

8/3/2020

Signature of Student — Date

Joshua Harrod

Printed Name of Student

Promoting Asthma Action Plans in a Pediatric Primary Care Clinic: A Quality Improvement Proje

Title of DNP Scholarly Project/practicum

Signature of Academic Mentor — Date

Appendix B

Project Mentor and Site Contract Agreement

PM and Site Contract Agreement

The Project/Practicum Mentor (PM)

Purpose

Each student will identify an individual that has practice expertise in nursing leadership. The PM needs adequate content understanding in the area related to the DNP project/practicum and agrees to mentor the student throughout the program and provide guidance with development and implementation of the DNP project/practicum experience, under the supervision of the course instructor and academic mentor.

Qualifications

The PM must:

- Hold a doctoral degree (for example, Phd, EdD, or DNP) from a regionally accredited University and have adequate knowledge and/or expertise related to the DNP scholarly project. (The exception to this rule: DNP 756 the PM may hold a Master's degree).
- In addition the PM must have expertise within the realms of nursing leadership that is documented in a CV or resume. This document should be provided to the student who will submit it for review by the project/practicum course instructor.
- The PM must have a current unencumbered RN license in the state where the DNP Project/practicum will occur. Compact license is acceptable provided both the student and the PM are authorized to practice in the state where the project/practicum will take place.
- The PM may not be the student's supervisor.
- The PM must possess adequate technology skills to read and respond to emails, and to communicate with you in a timely fashion.

Responsibilities of the PM

The PM agrees to:

- Support the student throughout the program or sessions they agree to participate. It is preferred that the PM commit to working with the student throughout the program.
- Help the student gain access to practicum experience at the practice site where applicable.
- Troubleshoot issues that arise during the planning, implementation, and evaluation of the DNP project/practicum.
- Provide encouragement and support during the project/practicum phase of the student's education.
- Share expertise regarding the project/practicum topic.
- Meet in person or virtually with the student and the Project/practicum Team as needed throughout the students' academic career at TUN.
- Mentor the student towards successful completion of the identified DNP scholarly project and/or practicum experiences, under the supervision of the Project Team and/or course instructor.
- Coach, support, and mentor the student towards success as necessary, including obtaining necessary site approvals in the identified project/practicum setting.

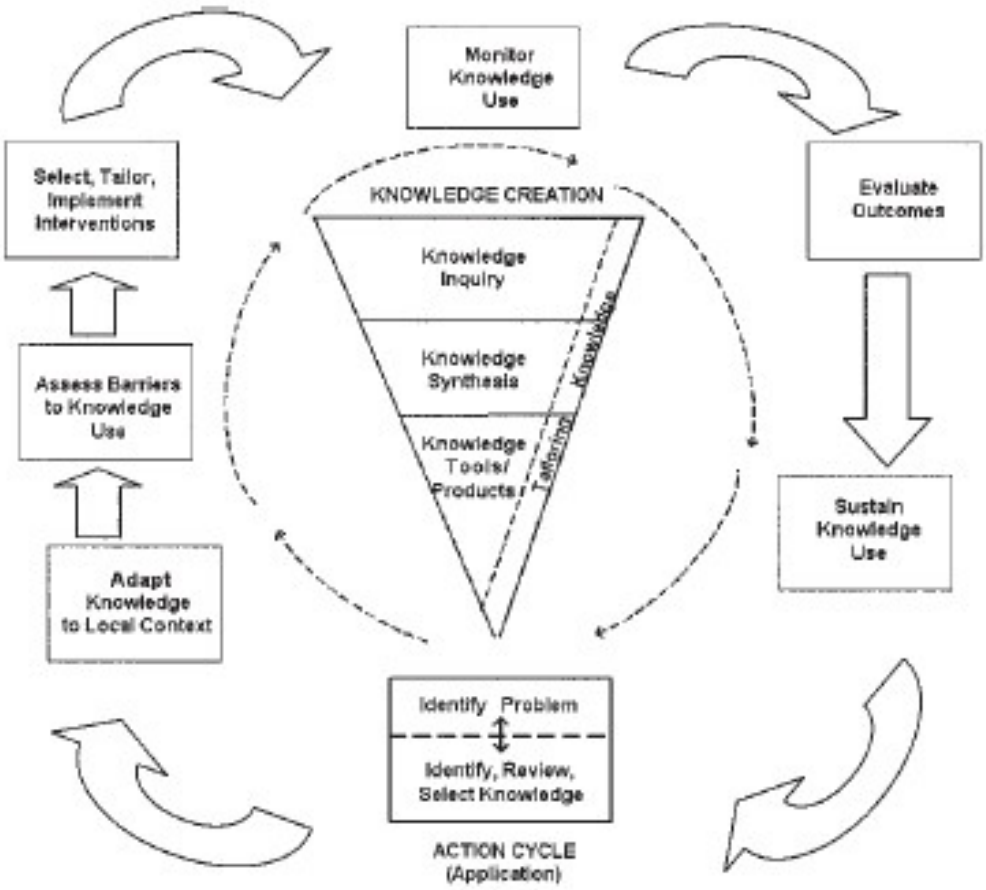
Responsibilities of the Student

The student agrees to:

- Utilize the time of the PM effectively and efficiently through effective communication and respect.
- Meet in person or virtually, with the Project Team at least as needed throughout the students' academic career at TUN.

Appendix A

The Knowledge-to-Action Framework



Note: (https://doi.org/10.102/chp.47)

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Post-implementation results showed a significant increase in provider asthma knowledge and the number of pediatric patients documented as receiving a written AAP at their asthma visits. This introductory project on implementing written AAPs may serve as a pilot for future QI projects and research studies. Further studies are necessary to examine the impact of receiving a written asthma plan on patient outcomes for pediatric asthma patients. As DNP-prepared nurses continue to translate research evidence and professional society guidelines into clinical practice, patients will receive the most effective care and the best possible outcomes.

already been enacted as the project site has adopted the use of the asthma smart phrase into their EHR and a pdf-fillable AAP template into their public access provider drive. The project lead will work with the project site owner to develop an asthma-related policy to add to their current policy and procedures handbook. To ensure continued use of the written AAPs at all pediatric asthma visits, the project lead will ensure all new-hire providers are given the asthma education PowerPoint. Additionally, the project lead will add a line item to the project site's monthly random chart audits they already perform. The project site currently randomly audits three charts per provider each month. This new line item will specifically ask if the patient seen had a diagnosis of asthma in the current encounters assessment. If yes, was it documented that a written AAP was provided. This will help sustain change as it will remind providers of the asthma action plan and its need at all pediatric asthma visits.

Conclusion

Asthma is the most common chronic respiratory illness in children (Patel & Teach, 2019). When managed appropriately, following evidence-based guidelines, asthma symptoms can be well-controlled (Murphy, 2009). However, more than 50% of children currently with asthma are classified as having uncontrolled asthma, and many are not receiving evidence-based care (Centers for Disease Control and Prevention, 2018b; Simon & Akimbi, 2016). The purpose of this DNP project was to educate providers on evidence-based pediatric asthma guidelines and implement a written AAP. At a pediatric outpatient clinic in Southern Nevada, the population of interest included four pediatric primary care providers who regularly manage asthma for children from birth to seventeen years of age. The project lead created an asthma education product to increase provider awareness of pediatric asthma guidelines and coupled this with an easy-to-use pdf-fillable standardized site-specific written AAP to facilitate provider use.

being enrolled for the pre/post-asthma education questionnaires. The same small sample size implemented the written AAP. The results would have been more impressive with larger sample size. For a more appropriate sample size, a census would need to be performed to find the number of pediatric providers practicing in the Las Vegas area. With this information, Cochran's Sample Size Formula could have been used to determine the appropriate sample size, but this would not have worked given the four-week implementation period (Pallant, 2013). The study design combined with the small sample size also required using the nonparametric McNemar's test instead of the initially sought-after parametric paired t-test (Pallant, 2013). Lastly, due to the short time frame, no patient outcomes, other than receiving a written AAP could be measured.

Dissemination

Dissemination of findings is an integral part of evidence-based practice (Hall & Roussel, 2017). According to Roger's Diffusion of Innovations Theory, when results are widely shared, there will be reduced uncertainty and increased innovation adoption (Chism, 2019). This QI project will be prepared as a PowerPoint presentation and delivered to Touro University Nevada faculty through Zoom online meetings on June 23, 2020. The QI project will also be submitted to the DNP repository. Additionally, the project lead will present the results of this QI project to the project site. Preparing a poster presentation for a conference such as the National Conference of Nurse Practitioners is another viable option for disseminating the results. Submitting this manuscript to peer-reviewed journals for publication, specifically pediatric and asthma-related journals would bring these results to providers working with the target population. This QI project may help serve as a model for similar clinics to enact this practice change.

Project Sustainability

A change management plan must be developed (Bemker & Schreiner, 2016). Change has

outcomes (Berenholtz et al., 2010). Ethical design and transparency, including study limitations, are essential for QI initiatives to ensure appropriate conclusions are drawn (Berenholtz et al., 2010). A significant limitation in the design of this project was the short time frame. With only a four-week implementation period one cannot know if patients would still be receiving written AAPs one year or even six months later. One cannot determine if compliance with newly implemented evidence-based guidelines may decrease over time.

Data recruitment was also biased, as the project lead had a pre-existing employee relationship with the project site, and the providers involved were not selected randomly. With this pre-existing working relationship providers may have been more enthusiastic about participating in the project or more likely comply with the newly implemented evidence-based guidelines than if the guidelines had been handed down from a superior without the asthma education presentation. Additionally, the providers chosen may not have been a complete representative sample of pediatric primary care providers and their typical practices regarding pediatric asthma as they were all employed at the same clinic.

Data collection was performed via chart audits, which are susceptible to human error. Chart tools were used to help decrease human error. Additionally, data collection was performed during a global pandemic, which caused a substantial decrease in patient visits when compared to one year prior. This decrease in the number of patients seen daily may have affected the implementation, as the providers had more time to spend with each patient. This increased time spent with each patient may have partially accounted for an increase in the percentage of patients receiving a written AAP compared to if they had been seen one year prior when the clinic was much busier, and the providers had less time to spend with each patient.

A limitation regarding data analysis was the small sample size, with only four providers

families with a written AAP at all of their asthma visits, many asthma-associated comorbidities can be decreased (Lakupoch et al., 2018). Nurses play a crucial in improving health outcomes for their patients by treating and educating them, implementing the most up-to-date evidence-based practice guidelines, and leading others to do the same (AACN, 2006). Throughout this DNP project, when given the appropriate facilitating education and tools to succeed, the providers drastically increased their provision of written AAPs to their pediatric asthma patients.

As leaders, DNP-prepared nurses must continue to implement evidence-based guidelines and advocate to improve the health outcomes of their patients (AACN, 2006). This DNP project exemplifies the powerful impact a doctorally prepared nurse can have on patient outcomes when acting as a change agent. Systems thinking and employment of interprofessional collaboration combined with promoting evidence-based practice guidelines and updated patient care technology resulted in a significant increase in the number of pediatric patients at the project site receiving evidence-based care. Although no other patient outcomes were measured at the project site or on this specific patient population, previous literature suggests that increased adherence to these guidelines and pediatric asthma patients receiving a written AAP may significantly decrease the number of ED visits, the number of unscheduled outpatient doctor visits, the number of days hospitalized, and the number of days of school absenteeism (Lakupoch et al., 2018). The findings of this study illustrate that nurses can be interdisciplinary leaders and enact change at the systems level through implementation of evidence-based policies to positive affect the lives of patients.

Limitations

Rigorous standards are necessary to determine if a QI project improves patient care

with a pre and post-asthma knowledge questionnaire. The asthma knowledge presentation reviewed current pediatric asthma evidence-based guidelines from GINA (2020) and NHLBI (2007), and a brief overview of the prevalence, economic burden, pathology, and management of pediatric asthma. Providers' scores on the asthma knowledge questionnaire increased significantly after the asthma education presentation with a mean score of 92.5%, which exceeded this project's objective of at least 80%.

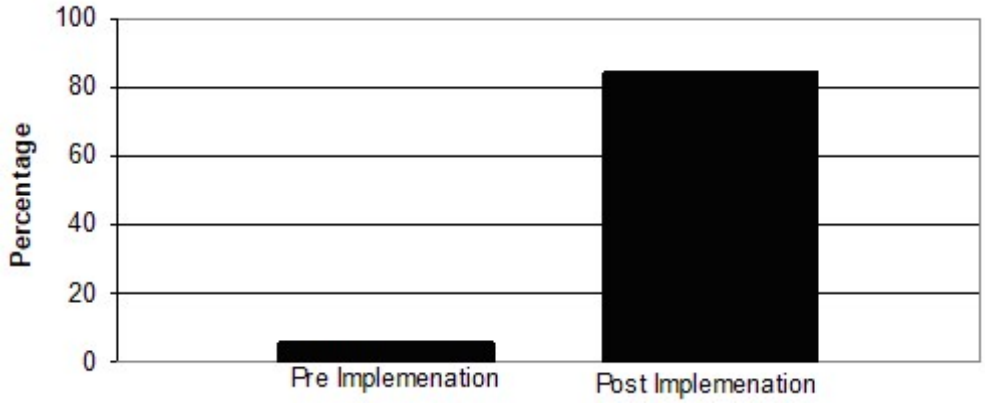
The project lead evaluated all pediatric asthma patient charts during the implementation period using a chart review tool. Charts were assessed to see if there was documentation that the patient had been provided a written AAP. There was a significant improvement in the number of patients documented as receiving a written AAP at their asthma visits during the implementation of the written AAP compared to the pre-implementation chart audits. The percentage of patients documented as receiving a written AAP increasing from 5.5% during the pre-implementation period to 84.6% during the post-implementation period, which was in line with the project objective of at least 80% of pediatric asthma patients receiving a written AAP at their asthma visits during the four-week implementation time-frame. These findings also coincided with previous studies that found asthma education that included national guidelines increased the use of written AAPs (Cabana et al., 2014; Lee et al., 2016).

Significance/Implications for Nursing

This project is significant to the profession of nursing because it addresses the care of asthma among children. Asthma is among the top three reasons for pediatric ED visits and childhood hospitalizations (CDC, 2020). Although pediatric asthma is a well-studied, manageable condition, it has a high economic burden, mortality, and morbidity (Patel & Teach, 2019). However, with proper care and following evidence-based guidelines, such as providing

Figure 2.

Percentage of Written Asthma Plans Provided Pre/Post-Implementation



Discussion of Findings

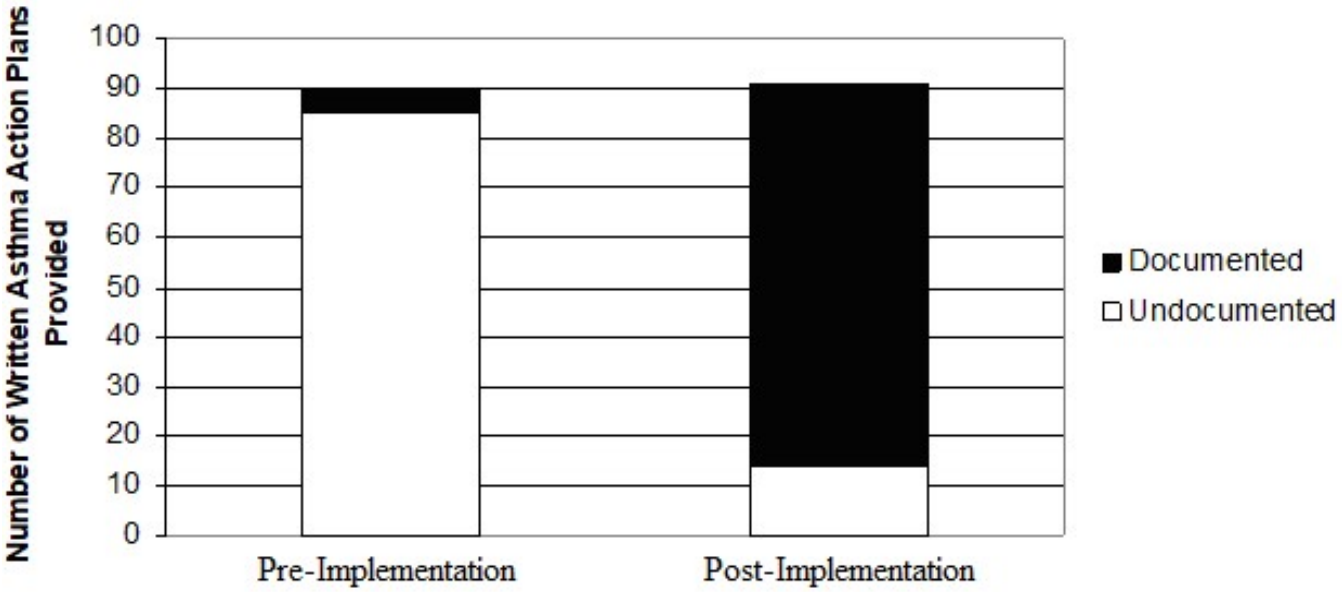
A site-specific written AAP was implemented by four providers for six weeks at the project site to increase the number of asthmatic children from birth to 17 years old receiving a written AAP at their asthma visits. This aligns with GINA (2020) recommendations and the NHLBI (2007) that all children should receive an up-to-date written AAP at all of their asthma visits. In a survey of Canadian physicians, Djandi et al. (2017) found having a blank asthma action plan template was a highly endorsed facilitator to using a written AAP, so in addition to the written AAP, a smart phrase was added to the EHR to increase ease of use and documentation by providers.

Prior to implementation, providers attended an asthma education PowerPoint presentation

The implementation of provider asthma education paired with the use of a standardized, site-specific asthma action plan increased the number of children documented to have received a written AAP at their asthma visit (see Figure 1.) The percentage of children who received a written AAP increased from 5.5% during the pre-implementation period to 84.6% during the post-implementation period (see Figure 2). This was in line with the project objective of improving provider compliance with national standards for pediatric asthma care by increasing the rate of pediatric asthma patients receiving a written AAP at their asthma visits to at least 80% within the four-week implementation time-frame. Initially, at the recommendation of a statistician, a paired-samples t-test would be used for this comparison. However, since the data was nominal, and not continuous, a McNemar's test was used instead. It was designed for this specific situation in which the dependent variable is dichotomous (answers are yes/no) (Pallant, 2013).

Figure 1.

Written Asthma Action Plans Provided Pre/Post-Implementation



	N	Minimum	Maximum	Mean	Std. Deviation
Pre Asthma Education	4	50	80	65.00	12.910
Post Asthma Education	4	80	100	92.50	9.574

Prior to implementation, the project lead conducted a chart review for the previous six months to ensure an adequate number of pediatric asthma patients were being seen at the project site in order to determine if statistical analyses could be performed. During the four-week post-implementation the practice site served 535 pediatric patients, 91 of which had an asthma diagnosis. The project lead extracted 91 consecutive asthmatic patients' charts preceding the post-implementation for pre-implementation comparisons.

A McNemar's test was conducted to evaluate the impact of an asthma education presentation combined with the use of a standardized site-specific written AAP on the number of pediatric asthmatic patients receiving a written AAP at their asthma visits. This nonparametric test assumes there is one nominal dichotomous variable collected from the participants at different time points (Pallant, 2013). There was a statistically significant increase in the number of children who were documented as receiving a written AAP following the asthma education presentation when compared to pre-implementation chart review, $p < .05$ (2 sided) (see Table 4).

Table 4.

Statistical Comparison of Written Asthma Action Plans Provided Pre/Post-Implementation

Chi-Square Tests

	Value	Exact Sig. (2-sided)
McNemar Test		.000[a]
N of Valid Cases	91	

a. Binomial distribution used.

indicated a large effect size. Providers' asthma knowledge questionnaire scores increased after the asthma education seminar (See Table 2). The mean score increased from 65 before the asthma education presentation to 92.5 after the asthma education presentation (see Table 3). This was in line with the project objective to educate providers on pediatric asthma guidelines, with providers scoring at least an 80 on the post-test. Question one, two, and five had the greatest improvement from incorrect to correct after the asthma education presentation. All provider got questions three, four, eight, nine, and ten correct pre and post-asthma education.

Table 1.

Statistical Comparison of Asthma Knowledge Questionnaire Scores Pre/Post-Asthma Education

Paired Samples Test

	Paired Differences							
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pre-Asthma Education vs Post-Asthma Education	27.500	5.000	2.500	19.544	35.456	-11.0	3	.002

Table 2.

Asthma Education Questionnaire Scores Pre/Post-Asthma Education

Pre-Implementation	Post-Implementation
50	80
80	100
70	100
60	90

Table 3.

Pre/Post-Asthma Education Descriptive Statistics

the same group of providers' pre/post-implementation. For a paired t-test to be used, certain assumptions must be met. These assumptions include the dependent variable is measured on a continuous scale, and the scores are obtained from a random sample of the population (Pallant, 2013). The scores must be independent of one another, there should be a normal distribution of scores, and the scores are obtained from populations of equal variances (Pallant, 2013).

IBM SPSS Statistics (Version 27) predictive analytics software will be used to perform statistical analysis. A statistician will not be hired. However, a statistician, Dr. Murukutla, faculty at Touro University Nevada has been consulted, reviewed my statistics plan worksheet (appendix L), and has recommended the above statistical analyses for this quality improvement project and confirmed all of the assumptions had been met for the proposed statistical analyses.

Analysis of Results

The week prior to implementation, four providers took the asthma knowledge questionnaire. The providers then watched the asthma education presentation and retook the asthma knowledge questionnaire immediately after. A paired-samples t-test was conducted to evaluate the impact of an asthma education presentation on the providers' asthma knowledge questionnaire scores. This test assumes the dependent variable was measured on a continuous scale, and the scores were obtained from a random sample of the population (Pallant, 2013). The scores must be independent of one another, there should be a normal distribution of scores, and the scores were obtained from populations of equal variances (Pallant, 2013). There was a statistically significant increase in the asthma knowledge questionnaire scores from pre-education ($m = 65$, $SD = 12.91$) to post-education ($m = 92.5$, $SD = 9.57$, $t(3) = -11$, $p < 0.05$ (Two-tailed) (see Table 1). The mean increase in asthma knowledge questionnaire scores was 27.5 with a 95% confidence interval ranging from 19.54 to 35.46. The eta squared statistic (0.98)

education.

The plan for analyzing scores on the asthma knowledge questionnaire pre and post-tests will include both descriptive statistics and statistical tests. The mean score on both the pre and post-tests will be calculated, and the post-test score will be compared to the pre-test. Knowing the mean score of each group will determine if there was an increase in scores and if an average post-test score of at least 80% was met. In order to determine if there was a significant difference in the pre/post-test scores, a paired t-test will be used to compare the means of the two groups of test scores. A paired-samples t-test was chosen because it will compare the mean scores for the same group of people on the same test, but on two different occasions, to determine if the difference in scores is significant (Pallant, 2013). For a paired t-test to be used, certain assumptions must be met. These assumptions include the dependent variable is measured on a continuous scale, and the scores are obtained from a random sample of the population (Pallant, 2013). The scores must be independent of one another, there should be a normal distribution of scores, and the scores are obtained from populations of equal variances (Pallant, 2013).

The plan for analyzing the success of AAP implementation will include both descriptive statistics and statistical tests. The descriptive statistic used will be the percentage of children who receive a written AAP during the five-week implementation period, with the goal of 80%. For a determination to be made if there was a significant difference in the number of written AAPs being provided before and after implementation, a paired t-test will be used to compare the mean number of children who received a written AAP in both groups. A paired t-test was chosen because it will compare the mean number of children receiving a written AAP before and after intervention implementation and determine if there was a significant change in the proportion of children receiving a written AAP at their asthma visits. This test can be used because it will be

Any chart that includes an ICD 10 diagnosis code of asthma will be reviewed in-depth to determine if a written AAP was provided to the patient and added to the chart review tool accordingly. Only the number of asthma patients seen and whether they received a written AAP or not will be recorded onto the chart review tool for continued aggregation. No patient identifying information will be saved or recorded. This will ensure the privacy and confidentiality of the participants are protected.

Ethics/Human Subjects Protection

The project lead submitted Institutional Review Boards (IRB) determination forms per Touro University Nevada policy. This project will be considered a quality improvement project which will not require IRB review. IRB is also not needed for the project site. Asthma education, including providing a written AAP to all pediatric asthma patients is considered a clinical standard of care by GINA (2020) and NHLBI (2007). There are no direct risks for participants in this project. Potential benefits include the clinic will now have a standardized written AAP. Patients may benefit from receiving this asthma self-care management tool. They may have a reduced number and severity of asthma exacerbations and associated complications such as missing school or family members missing work. Lunch will be provided during the education seminar as an incentive for attendance, and there will be no other compensation for attendance. No ethical issues or conflicts of interest have been identified for this project.

Measures/ Plan for Analysis

This QI project will use a pre/post chart review design to evaluate the educational training's effectiveness coupled with a standardized written AAP and EHR smart phrase on the provision of written AAPs to pediatric asthma patients at their asthma visits. It will also assess provider scores on an asthma knowledge questionnaire before and after receiving asthma

pediatric asthma guidelines, the chart review tool, the asthma smart phrase, and the components of an asthma action plan. The project lead will guide the training with the use of PowerPoint and will encourage participation and feedback from the providers. The PowerPoint was approved by the project team and will be reviewed by a content expert for validation.

SPSS Software

IBM SPSS Statistics (Version 27) predictive analytics software will be used for all statistical analyses and all statistical analyses will be performed by the team lead. This tool has been validated by IBM and permission to use this tool was granted by purchasing a one-year subscription from IBM. IBM SPSS Statistics is the world's leading statistical software used for both business and research applications to understand data, analyze trends, validate assumptions, and reach valid conclusions (IBM, 2020).

Study of Interventions, Data Collection

Pre/post-Education Test Questionnaire

For pre and post asthma education tests, the pre-test will be given immediately before the asthma education seminar and collected by the project lead immediately upon completion in a manila folder labeled "pre-tests". The post-test will be given directly after the asthma education seminar and collected by the project lead upon completion in a manila folder labeled "post-tests". The goal for the post-test is for all providers to score at least an 80%. Names are not required to be on the tests to ensure provider privacy, as the individual scores will be aggregated to find the mean of each group.

EHR Chart Audit

The clinic EHR will be utilized for chart audits. The project lead will perform the chart audits at the project site. This search will be conducted by reviewing all patient charts each week.

to determine if there is a significant change in their asthma knowledge scores. The asthma knowledge questionnaire will test basic knowledge of the prevalence and economic burden of asthma as well as comprehension and ability to apply the new asthma smart phrase and standardized written AAP to daily practice.

To determine the asthma knowledge questionnaire's validity, it was sent to a content expert and two members of the project team to have each question's relevance rated (appendix J) on a four point scale where 1 = Not relevant at all, 2 = Slightly relevant, 3 = Moderately relevant, and 4= Highly relevant (Polit & Beck, 2006). Then an item content validity index (CVI) (Appendix K) is computed for each question (Polit & Beck, 2006). The item content validity index (I-CVI) is the number of raters giving that question a score of a three or a four on the above scale, divided by the total number of experts, which gives the proportion of raters in agreement about the relevance of each question (Polit & Beck, 2006). Every question on this questionnaire was rated as a four by all three judges, therefore the I-CVI for each item was 1.0, which suggests the questions are relevant and is inline with the recommendation that with a panel of five or fewer experts the I-CVI should be 1.0 (Polit & Beck, 2006).

Asthma Knowledge Test Review Tool

An asthma knowledge test review tool was constructed by the project lead to track providers' scores on the asthma knowledge questionnaire before and after receiving asthma education. All pre-implementation and post-implementation test scores will be recorded on this tool. This tool will assist with tracking data for statistical analysis. The asthma knowledge test review tool was approved by the project team and reviewed by a content expert for validity.

Education Materials

The project lead developed training materials for staff. The training materials covered

this tool as it was composed by the project lead.

Chart Review Tool

A chart review tool was designed by the project lead to evaluate the providers' compliance with providing a written AAP at all asthma visits. This tool will assist with tracking data for statistical analysis. The chart review tool will be used to record the number of children ages 0-17 with a qualifying asthma diagnosis, and whether or not they were provided with a written AAP. The chart review tool was reviewed by the project team and discussed with a content expert for validation; it was also approved at the project site by stakeholders.

Asthma Smart Phrase

An asthma smart phrase was generated by the project lead. The smart phrase will be embedded into the clinics EHR for ease of use. The smart phrase includes key components of asthma education recommended by the NHLBI (2007). Using the smart phrase will ensure that when charts are audited the provision of a written AAP can be recorded correctly. The smart phrase also helps to ensure the providers cover all areas of asthma education. The smart phrase was reviewed by the project team and discussed with a content expert for validation; it was also approved at the project site by stakeholders.

Asthma Knowledge Questionnaire

A ten item multiple-choice asthma knowledge questionnaire was developed by the project lead. Each question is worth ten points; therefore, scores on the asthma knowledge questionnaire can range from 0 to 100. There will be no pass or fail for these questionnaires as they will be anonymous. The asthma knowledge questionnaire is to be given to the providers immediately before and after the asthma education presentation. The asthma knowledge questionnaire will be used to compare the providers' asthma knowledge before and after the asthma education seminar

analysis will be performed to evaluate the results using IBM SPSS Statistics (Version 27) predictive analytics software. The team lead will be available in person each week during chart audits, or via phone and email anytime to field any questions or concerns throughout implementation. The evaluation results will be disseminated to stakeholders via a debriefing presentation upon project completion.

Tools

Tools were developed and/or utilized for this DNP project. Tools include a standardized written AAP, a chart review tool, an asthma smart phrase, an asthma knowledge questionnaire, an asthma knowledge score review tool, educational materials in PowerPoint format, and IBM SPSS Statistics (Version 27). Each tool is described in further detail below.

Asthma Action Plan

A standardized written asthma action plan was created by the project lead. This tool was created using the Connecticut Department of Public Health's (2020) asthma action plan as a template. It includes elements of daily management including medications, how to avoid asthma triggers, how to recognize and handle worsening asthma symptoms, and who to contact in case of an exacerbation as recommended by the American Lung Association (ALA) (2020). It also includes three color-coded zones that are symptom based as recommended the NHLBI (2007). The green zone means no asthma symptoms are present and details routine maintenance medications that should be taken daily (Patel & Teach, 2019). The yellow zone will provide instructions for self-care during a mild exacerbation (Patel & Teach, 2019). The red zone will provide instructions for management of an acute severe exacerbation (Patel & Teach, 2019). The asthma action plan was reviewed by the project team and discussed with a content expert for validation; it was also approved at the project site by stakeholders. No permission was needed for

required for project implementation. The clinic owner has approved the project site with a signed site agreement (Appendix B) and has also provided a written permission letter for the quality initiative (Appendix C).

Interventions

During the first week of project implementation, the project lead will hold one asthma education seminar at each of the project sites' two clinics for all of the providers. The asthma education (Appendix D) provided will include a brief synopsis of the pathophysiology, prevalence, and economic burden of asthma. Pediatric asthma guidelines from GINA and NHLBI will be reviewed, with special focus on the provision of an asthma action plan and its main elements. The new standardized written AAP (Appendix E) will be reviewed in detail as well as best practices. There will be an explanation of the new asthma smart phrase (Appendix F) that has been built into the EHR and how to use it appropriately. Finally, the asthma chart review tool (Appendix G) will be reviewed, so the practice site can continue auditing charts after the project has ended if desired. During project implementation the chart review tool will be stored on the project leads personal computer, and only the project lead will have access. For continuity, the chart review tool will be uploaded to a shared folder at each clinic. There will be an asthma knowledge pre-test and post-test (Appendix H) given immediately before and after the education materials are presented. The project team lead will record scores on an asthma knowledge test review tool (Appendix I) so that statistical analysis can be performed on the data. There will be no remediation as the pre/post test scores will be anonymous.

At the end of each week for the subsequent five weeks, the project lead will perform post-implementation chart audits and record the results on the chart review tool. At the end of the five week implementation period the chart review tool will be reviewed and appropriate statistical

Stakeholders with an interest in this project will be the asthma patients, pediatricians, nurse practitioners, the clinic owner, medical assistants, front-office staff, and medical coders. Asthma patients may benefit from this project by receiving a written AAP at all of their asthma visits. Patients may be more likely to properly follow their medication regimens and better self-manage their asthma symptoms, and hopefully have less exacerbations. (Ducharme et al., 2011). The pediatricians and nurse practitioners will be vested by providing a written AAP to their asthma patients. The providers will be increasing their compliance with evidence-based guidelines and the quality of care delivered. The owner is vested in the project. In order to best serve the community, it is the pediatric clinic's responsibility to ensure the most up-to-date guidelines are being followed. The front-office staff, medical coders, and medical assistants are also vested. The better the clinic performs, by providing up-to-date, evidence-based, quality care the more likely that established and new patients will continue to utilize the clinic, resulting in job security. All of the staff have been informed and agreed to participate. The identified stakeholders are involved with the pediatric clinic and will be affected by the provider asthma education and implementation of a written AAP. All members of the clinic will work together collaboratively working to their full scope of practice to help ensure safe, effective, patient-centered quality care (AACN, 2006). All of the aforementioned stakeholders can be positively impacted by this project as well as other members of the healthcare community including hospitals, healthcare organizations, and health insurance companies. Lackupoch et al. (2017) found the provision of a written AAP significantly decreased emergency department visits, the number of unscheduled outpatient doctor visits, the number of days hospitalized, and school absenteeism when comparing pre/post implementation of written AAP. The project lead will maintain appropriate communication with key stakeholders and staff to prepare the resources

provides well-child visits, immunizations, sick visits, asthma treatment, and other health services for the pediatric population from newborn to seventeen years of age. The population served includes approximately 60% Caucasians, 25% Hispanics, 10% African Americans, and 5% Middle Eastern, Asian, and other. The clinic utilizes an electronic health record (EHR), e-clinical works. The two offices combined serve approximately 30-40 patients per day.

Population of Interest

The direct population of interest is the four pediatric providers who will receive asthma education and implement the use of a standardized, site-specific written AAP. At the time of the project, the clinic was supported by four providers including two board-certified pediatricians and two family nurse practitioners. The inclusion criteria are providers currently employed by the clinic who have agreed to participate in the QI project. Pediatricians could be a medical doctor (M.D) or doctor of osteopathy (D.O). Nurse practitioners need to be certified as either a pediatric nurse practitioner (PNP) or a family nurse practitioner (FNP). The two pediatricians and two board-certified family nurse practitioners who currently work for the pediatric clinic and have agreed to participate in the QI project, for a total of four providers who will be included. They are all employed full-time. Exclusion criteria would be any providers who did not agree to participate, and all staff who are not providers such as the front desk, medical assistants, billing specialists, etc.

The indirect population of interest is the providers' patients. Inclusion criteria include patients from birth to seventeen years of age seen during the five week implementation period who have an ICD10 diagnosis of asthma. Exclusion criteria include children with no history of asthma.

Stakeholders

towards the knowledge. Instrumental use describes an actual change in behavior or practice (Graham et al., 2006). To monitor the conceptual use of knowledge, pre and post asthma education tests will be administered to staff to determine if there has been a change in their knowledge and understanding of pediatric asthma guidelines and recommendations. To monitor instrumental use, each week, charts will be audited to evaluate the use of the asthma smart phrase to determine if pediatric asthma patients are receiving a written AAP at their asthma visits.

Evaluate Outcomes. In this step, outcomes need to be measured to determine if the application of knowledge actually makes a difference (Graham et al., 2006). At the end of the five week DNP project time line all pediatric asthma visit charts will be audited to determine the percentage of patients who received a written AAP at their asthma visit after implementing provider education and a standardized site-specific written AAP template. The rates of pediatric asthma patients receiving a written AAP will be compared to the rates pre-implementation to determine whether the efforts to promote pediatric asthma guidelines were successful.

Sustain Knowledge Use. In this step, a feedback loop that cycles through the action phases should be set in place (Graham et al, 2006). To sustain knowledge use, all new providers will receive the asthma education seminar with pre and post tests as well as access to the standardized site-specific written AAP and the asthma smart phrase. Current staff will also go through the asthma education annually, without pre and post tests. Additionally, biannual chart audits will be executed to continually assess the rates of pediatric asthma patients receiving a written AAP at their asthma visits.

Setting

The project setting is a privately owned, medium-sized, two-office, pediatric primary care clinics in Southern Nevada that sees approximately 12,000 patients annually. The clinics

visit at the practice site. Barriers included the practice site not having a standardized site-specific written AAP template available for use. There was no protocol in place for asthma visits. Providers may think it takes too much time to fill out a written AAP. Additionally, there was no site-wide pediatric asthma education, so it was unknown if all the providers were aware of current pediatric asthma guidelines, including to provide a written AAP at every asthma visit. Facilitators identified included the practice site using an electronic medical record (EMR).

Select, Tailor, Implement Interventions. During this step, there is planning, developing, and implementing of interventions to facilitate the uptake and implementation of new knowledge (Graham et al., 2006). For this DNP project three interventions have been chosen. One is providing a multidisciplinary asthma education seminar to the staff to increase their asthma knowledge, including education on practice guidelines including the provision of a written AAP to all pediatric asthma patients at all of their asthma visits. Another intervention is creating a standardized, site-specific written AAP to facilitate ease of use by providers. Finally, a smart phrase will also be added to the EHR. A smart phrase is a pre-defined text template that can be entered into the treatment section of a provider's note based on a specific diagnosis code, such as asthma, wheezing, etc. The smart phrase will include elements such as when they are due for their next asthma visit, and that they were counseled and educated on asthma, and that a written AAP was provided to the family. This smart phrase will be added to help prompt providers to follow the guidelines, and also make it so they can conveniently document their asthma visits and provision of a written AAP to their patients.

Monitor Knowledge Use. During this step, it is determined if the new knowledge is being used (Graham et al., 2006). Knowledge use can be monitored multiple ways. Conceptual use of knowledge describes a change in the level of knowledge, understanding, or attitudes

action cycle focuses on knowledge application and implementing the products of the knowledge creation phase, such as evidence-based guidelines into clinical practice (Graham et al., 2006). Therefore, only the major tenets of the action cycle will be reviewed for applicability to this DNP project.

Major Tenets

Identify Problem; Identify, Review, Select Knowledge. During this step, a problem or issue that deserves attention is identified and knowledge or research that might address the problem is searched and appraised (Graham et al., 2006). The project team lead identified a pediatric primary care clinic in Southern Nevada where asthma patients were not receiving a written AAP at their asthma visits. The project team lead performed a literature review of current pediatric asthma practice guidelines, as well as primary studies on the use of a written AAP including their effectiveness, and facilitators and determinants to their use in every day practice. The articles were critically appraised and it was determined there was in-fact a knowledge-practice gap that needed to be filled.

Adapt knowledge to Local Context. During this step, knowledge discovered on the problem identified is reviewed in the local context to determine its value, usefulness, and appropriateness to a specific setting and circumstances (Graham et al., 2006). To adapt the knowledge to this pediatric primary care clinic in Southern Nevada, the project team lead met with the primary stakeholder of the clinic, the owner. The lack of patients receiving a written AAP was discussed and they agreed there was a knowledge-practice gap that should be rectified.

Assess Barriers to Knowledge Use. During this step, the practice site is assessed for both facilitators and barriers of knowledge uptake and use (Graham, et al., 2006). The project team lead identified barriers and facilitators to using a written AAP for every pediatric asthma

guidelines (Graham et al., 2006). The action cycle is a planned processed approach of implementing knowledge products or guidelines into practice at a specific site with adaptations as necessary to fit their context (Graham et al., 2006). The knowledge creation and action cycle components of the KTA framework may be used by both knowledge-creators and knowledge-implementers simultaneously, working collaboratively throughout the process, or the model can be used by the groups at different points in time (Graham et al., 2006).

Historical Development of the Framework

The KTA framework was introduced by Graham et al. (2006) to help address the confusion and misunderstandings associated with multiple terms and labels associated with translating knowledge and best evidence into a practice setting. Graham et al. (2006) realized the translation of research findings into practice is often a very slow process, and that standardizing a systems level, bidirectional approach could help decrease the lag time between knowledge acquisition and its use in practice. The KTA framework builds on theories of planned action while promoting the importance of local context as a focus for adapting knowledge into a specific setting (Reavy, 2016). Since its inception, a citation analysis and systematic review of the literature from 2006 to 2013, Field et al. (2014) found 146 studies that described using the KTA framework to implement projects. These projects were quite diverse, and Field et al. (2014) found the KTA framework to be used across multiple disciplines of medicine including nursing and public health, with target audiences ranging from health professionals and policy makers, to the general public.

Application to DNP Project

The KTA framework, specifically the action cycle is very applicable to quality improvement initiatives such as the DNP project. The KTA framework is often used because the

patients receive a written AAP at all of their asthma visits. The aim of this DNP project is to increase the rate of pediatric asthma patients receiving a written AAP at their asthma visits in a pediatric primary clinic in Southern Nevada to at least 80%.

Project Objectives

In the five week timeframe of this DNP Project, the host site will:

1. Implement an evidence-based pediatric asthma guideline to provide pediatric asthma patients with a written AAP at all of their asthma visits.
2. Educate providers on pediatric asthma guidelines and how to use a written AAP through a training seminar with a pre/post knowledge test, with providers scoring at least an 80% on the post-test.
3. Develop a standardized site-specific written AAP to facilitate ease of use by providers.
4. Implement a pediatric asthma smart phrase in the EHR to facilitate ease of use by providers.
5. Improve provider compliance with national standards for pediatric asthma care by increasing the rate of pediatric asthma patients receiving a written AAP at their asthma visits to at least 80% within a four-week implementation time-frame.

Conceptual Framework

The conceptual framework that will guide this DNP project is the Knowledge-to-Action (KTA) framework, originally proposed by Graham et al. (2006). The KTA framework promotes how to move the best available evidence into the current practice setting (Reavy, 2016). The KTA framework is comprised of two main components: Knowledge Creation and the Action Cycle (see Appendix A) (Graham et al., 2006). Knowledge creation describes the processes of refining primary research through literature synthesis into applicable knowledge products, or

NHLBI (2007), pediatric asthma, and its morbidity, is still a significant public health concern (CDC, 2020). Both GINA (2020) and NHLBI (2007) include the provisions that a written AAP should be given to all pediatric asthma patients, yet, at an outpatient pediatric clinic in Southern Nevada, providers are failing to deliver their pediatric asthma patients with a written AAP at each asthma visit. Djandi et al. (2017) and Simon & Akimbi (2016) also found this is not happening for the majority of patients. Djandi et al. (2017) speculated there was a low awareness of the national guidelines recommending they provide a written AAP at each visit, as most of the physicians surveyed were interested in attending a training session on how to effectively complete and explain a written AAP. Additionally, Djandia et al. (2017) speculated that not having electronic access to a standardized template was a barrier to providing a written AAP to their asthma patients.

Therefore, this specific outpatient pediatric clinic in Southern Nevada failing to provide a written AAP to their patients may be due to a lack of pediatric asthma guidelines knowledge and or not having a clinic specific written AAP template to facilitate ease of use. It is prudent to reduce the overall asthma morbidity and its economic burden by providing healthcare providers with increased asthma education while prioritizing facilitators to increase their distribution of written AAPs (Borgmeyer et al., 2017; Cabana et al., 2014; Djandi et al., 2017; Lee et al., 2016). These actions will be implemented at said pediatric clinic and may increase providers' asthma knowledge and compliance with GINA (2020) and NHLBI (2007) recommendations of providing written AAPs to all their pediatric asthma patients, which may increase patients' quality of life, and also reduce the economic burden of pediatric asthma simultaneously.

Project Aims

GINA (2020) and NHLBI (2007) pediatric asthma guidelines recommend all pediatric asthma

included that it was a multi-center study in diversified regions of the U.S. with a large sample size and there was not much patient drop off from baseline interviews to follow-up one year later, only 16% (Cabana et al., 2014). Limitations included not knowing exactly what part of the education was most successful in impacting outcome measures, and due to the fact that physicians needed to agree/volunteer to the study they may have already had an interest in asthma and been more likely to incorporate the education they receive than if it was forced upon a general sample of physicians (Cabana et al., 2014).

This data suggests that healthcare provider asthma education can lead to increased confidence in teaching families about asthma, to include written AAPs, and increase their use of written AAPs (Borgmeyer, et al., 2017; Cabana et al., 2014; Lee et al., 2016). This increased confidence and use of written AAPs increases compliance with GINA (2020) and NHLBI (2017) guidelines and may also increase the quality of life of their patients by decreasing their asthma symptoms and healthcare utilization such as ED visits. (Cabana et al., 2014).

Addressing the Problem with Current Evidence

Although GINA (2020) and NHLBI (2017) have numerous pediatric evidence-based asthma guidelines available, half of pediatric patients with asthma are still considered to have uncontrolled asthma (CDC, 2018b). Asthma related costs for the U. S. are over $80 billion yearly (Nurmagambetov et al., 2018). Yet, asthma can be well-controlled, if the families have the right tools and education (Murphy, 2009). Part of this tool-set is having a written AAP so caregivers know what medications to take daily, how to determine symptom control, and how to self-manage low acuity asthma exacerbations at home (GINA, 2020; NHLBI, 2007).

Contextual Evidence

In spite of decades of evidence-based guidelines, specifically from GINA (2020) and

2016). Lee et al. (2016) found that readily providing NLHBI (2007) pediatric guidelines significantly increased the distribution of written AAPs to patients from 29% to 65%.

Cabana et al. (2014) conducted a RCT in ten different regions of the U.S. to assess physician asthma care education on pediatrician's communication skills and their patients' subsequent healthcare utilization for asthma. One hundred one pediatric primary care physicians participated, 53 in the intervention group, and 48 in the control group (Cabana et al., 2014). Randomization was accomplished by site, based on a coin toss rather than by physician, so physicians at five sites received the intervention and physicians at the other five sites were controls. Patients were eligible for the study if they were between the ages of 2-12, a patient of a study physician, and had no other diseases associated with pulmonary complications (Cabana et al., 2014). Using a random number generator 2300 patients were selected to be contacted, of these, 882 patients were ineligible (Cabana et al., 2014). Cabana et al. (2016) conducted baseline interviews with 870 of the 1418 randomized patients who were eligible, of which 418 were assigned to intervention, and 452 were assigned to control. One year later Cabana et al. (2014) were able to complete follow-up with 731 of these patients, 363 of which were in the intervention group, and 368 were in the control group. Using *t* tests, Chi squared tests, and Fischer's exact test to detect differences in on demographic and practice variables between control and intervention groups Cabana et al. (2014) found there was significant improvement in the number of days limited by asthma as well as a significant decrease in ED usage by patients of physicians who attended the physician asthma care education intervention. Strengths of this study were that both patients and physicians were randomized, specifically they randomized physician education by site instead, which limits the possibility of physicians inadvertently sharing education they learned with fellow colleagues at the same site (Cabana et al., 2014). Additional strengths

survey to 838 physicians in Quebec, Canada, 90 of who were found to be ineligible due to leaving practice or not seeing asthma patients and received completed questionnaires from 421 physicians. In this sample, barely 5% of physicians reported routinely administering written AAPs to asthmatic patients. Djandi et al. (2017) found facilitators highly endorsed by surveyed physicians included patients requesting a written AAP, having a blank template attached to the patient's chart, having a consultant pre-fill out the AAP, receiving monetary compensation for its completeness, and having another healthcare professional explain the AAP after being written by the physician. Limitations of this study were that it was only sent to physicians in one city, the target sample size was not reached, so some analyses may have been underpowered, and responders may have been biased towards asthma and that is why they decided to complete the survey (Djandi et al., 2017). Strengths of this study were that surveys were sent at random, and although they did not meet their target sample size, there was a relatively large sample size for one city (Djandi et al., 2017). This data suggests that a quality improvement project that prioritizes facilitators established by Djandi et al. (2017) may increase physician compliance with GINA (2020) and NHLBI (2007) recommendations for all asthma patients to receive an individualized written AAP.

Asthma Education for Healthcare Providers

To assess the effects of asthma education on providers' use of written asthma action plans three studies were reviewed. These studies consisted of one quasi-experimental pretest-posttest study, one randomized controlled trial, and one quality improvement project. Asthma education for health care providers has been shown to increase their confidence in teaching families about the written AAP (Borgmeyer, et al., 2017). Additionally asthma education including national guidelines has been shown to increase the use of written AAPs (Cabana et al., 2014; Lee et al.,

ED visits, or asthma quality of life when compared to standard education without a written AAP.

Khan et al. (2013) measured the number of ED visits, acute asthma attacks, missed school days, night-time waking, and unscheduled doctor visits in a RCT where the intervention group, 45 children, received a written AAP in addition to standard asthma education. The control group, 46 children, received standard education alone without a written AAP. Khan et al. (2013) found children who received a written AAP had a decreased rate of all measured outcomes when compared to the control group, but it was not a significant decrease when compared using a chi squared test to calculate the difference between proportions and the Mann-Whitney U-test for the comparison of means between the two groups. Comparison within groups was carried out by the Wilcoxon signed ranks test and a $p < 0.05$ was considered significantly different. Strengths of this study were that it was a randomized and the outcome assessor was blinded. Weaknesses of this study include that it was a single-center study and the sample size was quite small. Although the results were insignificant between the two groups, all outcomes measured were more favorable in the intervention group.

Facilitators to Using a Written Asthma Action Plan

Despite the GINA (2020) and NHLBI (2007)recommendations for all pediatric patients to receive an asthma action plan, Simon & Akimbi (2016) found that only about half of children aged 2-17 had ever received a written asthma action plan. To assess facilitators and barriers of using a written AAP there was only one article found specific to asthma action plans, a stratified survey of Canadian physicians by Djandi et al. (2017).

Djandi et al. (2017) mailed a survey containing 102 questions on asthma management, 11 of which pertained to written AAPs and enablers to their use. Djandi et al (2017) mailed the

care for asthmatic patients.

Individualized Written Asthma Action Plan Efficacy

To assess the efficacy of written asthma action plans both qualitative and quantitative health outcome studies were reviewed including three RCTs, one prospective study, one longitudinal quasi-experimental study, and one systematic review of 13 other studies. The results of the literature review were mixed. Some studies found positive health outcomes associated with receiving an AAP (Ducharme et al., 2010; Kessler, 2010; Lakupoch et al., 2018) while others found no discernible difference in health outcomes measured (Khan et al., 2014; Sheares et al., 2015; Sunshine et al., 2011).

Examples of positive health outcomes measured were decreasing emergency department visits by 83% in the six months following implementation of a written AAP (Lakupoch et al., 2018). Lakupoch et al. (2018) also found a significant decrease in the number of unscheduled outpatient doctor visits, the number of days hospitalized and school absenteeism when comparing pre/post implementation of written AAPs. Ducharme et al. (2010) found that receiving a written AAP at a pediatric ED significantly increased medication adherence to prescribed corticosteroids, asthma control, maintenance medication, and medical follow-up. Kessler's (2010) systematic review had mixed results, but overall found that written asthma action plans are beneficial to pediatric asthma patients, which supports current guideline recommendations.

Although a written AAP is recommended by both GINA (2020) and NHLBI (2007) not all studies showed it's effectiveness in their outcome measures. Sunshine et al. (2011) did not find receiving a written AAP within the previous year to be associated with improved health outcomes. Additionally, Shears et al. (2015) found that receiving a written AAP at a patient's first visit with a subspecialist did not have any significant effect on asthma symptom frequency,

more than $80 billion each year (Nurmagambetov et al., 2018). However, if asthma is diagnosed and managed appropriately with proper education, treatment, medication adherence, and self-management, symptoms can be well-controlled (Murphy, 2009). This data suggests that proper patient and caregiver education to adhere to medication regimens, identify asthma exacerbation onset, as well as proper self-management techniques during an exacerbation may help decrease pediatric asthma morbidity and the economic toll of asthma.

Current Asthma Education and Self-Management Guidelines and Recommendations

Ten national, international, and even global asthma recommendations were reviewed. All guidelines and recommendations agreed that prevention of asthma exacerbations is an essential part of asthma control (BTS & SIGN, 2019; Ducharme et al., 2019; Gardner et al., 2015; GINA, 2020; Lougheed, 2012; NAC, 2020; NHLBI, 2007; NICE, 2018; NICE, 2020; NSWMH, 2012). For the purpose of this review the focus will be on recommendations from the NHLBI and GINA.

Both GINA (2020) and NHLBI (2007) recommend that as part of asthma control and exacerbation prevention all families of children with asthma should receive asthma education including self-management techniques. This education should also be given as an individualized written asthma action plan (GINA, 2020; NHLBI, 2007). A written asthma action plan should include, daily management including what medicine to take daily with the specific names of medications, common triggers if known and how to avoid them, how to recognize that asthma symptom control is decreasing, what medications and dosages need to be administered, and when and how to obtain medical care (GINA, 2020; NHLBI, 2007).

Additionally, NHLBI (2007) did recommend that clinicians develop, implement, and evaluate systems-based interventions to support clinical decision-making and to support quality

action and plan" and "asthma and guidelines and children", Inclusion criteria included full text online, peer-reviewed journal articles, empirical-studies, English language, studies within the clinic or hospital setting, literature published within the last ten years ranging from 2010-2020. Studies published prior to 2010 were only considered if historically relevant. Exclusion criteria included studies not relevant to provider education or asthma action plans, articles that did not have pediatric data or were not relevant to the prevalence or impact of asthma on children, asthma guidelines without reference to pediatrics, guidelines not relevant to primary care practice, or guidelines that did not include patient education with self-management techniques. Though the search yielded 297 results, only 26 publications met the criteria for this literature review.

Synthesis Review

This literature review was performed to identify the following:

1. Significance and impact of asthma.
2. Current evidence-based pediatric asthma guidelines and recommendations.
3. Written asthma action plan efficacy.
4. Studies related to facilitators to using an asthma action plan.
5. Asthma education for healthcare providers.

Significance and Impact

Asthma is the most common chronic respiratory illness of childhood, with about eight and a half million children in America being diagnosed before reaching adulthood (NHIS, 2018; Patel & Teach, 2019). Acute asthma exacerbations account for roughly 500,000 ED visits and 80,000 hospitalizations annually, as well as over two million primary care office visits annually (CDC, 2018b; CDC, 2020). The economic burden of asthma in the U.S. is extensive, costing

school absenteeism, and increased quality of life for pediatric asthma patients (Agrawal et al.. 2005).

Problem Question

In essence, will a quality improvement project consisting of asthma education for pediatric primary care providers paired with use of a standardized, site specific asthma action plan increase asthma knowledge in providers and the percentage of pediatric asthma patients receiving a written AAP at their asthma visits during a four week time period? The population of interest is pediatric primary care providers at a pediatric primary care clinic in Southern Nevada. The interventions will include provider education on current asthma guidelines, specifically the use of a written asthma action plan in all asthmatic patients with a pre/post-test of their knowledge. Djandi et al. (2017) found being aware of national asthma recommendations was significantly associated with providing an AAP. An AAP will be implemented for providers to use. Comparison includes providers' pre/post-intervention test scores on asthma knowledge. The number of patients receiving a written AAP will also be compared through pre/post-intervention chart audits in order to check for compliance. The outcomes will be increased provider knowledge of asthma and the number of pediatric asthmatic patients receiving a written AAP. The time frame for this project will be four weeks. This time frame is sufficient to compare asthma knowledge tests scores as well the number of patients receiving a written AAP pre/post-intervention.

Search Methods

An electronic scholarly inquiry was performed searching databases including PubMed, CINAHL, Medline, UpToDate, and other governmental agencies, as well as bibliographies of available studies. Search terms used were "pediatric and asthma and provider and education and

physicians highly endorsed having a blank written AAP added to the chart as an enabler to using an AAP.

The dismal number of children receiving a written AAP is perplexing as there is much evidence supporting their use. Farag et al. (2018) implemented a written AAP in a randomized controlled trial (RCT) and found that adults who received a written AAP experienced significantly reduced rates of emergency department visits, hospitalizations, intensive care unit (ICU) admissions, and days of sickness leaves and absenteeism when compared to the control group who only received standard asthma education without a written AAP. Lakupock et al. (2017) found that providing children with a written AAP reduced emergency room visits, as well as school absences when compared to the previous six months before receiving a written AAP. A written individualized AAP is also recommended for asthmatics because it has been shown to increase medication adherence of inhaled corticosteroids, which are a controller medication that help reduce asthma exacerbations (Ducharme et al., 2011).

Problem Identification

A significant practice gap has been identified, in which asthmatic pediatric patients are not receiving a written AAP regardless of GINA's (2020) recommendation that all asthmatic patients should receive a written AAP at all asthma visits. This practice gap is not only happening throughout the United States as a whole, but at a pediatric primary care clinic in Southern Nevada. This clinic does not have a standardized protocol for managing their asthmatic patients, as such; there is inconsistent use of a written AAP. This practice gap is important because it adversely affects patients, and the economy as a whole, as asthma related healthcare usage costs the U.S. billions yearly (Nurmagambetov et al., 2018). Additionally, receiving an AAP has been associated with reduced asthma morbidity; specifically, less exacerbations, less

purpose of an asthma visit is to continuously assess ongoing asthma symptom control and adjust controller medications as needed (Patel & Teach, 2019). For children with persistent asthma it is recommended they follow-up every three months (Patel & Teach, 2019). An asthma action plan is a written document provided to patients and their caregivers at asthma visits with specific instructions on how to manage their asthma (Patel & Teach, 2019). The AAP should be clear and include both written instructions as well as pictorial descriptions (Patel & Teach, 2019). Typical asthma action plans include three zones (Patel & Teach, 2019). The green zone is routine maintenance medications that should be taken daily (Patel & Teach, 2019). The yellow zone provides instructions for self-care during a mild exacerbation (Patel & Teach, 2019). The red zone provides instructions for management of an acute severe exacerbation (Patel & Teach, 2019). Additionally, any known triggers should be identified, as well as how to help avoid these known triggers (Patel & Teach, 2019).

Despite the above guidelines from GINA and NHLBI recommending all asthma patients receive an asthma action plan, as well as advances in treatment, prevention, and management of pediatric asthma, it is estimated that 50.3% of children currently diagnosed with asthma are classified as having uncontrolled asthma (Centers for Disease Control and Prevention, 2019). Uncontrolled asthma exacerbations account for over 13 million days of school missed each year for children ages 5-17 (NHIS, 2013). Approximately 55% of children with asthma are prescribed controller medications, yet only 54.5% take them regularly as prescribed (Centers for Disease Control and Prevention, 2018a). As recently as 2013, it was found that only 50.7% of children aged 2-17 diagnosed with asthma had ever received a written asthma action plan (Simon & Akimbi, 2016). A stratified survey of Canadian physicians found that only 5.2% reported providing a written AAP to ≥70% of their asthmatic patients; however, over 60% of surveyed

Promoting Asthma Action Plans in a Pediatric Primary Care Clinic: A Quality Improvement Project

Asthma is a complex chronic illness characterized by episodes of reversible bronchi spasm, airway constriction, and inflammation in response to infections, exercise, irritants, and aeroallergens (Patel & Teach, 2019). Although there is no cure for asthma, if diagnosed and managed appropriately, symptoms can be well-controlled (Murphy, 2009). The mainstay of pharmacologic treatment for asthma consists of rescue medications used as-needed during asthma exacerbations and controller medications used daily to prevent exacerbations (Patel & Teach, 2019). To help with education and medication adherence, it is recommended that all asthmatic patients receive a written asthma action plan (Global Initiative for Asthma, 2020).

Asthma is the most common chronic respiratory disease in children, with about one in twelve, or roughly eight and a half million children in America being diagnosed before reaching adulthood (NHIS, 2018). Asthma is among the top three reasons for pediatric emergency department (ED) visits and childhood hospitalizations, accounting for 500,000 ED visits and 80,000 hospitalizations annually (Centers for Disease Control and Prevention, 2020). In addition to acute-care visits, there are over two million primary care office visits annually with asthma listed as the first diagnosis (Centers for Disease Control and Prevention, 2018b). The national financial burden of asthma in the United States is over eighty billion dollars each year (Nurmagambetov et al., 2018).

The guidelines from the Global Initiative for Asthma (GINA) (2020), the National Heart, Lung, and Blood Institute (NHLBI) (2007), and the National Institute for Health and Care Excellence (NICE) (2018) recommend providing asthma patients, or their caregivers, with a written asthma action plan (AAP) at asthma visits as part of routine patient education. The

Abstract

The purpose of this quality improvement project was to implement the use of written asthma action plans at pediatric asthma visits. The research question was will an asthma education presentation paired with a standardized, site-specific written asthma action plan template increase provider asthma knowledge and facilitate use of written asthma action plans. The setting was two pediatric primary care clinics in Southern Nevada. This quality improvement project used a pre/post chart review design with a four-week implementation period. This project evaluated the use of provider asthma education with a pre/post asthma education questionnaire coupled with a standardized site-specific action plan on the provision of written asthma action plans to pediatric patients from birth to seventeen years of age by four pediatric primary care providers. Provider pre/post asthma knowledge scores were analyzed with a paired-samples t-test. There was a significant increase in the providers' asthma knowledge questionnaire scores after viewing the asthma education presentation. The number of pediatric asthma patients receiving a written asthma action plan pre/post implementation was compared using McNemar's test. There was a significant increase in the number of patients receiving a written asthma action plan at their asthma visits during the implementation period. This data suggests education providers and facilitating ease of use of written asthma action plans may increase the number of pediatric patients receiving a written asthma action plan at their asthma visits. More research is needed to determine if receiving a written asthma action plan results in improved patient outcomes for this population.

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Promoting Asthma Action Plans in a Pediatric Primary Care Clinic: A Quality Improvement Project

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DNP Project I: In partial fulfillment of the requirements for the Doctor of Nursing Practice

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