Nurse Driven Treatment Algorithms for Common Injuries Experienced at a Midwestern Zoo's First Aid Station

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Abstract

Purpose: The purpose of this project was to create a system's change to integrate evidence-based, standardized treatment algorithm for the four common pediatric injuries and medical needs that are seen at a Midwestern Zoo's First Aid Station (FAS). This change will help the FAS nurses to efficiently assess, intervene, treat, and educate pediatric patients who are injured or in need of medical assistance.

Background: The Midwestern Zoo hosts 2.1 million visitors annually. The FAS treats approximately 900 pediatric patients each year with heat stroke/heat exhaustion, allergic reactions, head injuries, and wounds being the four most common medical needs. These conditions often result in minimal morbidity but without proper intervention may lead to significant sequelae and even death. The American Zoo Association (AZA) holds high standards on how safety is conducted at the zoo and recommends that written information be available to the zoo staff to treat emergent and non-emergent health concerns. The American Academy of Pediatrics (AAP) suggests the use of protocols and/or guidelines as an efficient approach to effectively treat the pediatric population and decrease variations in the care given to patients. These clinical guidelines reduce harm, foster cost-effective practice, and generate positive patient outcomes. Currently the FAS lacks a seamless, evidence-based approach to respond to childhood injury or medical needs.

Setting: Midwestern Zoo's FAS.

Sample: Six registered nurses employed at the FAS. The target population was pediatric patients (1 week-19 years of age) who presented to the FAS with heat stroke/heat exhaustion, allergic reactions, head injuries, and wounds.

Methods: The Plan, Do, Study, Act (PDSA) cycle provided the foundation for implementing the four treatment algorithms. Integration of the treatment algorithms into practice was determined by reviewing the nurses' documentation of pre-determined key components of each specific algorithm.

Results: The results of the FAS nurse's documentation showed 97% accurate documentation to the assessment of a wound, only 84% adherence for documentation related to patient education on the signs and symptoms of wound infection. Head Injury: 100% documented on level of conscious, 84% documented the Glasgow Coma Score (GCS), only 80% documented on assessing the eyes- Pupils, Equal, Round, React to Light (PERRL). Allergic Reaction: 81% documented on education of signs and symptoms to watch for when they go home, and only 63% or less included specific treatment of the allergic reaction.

Conclusion: Treatment algorithms appear to be a reasonable approach for promoting consistent, seamless care when treating pediatric common, acute injuries at a FAS. The treatment algorithms empowers nurses to respond in an evidence-based manner which supports positive outcomes for the pediatric population seen at the FAS.

Keywords: evidence-based nurse driven treatment algorithms, First Aid, mass gatherings, Heat Illness, Head Injuries, Wound Care, Anaphylaxis, evidence-based practice

Nurse Driven Treatment Algorithms for Common Injuries Experienced at a Midwestern Zoo's First Aid Station

Mass gatherings bestow a unique array of challenges for health care professionals. The number in attendance at mass gatherings is often unpredictable. This random number is further complicated by the range of the crowd members' age, the existence of underlying health conditions, the weather, and specific behaviors conducted before or during the mass gathering. These behaviors may be influenced by the consumption of alcohol and or drug use. The mass gathering's venue and size of the crowd may also delay or limit access to a health care professional for those needing medical care. Tourist attractions are not immune to the challenges of mass gatherings. According to the Association of Zoos and Aquariums, there are over 181 million people who visit U.S. zoos and aquariums each year. This number surpasses the attendance at National Football League, National Hockey League, National Basketball League, and Major League Baseball games combined. The Association of Zoos and Aquariums states that worldwide, 700 million people visit zoos and aquariums annually, which represents approximately 10% of the world population (Association of Zoos and Aquariums, 2021).

Background

Mass gathering research provides challenges. Evidence-based practice guidelines and uniform standards for anticipating health care needs and providing healthcare during mass gatherings is limited. The standards with mass gatherings vary among health guidelines and legislation (Arbon, 2007). In mass gatherings there are a variety of casualty types and acuity levels of patients. Minor injuries, heat-related injuries, respiratory issues, and problems such as blisters, sunburn, headache, and upset stomach accounts for 80% of causalities seen (Arbon, 2007). Gatherings that take place outside generate more environmental injuries such as sunburn

and lacerations. There is a commonality among countries and international literature regarding reported injuries seen at mass gatherings (Arbon, 2007). Visitors at a local Midwestern Zoo were reported to seek medical attention for a variety of reasons including heat-related illness, head injuries, allergic reactions, and wound care (Children's Hospital and Medical Center, 2021).

Triage at a large gathering can be complex. It requires knowledgeable medical professionals who are able to prioritize patients' needs and expedite patient care. The patient presentation rate (PPR) is used to predict patient presentation rates at mass gatherings and is used for resource planning. The PPR is the number or people who exhibit an illness or injury per 1,000 partakers in a crowd or mass gathering. It is variable between events and there is no standard model that is available currently to foretell the PPR for a mass gathering. Any event may have potentially hundreds of patients who could be injured in a short amount of time and need first aid and or streamlined to the proper service or point of care needed (Turris & Lund, 2012). There is limited information to identify what elements effect the PPR. It is impossible to predict the number of injuries that would be seen at the FAS in advance but looking at prior data and reviewing what type of patients have presented to the FAS more frequently during different times in the season, is one way to proactively prepare for the most seen and most common medical conditions or injuries.

The availability of appropriate resources at mass gatherings is as vital as the knowledge and capabilities of those that use them (Turris & Lund, 2012). Resources at mass gatherings may include first aid equipment and supplies, automatic external defibrillators, basic life support and advanced life support. The medical team at mass gatherings is variable and may include physicians, Emergency Medical Technicians, and nurses. The Mass Gathering Medicine Interest Group within the Department of Emergency Medicine at the University of British Columbia

conducted a systematic review of the literature and found that medical care providers not only provided medical attention to injuries, but also helped to provide health promotion, injury prevention, and customer service at mass gatherings. The research was not obtained by any triage measurement or acuity scoring system, nor are there any present tools to measure triage needs where there is a mass gathering (Turris & Lund, 2012). There are limitations in the literature that identified different challenges in developing a triage mass gathering tool, such as a lack of evidence that focuses on unique populations such as children, the lack of evidence supporting a particular triage system, and triage systems that are used are not evidence-based (Turris & Lund, 2012).

Morbidity and Mortality

The FAS treats approximately 900 pediatric patients each year with heat stroke/heat exhaustion, allergic reactions, head injuries, and wounds being the four most common medical needs. These conditions often result in minimal morbidity but without proper intervention may lead to significant sequelae and even death. Non-fatal heat illness in the United States accounts for 4.5 occurrences per 100,000 athletes who are exposed. Heat illness is reported as the third major cause of mortality among teenage athletes, behind traumatic and cardiac causes. Heat-related illnesses may result in serious conditions such as heat exhaustion and heat stroke. Extremely high body temperatures can cause brain and organ damage and in severe cases, may result in multisystem organ failure and death (Ishimine, 2021). From 2004 – 2018 in the United States, there was an average of 702 heat-related deaths annually.

There are several factors that can also contribute to heat illness such as being overweight, obese, prescription amphetamines for attention deficit hyperactivity disorder (ADHD), dietary supplements, increased activity, and exposure to hot, humid weather (Ishimine, 2021). The

incidence of heat-related illnesses increases during the months of June through August which is typically when zoos host a large volume of visitors. Two-thirds of heat illness occurs in infants, young children, and adolescents in August, when there is a higher risk of morbidity and mortality (Ishimine, 2021). Heat illness poses an increased risk for infants and young children, due to their decreased thermoregulation. Children take a longer time to acclimate to a warmer environment, changes in temperature and or humidity, than do adults. Children can exhibit several physiologic changes such as sweat production, electrolyte losses in sweat, increased blood flow with physical activity, increased plasma, and stroke volume, decreased urine sodium excretion, and a decreased temperature maximum to begin sweating, all these bodily changes contribute to a child's increased risk for heat-related illnesses compared to adults (Mangus & Canares, 2019).

At a Midwestern Zoo, the FAS sees a multitude of pediatric head injuries. Head injuries continue to be the leading cause of morbidity and mortality in the pediatric population. There are 1.5 million head injuries that happen annually in the United States in which 300,000 are pediatric cases, which lead to hospitalizations. Head injuries may not be preventable, but the assessment, treatment, evaluation, and education to the pediatric patient and family can make a vast difference in the pediatric patient's health outcome from that injury. Largely, 90% of mortality among pediatrics is related to head trauma, and falls are the second most cause of pediatric head injuries (Atabaki, 2007). Falls account for 20-25% of emergency room visits (World Health Organization Unicef, 2017) and are the fourth leading unintentional, nonfatal injury for children (Stanford Children's Health, 2022; World Health Organization Unicef, 2017). Head injuries accounted for more than $1 billion in pediatric hospitalizations and deaths in the year 2000 (Wing & James, 2013).

Injuries continue to be the leading cause of death for Americans between the ages of 1 to 44 years old, regardless of ethnicity, race, gender, sex, or socioeconomic status (Office of Disease Promotion and Health Prevention, 2021). Each year more than 180,000 people die from injuries, and 1 in 10 have a nonfatal injury which requires treatment in an emergency department. Non-fatal falls have a significant burden on many health care facilities around the world, especially on health care costs (World Health Organization Unicef, 2017).

Between 2000-2017, there were 1,109 deaths reported from hornet, wasp, and bee stings (Quick Stats, 2017). Up to 5% of the United States population has experienced an anaphylactic reaction; however, fatal outcomes are rare with venom or food allergy representing less than 1% of the total mortality rate. The National Institute of Allergy and Infectious Disease indicates that foods and stinging insects are the most often associated triggers in children and adolescents for allergic reactions (Zemik et al., 2012).

Zoo Statistics

A Midwestern Zoo hosted a record 1 million visitors annually from 2018-2022. These visitors include individuals from all over the United States and the world. From March 1st, 2018 – October 31st, 2022, the zoo's First Aid Station cared for a total of 1226 pediatric patients who presented in need of first aid or an injury. Patients 0-2 years of age- 118, patients 3-5 years of age- 160, patients 6-12 years of age- 252, patients 13-19 years- 128, patients over 19 years of age- 546. There are several zoo activities which are documented such as: Band-Aids- 3022, medicine- 2213, ice packs/wraps- 793, vital sign checks- 246, respite needs- 373, baby/child needs-394, personal assistance- 1647, assistance of a family member- 242, informational- 1079, non-healthcare related supply- 302, concern/complaint report- 32, for a total of 10,343 people. These activity occurrences are both pediatric and adult. The First Aid Station from July 1st, 2022

– October 31st, 2022, had a total of 186 documented injury reports that were treated by a nurse. Follow up phone calls are completed by the FAS nurse for those who have significant injuries or incidents (Children's Hospital and Medical Center, 2021). From March 1st, 2022, to October 31st, 2022, the First Aid Station nurses cared for: 11- allergic reactions, 26- head injuries, 3- heat related, 34- wound care patients, (Children's Hospital and Medical Center, 2022).

Significance

Childhood injuries cannot always be prevented, but the treatment of those injuries can help save their lives and or improve patient outcomes. The American Zoo Association (AZA) provides accreditation for zoos and aquariums and holds high standards on how they function and conduct safety at these venues. The AZA provides guidelines for staff to be properly trained and inhabit a safe environment for the visitors and staff. The guidelines recommend that the zoo has an Automated Emergency Defibrillator (AED) and appropriately trained staff for these systems (Association of Zoos and Aquariums, 2021). Further, the zoo must have a written plan that is available to use in the case of health emergencies and first aid that is easily accessible for staff. Emergency procedures must be written and provided for staff to access in the event of an emergent or urgent situation (Association of Zoos and Aquariums, 2021).

The American Academy of Pediatrics (AAP) has a policy statement that promotes the use of clinical practice guidelines in an effort to decrease variation in care to patients and reduce poor patient outcomes. These guidelines decrease the chances of harm, are cost effective, and promotes optimal health outcomes. The AAP discusses the importance of using the evidence-based process to select, review, and develop policies. The research supports the evidence, to help create policies and guidelines for practice (American Academy of Pediatrics, 2004). The AAP also recommends that community parks and recreation programs should emphasize

awareness, education, and the implementation of heat illness reduction strategies to trained staff. Staff should be readily available on site during those times of activity and in periods of extreme heat (American Academy of Pediatrics, 2011). The AAP suggests the use of protocols to effectively treat the pediatric population. Scientific evidence helps to guide clinical practice providers with recommendations for evidence-based practice (American Academy of Pediatrics, 2004).

The Midwestern's Zoo has a partnership with Children's Hospital and Medical Center. The nurses at the First Aid Station are employed by the hospital. Children's Hospital and Medical Center provides full financial funding for the FAS and ensures the FAS nurses are prepared to respond, assess, treat, evaluate, and educate any pediatric patient and family. All nursing care services and treatments are 100% free of charge, and these medical services are free to the public.

The Midwestern Zoo prioritizes safety which is evident in the zoo's safety manual. The safety manual provides the specifics related to a safe and healthful environment for both employees and visitors. The human resources department provides communication between employees and management with any workplace health or safety concerns. Employees at the Midwestern Zoo receive periodic workplace safety training to help decrease or eliminate workplace hazards and keep everyone safe (Randall, 2012).

Clinical Problem Statement

Minor injuries or acute events are common at mass gatherings. Tourist attractions, such as zoos, are not immune to these challenges. Each year approximately 900 pediatric patients present to the FAS at a Midwestern Zoo with four common medical needs: heat stroke/heat exhaustion, allergic reactions, head injuries, and wounds. These medical needs may result in

simple treatment, advanced treatment requiring referral to a healthcare facility, or emergent life-threatening treatment needing Emergency Medical Services. Both the American Academy of Pediatrics and zoological society encourage the use of clinical practice guidelines to promote optimal patient outcomes. However, the FAS does not currently utilize an efficient, deliberate approach to manage these pediatric patients.

Purpose/Aims

The purpose of this project was to create a system change. The intention was to integrate an evidence-based, standardized treatment algorithm for the four common pediatric injuries and medical needs that are seen at a Midwestern Zoo's First Aid Station (FAS). This change helped the FAS nurses to efficiently assess, intervene, treat, and educate pediatric patients who were injured or in need of medical assistance. It was anticipated that nursing documentation of the patient encounter would be enhanced by incorporating specific elements of the treatment algorithm. The purpose was achieved with the following aims:

1) Developed evidence-based treatment algorithms for the top four most seen medical concerns at the FAS: Heat Illness, Head Injuries, Anaphylaxis/Allergic Reaction, and Wound Care.

2) Educated the nursing staff on the new treatment algorithms. Including documentation practices that indicated implementation of the algorithms.

3) Evaluated the systems change with PDSA cycles:

- Using a paper survey, the nurses informally provided feedback on each of the algorithms clinical use.

- Analyzed integration of the algorithms by reviewing the FAS nurses' clinical documentation regarding pre-determined key components of each specific algorithm.

4) The system change was intended to improve the process and delivery of the standard of care for pediatric patients who presented to the FAS. There was no intent to use the data for research purposes, including generalizing knowledge beyond the project setting.

Review of the Literature

The purpose of this literature review was to examine the current research available regarding first aid treatment of the most common childhood injuries that specifically occur at the First Aid Station at a Midwestern Zoo. These common injuries included head injuries, allergic reactions, heat stroke/heat exhaustion, and wound care. The research was to support not only the current protocols at the FAS, but determined if those protocols were up to date with the most current evidence-based information and treatment to pediatric patients.

Levels of Evidence

Evaluating evidence and research is the second phase of the Johns Hopkins Evidence-Based Practice Model (JHEBP). Substantiation helps to identify the level of evidence for decision-making based on the methods and quality of the study (OHSU Library, 2019). The model describes different levels of research evidence. A Level I study includes evidence from a systematic review or meta-analysis of all relevant randomized controlled trials or evidence-based clinical practice guidelines based on systematic reviews or randomized controlled trials (RCT). Level II studies have evidence obtained from a systematic review and combination of RCT's and quasi-experimental study, with or without meta-analysis. Level III studies are non-experimental, mixed methods, qualitative studies, and systematic review of a qualitative study with or without

meta-analysis. Level IV studies are non-research evidence where expert committees or panels make opinions based on the scientific evidence such as: clinical practice guidelines, position statements, literature reviews, quality improvement, or financial evaluation, based on experimental evidence (OHSU Library, 2019).

Literature Search Criteria

A review of the literature was conducted between March 2021 – June 2022. The evidence was obtained by utilizing the following search engines and multiple databases including UpToDate, Elsevier, ClinicalKey Journals, Google, Google Scholar, PEDIATRICS, Association of Zoos and Aquariums, Lexicomp, Elsevier Science Direct Journals, American Academy of Pediatrics, Policy Stat, PubMed Central. Searches were limited with relevant literature from the last 18 years, from articles in journals and online web browser searches. Keywords for the search were based on *mass gatherings, first aid, head injuries, heat stroke, heat exhaustion, anaphylaxis, allergic reactions, wound care, EMT protocols, nurse driven evidence-based protocols, algorithms, zoo association, evidence-based practice, level of evidence, treatment algorithms, nursing theories, plan-study-do-act model.*

The application of the inclusion/exclusion criteria reduced the search to eight articles relevant to mass gatherings and triage, recommendations to clinical practice guidelines, and nurse driven evidence-based protocols. Table 1 indicates the evidence level of each of these eight articles per the Johns Hopkins Evidence-based Practice for Nurses and Healthcare Professionals (OHSU Library, 2019). As noted in Table 1, the literature review included six Level IV studies and two Level III studies. These studies were reviewed in the following sections and organized based on clinical practice guideline recommendations, development and research into nurse driven evidence-based protocols and using a health care team during triage at

mass gatherings. Exclusion criteria included articles which were primary focused on the care of adults in mass casualties and/or the treatment of adults with first aid injuries who were treated by Emergency Medical Technicians personal (Schwartz, et al., 2015).

Table 1

Literature Review Levels of Evidence

Recommendations for Clinical Practice Guidelines	Level IV	American Academy of Pediatrics, 2004 American Academy of Pediatrics, 2011 Association of Zoos and Aquariums, 2021
Nurse Based Order Set Evidence Based Protocol Nurse Driven Protocol	Level IV	Lukes & Schjodt, 2019 Brooks, 2018 Schiessler, Darwin, Phipps, Hegemann, Heybrock, & Macfayden, 2019
Mass Gatherings and Medicine Triage During Mass Gatherings	Level III	Arbon, 2007 Turris & Lund, 2012

Nurse Driven Evidence-Based Protocols

Development and initiation of nurse driven evidence-based protocols and treatment algorithms, would help guide nurses in the treatment of those childhood injuries. The question remains, how does the use of nurse driven, evidence-based protocols and algorithms help guide the nurse and provide a more standardized approach to care, when a pediatric patient is injured and in need of first aid treatment? Immediate first aid to any minor or major medical issue, at a Midwestern Zoo, helps aid in the positive outcome to a childhood trauma, injury, or medical problem. Having nurse driven evidence-based treatment algorithms can help guide the treatment of the most frequently seen childhood injuries at a Midwestern Zoo, such as head injuries, allergic reactions, wounds, and heat exhaustion. Having nurse driven evidenced-based treatment algorithms can help aid in the diagnosis, treatment, intervention, education, and teaching of these four identified medical injuries. Assessing current policies and procedures and developing and acting on nurse driven evidence-based treatment algorithms that are easy-to-follow, can potentially help lower the severity of negative medical outcomes in this pediatric population.

Nurse-driven clinical pathways were studied in various pediatric patient settings and suggested positive patient results in the following arenas: oral rehydration therapy, antibiotic administration for febrile neutropenic patients with acute myeloid leukemia (AML), early administration of oral corticosteroids to patients who presented with moderate to severe acute asthma exacerbations, and indwelling catheter removal protocol to reduce catheter-associated urinary tract infection (CAUTI) rates in a pediatric intensive care unit (PICU). These studies supported nurses' independent thinking and critical thinking skills to effectively and safely integrate the algorithm to manage patients who present with acute needs. The AAP states clinical practice guidelines are aimed to decrease variations in the care given to patients. These clinical guidelines are to help reduce harm, foster cost-effective practice, and generate the best health care results (American Academy of Pediatrics, 2004).

Clinical Pathways.

Clinical pathways continue to improve the delivery of health care and improve health care quality (Lavelle, et al., 2015). For routine clinical practice, there continues to be a growing amount of evidence to support the use of clinical pathways to enhance clinical decision making. The coordination with the multidisciplinary team and health professionals is a key piece to providing a system of support and coordination to improving clinical standards and processes to improve practice that is evidence-based. This process can lead to enhanced quality improvement, standardize practices, which lead to the improved health of children (Lavelle, et al., 2015).

A clinical pathway helps to define a particular setting of patients with created guidelines. The pathways are designed as a flow chart, a hierarchical algorithm is the glimpse of the clinical problem as its highest level. It provides a visual model to help guide and manage the clinical

problem complexity. Using clinical pathways and or treatment algorithms are an effective platform to communicate standardized care and treatment. The Institute of Medicine discusses the importance of clinical practice guidelines that have recommendations throughout, to optimize patient care by a systematic review of clinical based evidence. The clinical pathway can help provide detail in processes to support implementation of the clinical practice guideline recommendations into specific actions, to provide direction of patient care by the health care team (Lavelle, et al., 2015).

Evidence-based Practice Oral Corticosteroids Study

A nurse driven protocol study was initiated where early administration of oral corticosteroids was given to patients who presented with moderate to severe acute asthma exacerbations. This quality improvement study implemented evidence-based practice guidelines to promote improved patient outcomes. The nurses in the emergency room (ED) could initiate oral corticosteroids before the physician saw the patient. This study took place in a children's hospital ED which saw an annual caseload of 60,000 children of which 2,500 were asthma-related visits. Six hundred and forty-four patient charts were reviewed for children between the ages of 2 to 17 years of age. A Pediatric Respiratory Assessment Measure (PRAM) score was used to analyze the triage nurse-initiated bronchodilator treatment before a provider assessed the patient. A PRAM score ranges between 1-12 points on a severity scale. Patients with at PRAM score of >4 were eligible for the study. A multidisciplinary team created a provision for the ED nurses to initiate oral dexamethasone treatment for a child presenting with moderate to severe asthma. Timely administration of dexamethasone improved patient outcomes as indicated by decreased hospital admissions and less time spent in the ED. This nurse-initiated treatment was given to the child before the physician assessed the patient, these children had a 24-minute

median difference and 95% nurse confidence interval. The results of the quality improvement project not only improved the patient outcomes in the pediatric ED but empowered the nurse to provide a higher level of care to children who presented with moderate to severe asthma exacerbations. Standardized clinical pathways have continued to show reduced hospitalization rates in asthma patients. The objective of the study was to help improve the proficiency of steroid administration timing and optimize the nurse's scope of practice, which decreased the inconvenience of sickness for the children presenting with moderate to severe asthma in the ED (Zemek et al., 2012).

Evidence-based Practice CAUTI study

An evidenced-based nurse driven indwelling catheter removal protocol was created and initiated, to help reduce catheter-associated urinary tract infection (CAUTI) rates in a pediatric intensive care unit (PICU). The indwelling catheters were producing increased rates of CAUTI's. In 2016, CAUTI rates were 1.25 (number of infections per 1,000 catheter device days) representing all inpatient units versus the PICU at 1.53. In the year 2017, 5 CAUTI's were identified at a rate of 18.7 and the inpatient hospital units had a rate of zero. Not only were these infections costly, approximately $1,000 per CAUTI, but the length of hospitalization increased for those patients. The study listed out defined bundled elements to insertion and removal of an indwelling catheter. The focus of the project was the correct order of the steps for implementing the bundle. After one month of initiation of the nurse-driven evidence-based protocol and the use of bundled elements, the PICU CAUTI's decreased by 60%, and one year after initiation of the protocol there was only one CAUTI. This protocol helped nurses to advocate and question if an indwelling catheter was still needed on a patient. The use of the evidenced-based, nurse driven indwelling catheter removal protocol helped to increase the nurses critical thinking skills, by

using the protocol guidelines and putting them into practice. The nurses also felt more empowered in their patient's care (Schiessler et al., 2019).

Evidence-based Practice ORT Study

A nurse-driven protocol for Oral Rehydration Therapy (ORT) in mildly dehydrated pediatric patients was identified and developed in a pediatric emergency department. The AAP recommends ORT as a first line treatment for mild to moderate dehydration. Data collection shows that physicians in ED's in the United States still believe ORT is time consuming and the use of ondansetron and or I.V. fluids is used before trying ORT. Clinical practice guidelines were developed for the assessment of dehydration in pediatric patients which helped to identify pediatric patients in the ED who could benefit from oral rehydration therapy (Bowen et al., 2018). A team of ED nurses developed a nurse-driven protocol for the purpose of implementing ORT for pediatric patients who presented in the ED with mild dehydration, by using national recommendations and standardizing guidelines, it empowered nurses to initiate standards of care to the pediatric patient, before seeing a physician. The initiation of the ORT protocol improved both patient and family experience in the ED and decreased length of stay. Families who were discharged home, reported the education they received empowered and encouraged them to continue to manage gastroenteritis and ORT at home (Bowen et al., 2018). The data was collected through 45 chart audits, where data confirmed and validated the early use of nurse-driven protocols in the ED to begin ORT early, decreased the time in minutes which a patient stayed in the ED, from 160 minutes to 125 minutes, decreasing stay in the ED to 22% overall (Bowen et al., 2018).

Evidence-based Practice Time to Antibiotics Study

A local Midwestern pediatric hospital identified febrile neutropenic patients who presented in the ED, were not receiving antibiotic therapy within the goal administration of less than 60 minutes upon admission. Research indicates that antibiotic therapy initiated in one hour of recognition of possible sepsis, can decrease the number of adverse outcomes, such as fluid resuscitation and or admission to the intensive care unit (Lukes & Schjodt, 2019).

A chart review was conducted and found that 39 patients who had a diagnosis of AML did not receive antibiotics within the goal administration of less than 60 minutes of admission. These specific patients were triaged as Emergency Severity Index (ESI) level 2, but no nursing procedures or standards were available to guide nurses on what to initiate with these critically ill patients (Lukes & Schjodt, 2019). An interdisciplinary team which included nurses, came together to create a quality improvement project that used evidence-based data to create interventions in the treatment of these patients. First, there was a creation of an order set in the electronic medical record. Second, orders included that initiation of a broad-spectrum antibiotic was approved to be given prior to receiving the patient's CBC results. Third, a nurse triage order set was created for the nurses to initiate when any patients presented febrile, neutropenic, and had AML. A total of 101 patients were evaluated by measuring the impact (time in minutes), to the timing of specific intervention points: Triage to First Order, Triage to Antibiotic, Triage to Blood Order to Antibiotic. These guidelines were shown to improve accessibility, patient safety, nurse workflow, and provider workflow (Lukes & Schjodt, 2019). After all these interventions were put into place, the time to antibiotic administration on febrile neutropenic patients with AML, assessing four different cohorts, showed a decrease in the time of antibiotic administration to the patient, from 128 minutes to <60 minutes. These results support how using a nurse triage

order set, can help to improve the nurse and provider workflow and nursing autonomy, to help to guide the assessment and initiation of treatment to improve pediatric patient outcomes (Lukes & Schjodt, 2019).

Impact on Nurse Confidence

Pre- and post-surveys to assess the knowledge or lack of knowledge to direct care registered nurses (RN), have shown positive results in substantially identifying the RN's confidence with using specific protocols. One study utilized a pre- and post-survey of 35 RNs at the Veterans Administration Medical Center in St. Louis. The nurses were questioned about their understanding and use of an Enhanced Recovery After Surgery (ERAS) protocol, which helps to decrease the body's impact after surgery and relates to the patient's recovery time. The key principle of the project was to help RN's deliver safe, effective, quality care to patients. The presurvey identified the nurse's home unit, length of practice as an RN, and revealed several RN's that lacked confidence in using the protocol. A PowerPoint presentation was developed to provide educational content, description, and education of the ERAS preoperative protocol. Thereafter, education and training were initiated of the use of the ERAS protocol. A posttest was given after the RN's received training, where the data analysis conveyed an increase of expertise and confidence after obtaining proper use and education of the ERAS protocol. Ninety-seven percent of the RN participants credited their confidence to the use of evidence-based protocols, and recognized their significance (Brooks, 2018).

Nurses who are at the bedside and in the leadership role, hold strong viewpoints about evidence-based practice. Quality care and positive patient outcomes are associated with those beliefs. One study investigated the organizational culture of pediatric nurses and how the nurses support evidence-based practice and can utilize and implement it into their practice. Assessing

and recognizing if an organization is ready to positivity support a work culture using evidence-based practice, and identifying barriers is essential. An organization was creating and building a culture in which the use of evidence-based practice would be ingrained into their culture and investigate if that organization was ready for a system wide change. This cross-sectional study was conducted in a large tertiary hospital with a free-standing pediatric and medical school teaching facility. This hospital employed 2133 registered nurses, who all received an anonymous survey with a link to participate in a research study (Patton et al., 2022). The study included all fields and levels of nurses such as: registered nurses, nurse leadership-managers, Advance Practice Registered Nurse's, and Clinical Nurse Specialists. The questions on the survey used a Likert-type scale to rate each question, that discussed areas such as the nurse's confidence in utilizing evidence-based practice in their daily patient cares, what extent the organization shared outcomes of past and current evidence-based practice, and perceived readiness for integration of evidence-based practice in the culture of the organization. A total of 396 registered nurses participated in the study. The pediatric nurses in the study reported high beliefs of the use of evidence-based practiced within the organization, felt that they had appropriate support and commitment from health care providers and leadership, and it aligned with the organizations mission and values (Patton et al., 2022). Nursing leaders and clinical nurse staff did not have significantly different scores, which indicated that the organizations leadership needs to continue to have evidence-based practice be ingrained within the vision, be visible, and continue to be used intentionally from the leaders and carried down to clinical nurses.

The study found pediatric nurses lacked the awareness of how to access resources for evidence-based practice. The nurses also were unsure of how to go about initiating and

implementing evidence-based practice into their daily cares. Findings identified the importance of integrating evidence-based competencies into the everyday skillset of practicing nurses and nurse leaders, is an essential component of developing evidence-based practice into the organizational culture (Patton et al., 2022). The study identified the importance of the organization to self-examine the significance of encompassing an evidence-based practice leader, to provide more education about the use of evidence-based practice and its use in the organization-to help establish it into a part of everyday culture. Capitalizing on current professional development opportunities and use of underutilized resources such as UpToDate, Clinical Key, and Elsevier, which are available for staff to use for point-of-care. The study supports the beliefs of nursing staff as an essential component for organizational readiness and the use of evidence-based practice in an organization. Development of a model for how nurses can utilize evidence-based practice in their day-to-day care, would benefit all levels of nursing. Visualizing that model would help any nursing professional to see and understand how that can build a foundation towards professional nursing excellence. Increasing awareness, the use of available recourses, and development of a clear pathway for nurses to use, can help develop the knowledge and confidence a nurse or advanced nurse professional need and empower those nurses to apply evidence-based practice into their routine care (Patton et al., 2022).

Approach to Developing Triage Protocols

The combination of Emergency Medical Technicians (EMT), physicians, and nurses can be combined on mass gathering sites. This on-site medical team allows each provider to practice rendering each medical professional's skill set. Specific protocols are needed to establish and refine EMS provider roles within the medical team (Schwartz et al., 2015). Creating a triage system to be used in mass gatherings needs to be versatile. A precise and efficient way that the

medical team can treat a full spectrum and variety of patients of all ages and the ability to care for non-urgent care needs. Second, the system needs to be simple to use and learn. Third, the system must be evolving have a way to identify if a patient is a high acuity score such as a collapse or unconscious person, or if it is a minor issue such as a request for medication. Fourth, the system needs to be supportive of communication between medical care professionals on the scene of an incident. Fifth, the system should be practical. The medical staff needs to have the proper equipment to use in the event of an injury or emergency (Turris & Lund, 2012).

An algorithm was created for paramedics to use to help guide their decisions when determining if a patient needs to be transported to the hospital. The algorithm listed things such as common injuries and illnesses, like burns, lacerations, and asthma. This algorithm tool had a downfall. The tool was very basic and did not help with how to treat and or triage the vast array of injuries and illnesses that could bestow to the medical provider. A patient could be stable, look and act fine at one moment and the next minute take a turn for the worse, and become unstable (Turris & Lund, 2012). The development of a triage system would be beneficial to be used at mass gatherings that address a variety of physiology factors, communication, addressing minor concerns, such as wound care, sunscreen use, and over the counter medication use. The literature lacks support to classify medical services provided to an individual that can be ranked low acuity. Low acuity patients need to be accounted for and tracked in a charting system, to identify those services as well as in a mass gathering.

A scale was created at the University of British Columbia. A Mass Gathering Medical Triage Acuity Scale/Discharge Acuity Scale (TAS/DAS), the project included three phases. First was the creation of the tool. The second phase is applying the tool at mass gatherings and events. Third phase would be testing the Triage Acuity Scale and evaluating its use. This

TAS/DAS was created based on an extensively used system in place called the Simple Triage and Rapid Treatment (START). The START uses a colored acuity scale, physiology based, deceased is black, emergent or resuscitative is red, urgent is yellow, minor injuries are green, and dispensary is white. This white triage level indicates services such as a band aid, sunscreen, and over the counter medications (Turris & Lund, 2012). Using a tested triage acuity system during a mass gathering, is an effective approach to helping improve and streamline care for mass gatherings. Adapting an acuity system can help to improve consistency and communication between health care professionals (Turris & Lund, 2012).

Literature Summary and Project Impact

The evidence provided by the literature review emphasized the importance of how nurses or health care providers can advocate for changes after identifying a problem or aspiring to find a solution for a dilemma. Developing a standardized protocol has been proven by the research, to increase patient satisfaction, improve patient outcomes, and reduce costs for the patient and the facility. The quality improvement projects also encouraged the development of a standardized protocol and or algorithm which was incorporated into the daily practice of the nurses, providers, and other interdisciplinary health care team members (Patton et al., 2022). Utilizing a standard of practice, with evidence to support, positively improves patient care and clinical outcomes. The Children's Hospital and Medical Center's First Aid Station Policies for the top four injuries or medical needs were identified by searching Children's Hospital and Medical Center's Policy Stat database for written policies. Each of the top four injuries/medical needs were then reviewed for accuracy and the inclusion of evidence-based guidelines. Subsequently, treatment algorithms were created to reflect the most up to date, evidence-based information regarding assessment, treatment, evaluation, and patient education. Pediatric head injuries need to be

assessed and triaged quickly to determine if further testing is warranted (Atabaki, 2007). Utilizing an evidence-based tool such as the Glasgow Coma Scale to evaluate a pediatric patient is an essential tool (Jain & Iverson, 2021). See Appendix A for the Head Injury Algorithm. Allergic reactions and anaphylaxis can be potentially life-threatening for a child. It is imperative to promptly identify and treat a pediatric patient who is suffering a reaction, which can present in a variety of clinical presentations (Fischer, Vander Leek, Ellis, et al., 2018). Refer to Appendix B for the Allergic Reaction Algorithm.

Heat Illness assessment and treatment is imperative in the pediatric patient to decrease worsening side effects such as heat stroke. If it is not quickly treated, it can have life-threatening effects to the child (Ishimine, 2021). Heat stroke can cause cellular injury if not treated promptly (Jardine, 2007). See Appendix C for the Heat Exhaustion Algorithm. Wounds such as lacerations and cuts, need to be assessed and treated to help prevent infection to the location of the wound and to evaluate the need for further intervention at an Emergency Department (UpToDate, 2022). See Appendix D for the Algorithm on Wounds.

Theoretical Framework

The treatment algorithm enables the ability to evaluate the processes which care is delivered by using constant quality improvement, by following strategic measures to be followed during implementation. The Plan-Do-Study-Act (PDSA) cycle is an evidence-based practice model which has a swift cycle of an improvement method that tests desired adjustments in the delivery of a health care process. It is important to share information in the PDSA cycle with other health care workers, reviewing the latest data and steps in the process until an aim is achieved (Lavelle, et al., 2015). The PDSA cycle is also known as the Deming Cycle. The cycle begins with the Plan step which identifies a goal or the purpose, conveying a theory, and

outlining the plan and how you will put it into action. The Do step is where you put your plan into action. Next is the Study step, where your outcomes are put into action with your strategies. There is focus on key measures to follow during implementation, which is shared with the nursing team. Monthly feedback on using the treatment algorithms and its positive outcomes, supports what is working, not working, or is missing from the treatment algorithms. This process is repeated until the aim is accomplished. Monitoring of this continued process confirms that positive outcomes are measured and areas in need for improvement are identified (Lavelle, et al., 2015).

The final part of the process is the Act step (The W. Edwards Deming Institute, 2021). This concludes the PDSA cycle, incorporating the insight gained by the implementation of the study. This step is where the nurses' charting, surveys, and feedback are reviewed and where changes can be made to the goals or plan which influences the implementation of a new practice change. The steps of the PDSA plan can be replicated as an everlasting cycle of recurrent learning, development, and change. Dr. Deming stressed the need for always looking at and reassessing the steps, continuously learning, using the latest knowledge, and to look at the successes and failures of the plan. The plan can always be revised and changed to help make improvements (The W. Edwards Deming Institute, 2021). The specific tasks of this project related to each step of the PDSA cycle are depicted in Figure 1.

Figure 1

Project Steps Based on PDSA Cycle from The W. Edwards Deming Institute, 2021.

-Modified treatment algorithms based on survey results

-Planned for re-implementation of treatment algorithms for long-term use in the Midwestern Zoo's First Aid Station

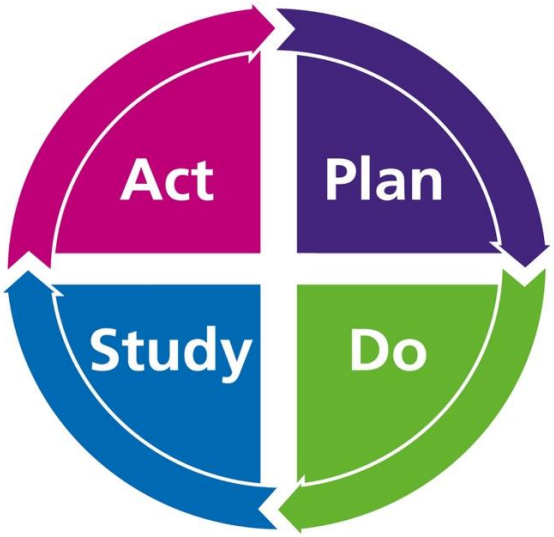
-Debriefed with the FAS nursing staff, manager, and emergency department FAS support physician

-Initiated use of pediatric treatment algorithms at the Midwestern Zoo's FAS for future use

-Determined the project purpose which was to create a systems Change. Integrate an evidence-based, standardized treatment algorithm for the four common pediatric injuries and medical needs that are seen at a Midwestern Zoo's First Aid Station (FAS). This change will help the FAS nurses to efficiently assess, intervene, treat, and educate pediatric patients who are injured or in need of medical assistance.

-Engaged FAS nurses using a PowerPoint presentation to discuss the project methods

-Retrieved best evidence to support project methods



-Analyzed the results by obtaining a chart review of the FAS nurses' documentation in the EMR.

-Reviewed the charts for specific documentation that pertained to each specific treatment algorithm, and made sure the nurses were correctly documenting by using specific assessment, treatment, evaluation, and education points that correlate on the treatment algorithm

-Identified any barriers if any to utilizing the treatment algorithms.

-Determined information that needed to be added or removed from the treatment algorithms

-Summarize and reflect on what was learned from the surveys for quality improvement.

-Educated the FAS nurses on the use of the treatment algorithms, project importance, and implementation process

-Evaluated feedback from the FAS nurses and made necessary changes to the treatment algorithms

-Performed chart reviews to see if specific documentation was used in the EMR by utilizing the treatment algorithms

Methods

The purpose of this project was to create a system's change. The intention was to integrate an evidence-based, standardized treatment algorithm for the four most common pediatric injuries and medical needs that are seen at the Midwestern Zoo's First Aid Station (FAS). This change helped the FAS nurses to efficiently assess, intervene, treat, and educate pediatric patients who are injured or in need of medical assistance. It was anticipated that nursing documentation of the patient encounter would be enhanced by incorporating specific elements of the treatment algorithm which would be included in the nurses charting.

Ethical Considerations

Approval for project implementation was obtained from involved parties including an identified project champion, who served as a resource for the project and the manager of the FAS, Mentor- DJ Scrivner, MA, BSN, RN, NEA-BC, who is the Director of Emergency Services, Trauma, Transport & Health Hut at Children's Hospital and Medical Center. Project Chair Susan Connelly DNP, APRN-NP, who served as a resource to the project lead during planning and implementation. Letters of support from the project manager can be seen in Appendix E. All project details were approved by both the Children's Hospital and Medical Nursing Project Advisory Council, Amy Phillips, MSN, APRN-CNS (Appendix F). The project was identified as exempt from the IRB review by both the University of Nebraska Medical Center and Children's Hospital and Medical Center and Creighton University IRB's due to quality improvement status (see Appendix G and Appendix H). Pre-approval of the project was obtained by Children's Hospital and Medical Center (CMHC) after submission through the REDCAP system. REDCap is a secure, web-based database used by CHMC to capture information on projects occurring at the institution. Additionally, Creighton University College

of Nursing Internal Review Committee reviewed the project prior to submission to the Institutional Review Boards (IRB) (Appendix I) signifying the project met the rigors of a Doctor of Nursing (DNP) project.

Ethical Considerations for FAS Nurses

All nurses in the FAS obtained PowerPoint and video education on the project and the use of the treatment algorithms. Each nurse received a survey midway throughout the project, to evaluate their use of the treatment algorithms. The nurses were educated to utilize the treatment algorithms for each of the pediatric patients who presented to the FAS with one of the four top injuries and medical needs seen. The nurses were encouraged to use those treatment algorithms to guide their care, treatment, evaluation, and education to the pediatric patient. All required communication between the project lead and the FAS nurses and manager were through CMHC issued e-mail accounts. No patient identifiers were used at any time during communication.

Ethical Considerations for Pediatric Patients

Pediatric care at the FAS was offered in its historical fashion. The only change was the use of the algorithm to promote seamless, evidenced-based care for the four identified presentations. All participants remained confidential. Charts were accessed to determine accuracy of the nurses' documentation. No specific patient information was ever used with data entry.

Ethical Considerations for Data Collection and Storage

During the data collection phase of this project, guidelines in accordance with HIPAA were followed to ensure confidentiality of all patient information. All chart review data remained confidential with no patient names or patient identifiers used. Any patient information remained password protected and unidentified on the documentation in the Midwestern Zoo's

FAS computer and recorded on a Word spreadsheet. Any hard copies of surveys and or printed chart review information were kept at the FAS, in an office which was locked at all times when staff members were not present. Patient data was entered into the data collection spreadsheet only when the project lead was at the institution to prevent potential loss of forms that contained patient identifiers. All hard copies of data collection or survey results were appropriately discarded following data collection and project completion in patient health information shred bins provided at the institution.

Sample and Setting

Setting

The study was conducted at a Midwestern Zoo's First Aid Station, in Omaha, Nebraska. The FAS is a free-standing clinic located inside of the Midwestern Zoo. It is located next to guest services at the entrance of the zoo. Patients are allowed to walk into the FAS for treatment and are seen as a first come first serve basis and are prioritized depending on their triage level of severity and injury. Occasionally patients are assessed in the field and transported to the FAS for further evaluation and treatment.

Sample

The nurses who work at the zoo's FAS. The sample is using 6 RN's working at the FAS, 7 days per week. The target population will be pediatric patients, ranging from infants to young adult, from 1 week old to 19 years of age, who present to the FAS for illnesses or injuries during the project's 8-week timeframe.

Design

This systems change utilized a convenience sample at a Midwestern Zoo's FAS and evaluated the implementation of four specific treatment algorithms. The integration of the

treatment algorithms into practice was determined by reviewing the nurses' documentation of pre-determined key components of each specific algorithm.

Materials

The treatment algorithms for the four most common injuries were readily available for the FAS nurses to use in the event of a pediatric injury (Appendix A-D). There were four treatment algorithms, Head Injuries, Wound Care, Heat Stress, and Allergic Reactions. Each algorithm listed key clinical decision-making assessments and questions to further evaluate a patient's injury. The treatment algorithms included specific assessments, treatment, evaluation, and education to provide to the pediatric patient and family.

Survey

The FAS nurses were given a survey to complete, about the application and utilization of the treatment algorithm. The survey allowed the FAS nurse to evaluate the use of the treatment algorithm with the patient's initial assessment, treatment, evaluation, and education. The survey helped to evaluate the effectiveness and efficiency of first aid treatment using the most up to date evidence-based policies and treatment algorithms. The survey was completed two weeks into the initiation of the treatment algorithms. Refer to Appendix J for the First Aid Station Algorithm Survey. This survey assessed the pragmatics of the treatment algorithms as well as the usefulness of the treatment algorithms into the nurse's clinical practice. The survey also requested the algorithm's impact on the nurse's confidence when caring for pediatric patients.

FAS Database Electronic Charting System. This systems change was evaluated by reviewing the nurse's documentation of the pediatric patient encounter in the Children's Hospital and Medical Center's Zoo Charting system's Electronic Health Record (EHR).

Other Materials. Microsoft PowerPoint was used to educate the FAS nurses and manager prior to project implementation. Information and data collection were evaluated using the functions of Microsoft Excel application. Pre-implementation education among project team members utilized Zoom and WebEx for virtual, face-to-face meetings per institutional guidelines.

Nursing Education

The nurses at the FAS were educated on the methods of the project by reviewing a pre-recorded PowerPoint presentation. The presentation educated the staff about the importance of using nurse-driven evidence-based treatment algorithms to guide their care for each of the top four pediatric injuries seen at the FAS. The PowerPoint presentation described the background, aims of the project, important literature review, methods, and timeframe for implementation. The nurses were presented and provided the treatment algorithms, located in Appendix A-D, which outlined with the steps for assessment, treatment, evaluation, and education to use in the care of the pediatric patient. The nurses were informed their documentation would be reviewed for validation of using the treatment algorithms.

Implementation

Following the FAS nursing staff education and modification to the algorithms following the information gained from the 2-week survey, the four treatment algorithms were implemented into practice. The treatment algorithms were kept in a folder for the FAS nurses to have readily available. The nurses were aware that their charting would be reviewed to demonstrate integration of the algorithms into practice. The specific documentation criteria were provided on each of the treatment algorithms for heat stress/heat exhaustion, allergic reaction, head injury, or wound care.

Data Collection and Analysis

Nursing documentation was reviewed for an eight-week timeframe. The four treatment algorithms were evaluated for their effectiveness during the systems change using a chart review process by the project leader. The charts were reviewed to determine if they contained the predetermined documentation components of the algorithm. The specific measures for each algorithm were listed on an Excel spread sheet and "checked- off" as either complete or incomplete. It was hopeful that 90% of the key documentation measures would be evident in the nurse's documentation. Descriptive statistics were also collected which included the age of the patient and presenting condition.

Results

Table 2 includes the ages and the total number of pediatric patients seen at the FAS during the 8-week time frame. Table 3 depicts the number of pediatric patients who presented to the FAS with a presenting concern of wounds, head injury, allergic reaction, or heat exhaustion. Heat exhaustion and heat stroke, head injury, allergic reaction, and wounds charting were specifically reviewed for the accuracy of charting. Several areas in the FAS nurse's charting had an accurate detailing of the patient's encounter. The FAS nurse's documentation demonstrated proficiency in the initial assessment questions and assessment of the injury or medical need. Among those four medical needs, there were common charting points that were missing in the documentation. Specifically, information related to patient education and discharge instructions and patient medication. The specific areas of documentation that did not achieve the 90% benchmark are listed in Table 4.

Table 2

Pediatric Patients and Ages Seen between 6/1/2022 – 10/31/2022.

Patient Age	Total
0 – 2 years old	21
3 – 5 years old	31
6 – 12 years old	26
13 – 19 years old	21
Total	99

Table 3

Documentation of Pediatric Injury's/Medical Needs in the EMR in an 8-week timeframe

Documentation	Number of pediatric patients with documentation in the EMR
Wounds	34
Head Injury	26
Allergic Reaction or Life-Threatening Allergic Reaction	11
Heat Stroke or Heat Exhaustion	3

Out of the six FAS nurses who utilized the treatment algorithms, two identified barriers to the use of the treatment algorithms. Barriers identified were not having the treatment algorithm readily available in the clinic during emergent situations and not being available in the field when responding to an emergent medical call. Table 5 depicts the barriers identified by the FAS nursing staff.

The assessment of the survey four weeks in reveled the nurses at the FAS liked having the treatment algorithm readily available for use when assessing, treating, and educating patients and families. Only one change was suggested, to add albuterol on for allergic reactions. This is indicated when a patient is in for an asthma exacerbation.

Table 4:

Documentation in the Electronic Medical Record

Treatment Algorithm	Specific Criteria Reviewed of Nurse's Documentation in the Electronic Medical Record	Documentation in the Electronic Medical Record
Head Injury (N=26)	PERRL	21 (80%)
	GCS	22 (84%)
	Observing Patient for 15-20 minutes after a head injury	6 (23%)
	When the parent should seek immediate medical attention	17 (65%)
Wounds (N=34)	Medication: Dose/Route/Amount per stated Weight	9 (26%)
	Cleaning of wound with soap and water	16 (47%)
	Tetanus Booster Warranted	1 (2%)
	Education of the symptoms of infection to watch for	22 (64%)
Allergic Reaction (N=11)	Benadryl administered, medication dose/route per stated weight	7 (63%)
	Education of signs and symptoms to watch for	9 (81%)
Heat Exhaustion (N=3)	Education of signs and symptoms to watch for	1 (33%)

Table 5

Barriers to use of the treatment algorithms, identified by the FAS nursing staff

Barrier	Number of FAS nurses who identified a Barrier (N=6)
1. May not be convenient to use when responding to an emergent medical call within the Midwestern Zoo.	n = 2 (30%)
2. Not always looking at the treatment algorithm in an immediate medical situation.	n = 2 (30%)
3. Missing a multitude of other possible treatment algorithms for other medical needs, injuries, or emergencies.	n = 1 (10%)

Note: Nurses were encouraged to share more than one barrier to identify if applicable.

Discussion

The implementation of the treatment algorithms for the top four injuries seen at the FAS appeared to be a beneficial tool to utilize while assessing, treating, and evaluating pediatric patients. Documentation indicated integration of the algorithms into nursing practice as the majority of documentation reached the benchmark of 90% compliance. The deficient areas (< 90% compliance) seemed to be related to medication and discharge instructions related to signs and symptoms of when to seek additional medical care. Both these deficiencies identified opportunities for further nursing education regarding the care of pediatric patients and the importance of documentation to support optimal patient outcomes.

The utilization of the PDSA cycle appeared to be a reasonable approach to implementing a system's change. The opportunity for the nurses to provide feedback at the 2-week implementation point, promoted their buy-in of the algorithms. The rapid turn-around-time for making their suggested changes also facilitated a seamless integration of the algorithms. The FAS nurses thought the treatment algorithms were user friendly, easy to follow, and visually appealing. The FAS nurses stated the treatment algorithms helped to change their practice by

having easy access to the most common medical needs and injuries presenting to the FAS. All nurses agreed that having the education box included on each algorithm was a valued component. The nurses all strongly agreed the treatment algorithm helped improve their initial assessment, interventions, treatment, and education by applying the treatment algorithm into their practice at the FAS. The treatment algorithms were beneficial to guide patient care in the event of a pediatric medical need or injury. All nurses agreed and would appreciate having more treatment algorithms available for use with other medical needs or medical emergencies that present to the FAS.

Limitations

There were several limitations identified in this project. The first was the eight-week time frame did not allow for a long enough time frame to capture trends in the nurses' documentation and the inclusion of the specific documentation points identified with each algorithm. An extended time frame would have allowed re-education of the nurses regarding identified deficits and then further use of the algorithms to determine if the feedback was incorporated into their practice. The second limitation was the accessibility of the treatment algorithms. The treatment algorithms were in an easily accessible area in the FAS; but, when there was an emergency out in the Midswestern Zoo's grounds, the treatment algorithms were not available for use which hindered documentation practices. The final limitation was that patient outcomes were not followed with the use of the algorithms so its clinical utility was not captured with this specific pediatric population who presented at the FAS.

Implications for Practice

This project improved patient assessment, treatment, and education to the pediatric patient and family, by utilizing and referencing the treatment algorithm at the FAS at a

Midwestern Zoo. The nurse's documentation helped to identify specific key assessments, treatments, and education that was provided in each treatment algorithm to help guide patient care. The treatment algorithms increased the FAS nurse's knowledge on the top four pediatric injuries that are seen at the Midwestern Zoo's FAS. This knowledge allowed the nurse to be more aware of what specific assessment questions to ask in an injury or emergency, understand how to appropriately treat an injury, and to be able to provide education to the pediatric patient and family.

Sustainability

Successful integration of the treatment algorithms (as evidenced by accurate charting) will promote deliberate, efficient patient care and ultimately result in positive patient outcomes. These positive results encouraged use of the algorithms and endorsed the creation of additional algorithms for other common concerns, injuries, and medical needs encountered at the FAS.

Opportunities for Future Research

Conduct a longitudinal study to determine if the use of the algorithm improved patient outcomes and promoted patient understanding of patient education. Additionally, a qualitative study could be completed to determine if the integration of the algorithms enhanced nursing confidence when caring for pediatric patients in the FAS. And finally, a retrospective chart review could determine the timeline for waning documentation practices to establish a timeframe for offering in-services to promote accurate documentation.

Conclusion

The treatment algorithms make the delivery of care seamless by improving the consistency, continuity, and coordination of care. This empowers nurses to give a higher level of care and a higher understanding of their responsibilities. It puts the pieces together in a coherent,

nonconflicting way. The implementation of a treatment algorithms at a Midwestern Zoo's FAS has helped to improve quick access and reference to assessing, treating, evaluating, and educating a pediatric patient's injury's and or medical needs. The treatment algorithms help provide consistent guidance for the health care team and FAS nurses at a Midwestern Zoo. These treatment algorithms have benefitted and supported positive outcomes for the pediatric population seen at the FAS.

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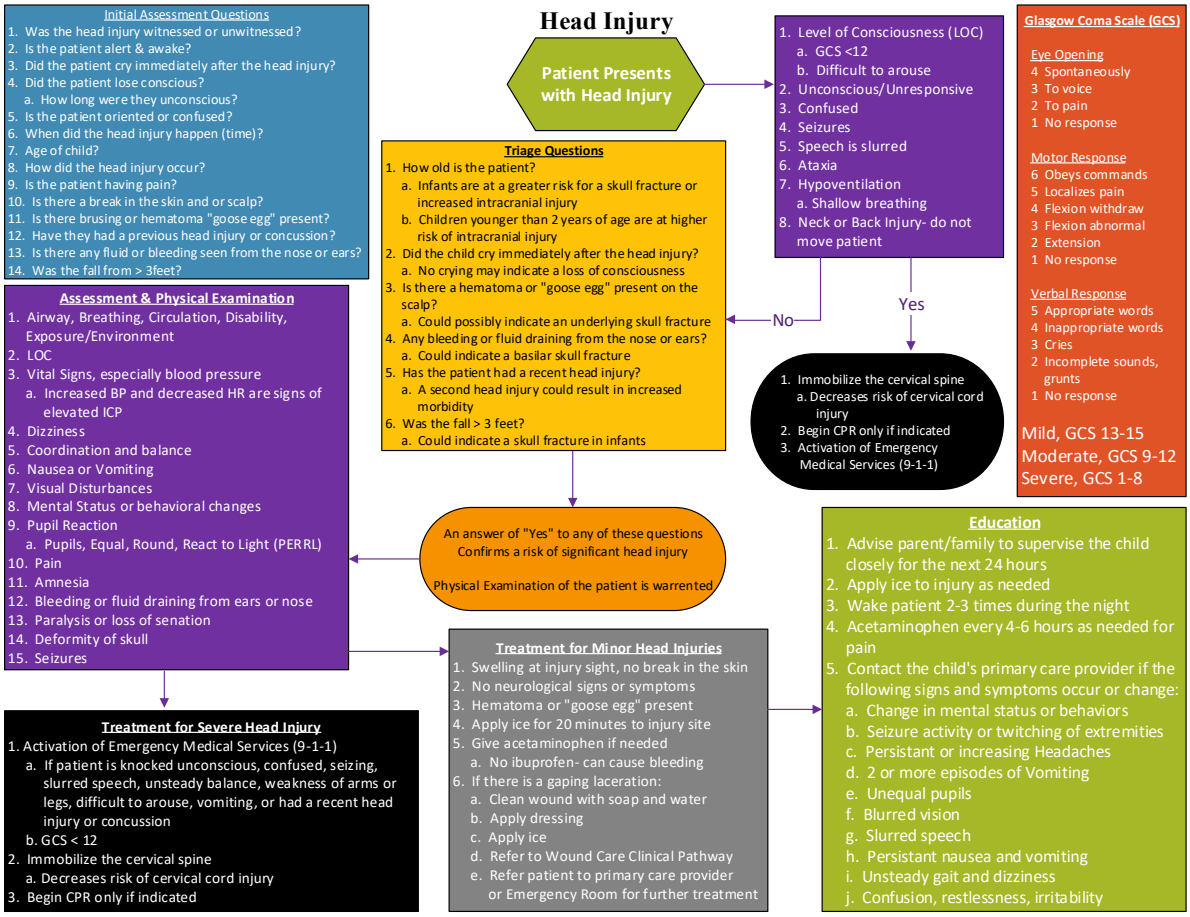
Appendix A


Head Injury
Patient Presents with Head Injury
Initial Assessment Questions
1. Was the head injury witnessed or unwitnessed?
2. Is the patient alert & awake?
3. Did the patient cry immediately after the head injury?
4. Did the patient lose conscious?
a. How long were they unconscious?
5. Is the patient oriented or confused?
6. When did the head injury happen (time)?
7. Age of child?
8. How did the head injury occur?
9. Is the patient having pain?
10. Is there a break in the skin and or scalp?
11. Is there brusing or hematoma "goose egg" present?
12. Have they had a previous head injury or concussion?
13. Is there any fluid or bleeding seen from the nose or ears?
14. Was the fall from > 3feet?
Triage Questions
1. How old is the patient?
a. Infants are at a greater risk for a skull fracture or increased intracranial injury
b. Children younger than 2 years of age are at higher risk of intracranial injury
2. Did the child cry immediately after the head injury?
a. No crying may indicate a loss of consciousness
3. Is there a hematoma or "goose egg" present on the scalp?
a. Could possibly indicate an underlying skull fracture
4. Any bleeding or fluid draining from the nose or ears?
a. Could indicate a basilar skull fracture
5. Has the patient had a recent head injury?
a. A second head injury could result in increased morbidity
6. Was the fall > 3 feet?
a. Could indicate a skull fracture in infants
1. Level of Consciousness (LOC)
a. GCS <12
b. Difficult to arouse
2. Unconscious/Unresponsive
3. Confused
4. Seizures
5. Speech is slurred
6. Ataxia
7. Hypoventilation
a. Shallow breathing
8. Neck or Back Injury- do not move patient
No
Yes
1. Immobilize the cervical spine
a. Decreases risk of cervical cord injury
2. Begin CPR only if indicated
3. Activation of Emergency Medical Services (9-1-1)
Glasgow Coma Scale (GCS)
Eye Opening
4 Spontaneously
3 To voice
2 To pain
1 No response
Motor Response
6 Obeys commands
5 Localizes pain
4 Flexion withdraw
3 Flexion abnormal
2 Extension
1 No response
Verbal Response
5 Appropriate words
4 Inappropriate words
3 Cries
2 Incomplete sounds, grunts
1 No response
Mild, GCS 13-15
Moderate, GCS 9-12
Severe, GCS 1-8
Assessment & Physical Examination
1. Airway, Breathing, Circulation, Disability, Exposure/Environment
2. LOC
3. Vital Signs, especially blood pressure
a. Increased BP and decreased HR are signs of elevated ICP
4. Dizziness
5. Coordination and balance
6. Nausea or Vomiting
7. Visual Disturbances
8. Mental Status or behavioral changes
9. Pupil Reaction
a. Pupils, Equal, Round, React to Light (PERRL)
10. Pain
11. Amnesia
12. Bleeding or fluid draining from ears or nose
13. Paralysis or loss of senation
14. Deformity of skull
15. Seizures
An answer of "Yes" to any of these questions Confirms a risk of significant head injury
Physical Examination of the patient is warrented
Education
1. Advise parent/family to supervise the child closely for the next 24 hours
2. Apply ice to injury as needed
3. Wake patient 2-3 times during the night
4. Acetaminophen every 4-6 hours as needed for pain
5. Contact the child's primary care provider if the following signs and symptoms occur or change:
a. Change in mental status or behaviors
b. Seizure activity or twitching of extremities
c. Persistant or increasing Headaches
d. 2 or more episodes of Vomiting
e. Unequal pupils
f. Blurred vision
g. Slurred speech
h. Persistant nausea and vomiting
i. Unsteady gait and dizziness
j. Confusion, restlessness, irritability
Treatment for Minor Head Injuries
1. Swelling at injury sight, no break in the skin
2. No neurological signs or symptoms
3. Hematoma or "goose egg" present
4. Apply ice for 20 minutes to injury site
5. Give acetaminophen if needed
a. No ibuprofen- can cause bleeding
6. If there is a gaping laceration:
a. Clean wound with soap and water
b. Apply dressing
c. Apply ice
d. Refer to Wound Care Clinical Pathway
e. Refer patient to primary care provider or Emergency Room for further treatment
Treatment for Severe Head Injury
1. Activation of Emergency Medical Services (9-1-1)
a. If patient is knocked unconscious, confused, seizing, slurred speech, unsteady balance, weakness of arms or legs, difficult to arouse, vomiting, or had a recent head injury or concussion
b. GCS < 12
2. Immobilize the cervical spine
a. Decreases risk of cervical cord injury
3. Begin CPR only if indicated

Appendix B

Allergic Reaction

Patient presents with Allergic Reaction

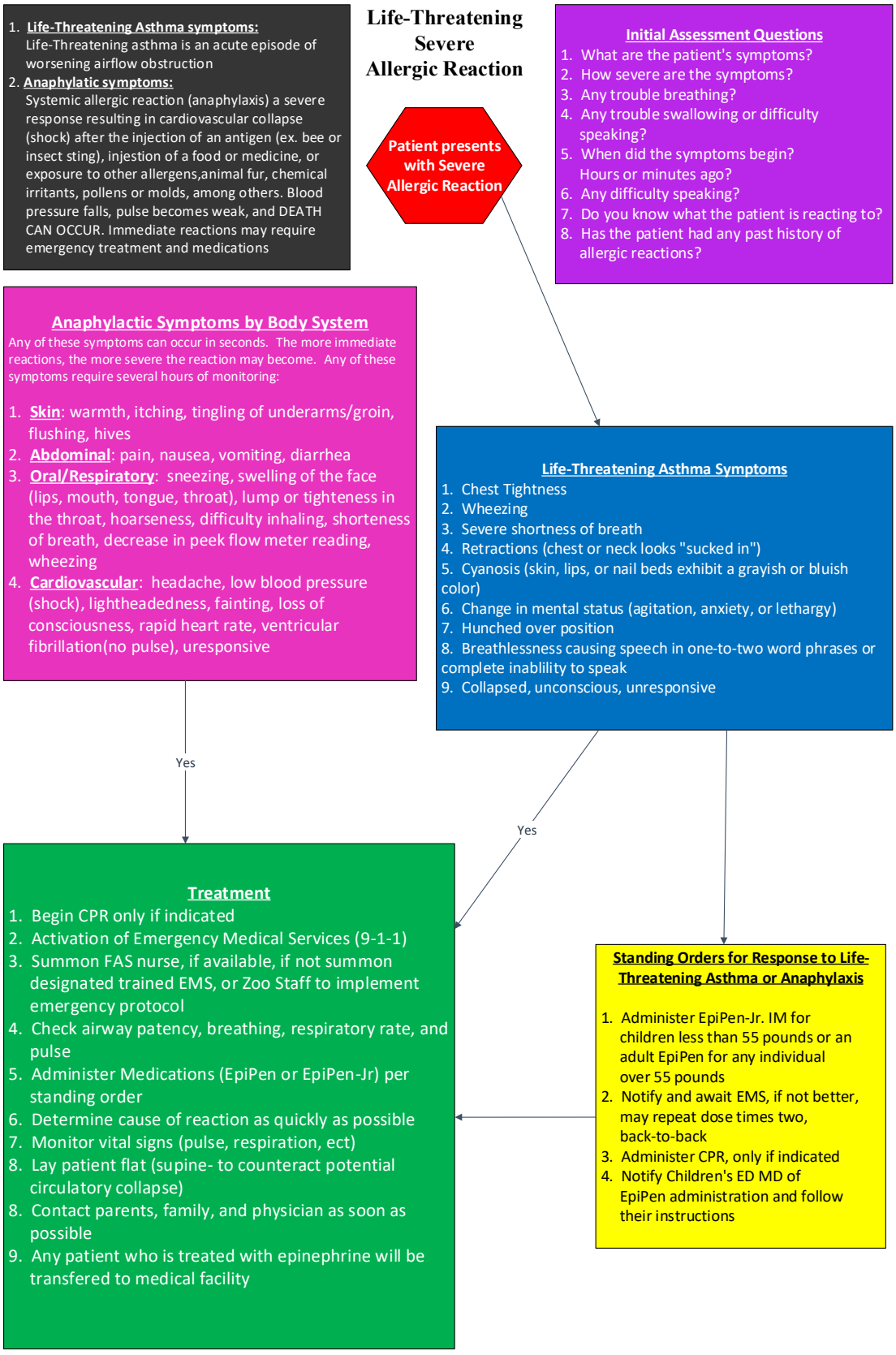
Initial Assessment Questions
1. What are the patient's symptoms?
2. How severe are the symptoms?
3. Any trouble breathing?
4. Any trouble swallowing or difficulty speaking?
5. When did the symptoms begin?
   Hours or Minutes ago?
6. Any difficulty speaking?
7. Do you know what the patient is reacting to?
8. Does the patient have any past allergic reactions?

Assessment
1. Swelling near site of contact in body parts (other than the area of a bite or sting)
2. Coughing, hacking cough
3. Difficulty breathing
4. Difficulty swallowing or tightness of the throat
6. Upset stomach or cramping
7. Nausea
8. Vomiting
9. Hives- red raised bumps or blotchy skin
10. Weakness
11. Headache
12. Chest Pain
13. Fainting
14. Runny nose, itchy watery eyes

Treatment:
1. Check the patient's airway patency, breathing, respiratory rate and pulse
2. Ask if the patient is allergic to any medication
3. For Mild Allergy symptoms:
   a. Administer H1 antihistamine- *diphenhydramine* (Benadryl) per medication protocol
4. **Eyes**: Itchy, watery- wash out eyes with saline solution
5. **Skin**: Itchy allergic rash- wash area with soap and water, pat dry, & apply OTC hydrocortisone cream and cold compress
4. Encourage the patient to sit or lie down and rest
5. Observe the patient for any further symptoms and or reactions for at least 15 minutes

Education
1. Follow up with the child's primary healthcare provider regarding the reaction and precautions needed for future exposure
2. Watch for worsening symptoms and anaphalaxis including respiratory depression, this warrents immediate call to the child's primary healthcare provider or EMS
4. Can repeat antihistamine dosing of diphenhydramine dose every 6-8 hours PRN, or adminster dose of an OTC antihistamine and follow the dosing instructions on the medication, such as cetirizine (Zyrtec) or loratadine (Claritin)
5. Apply cold compresses as needed to area of concern.

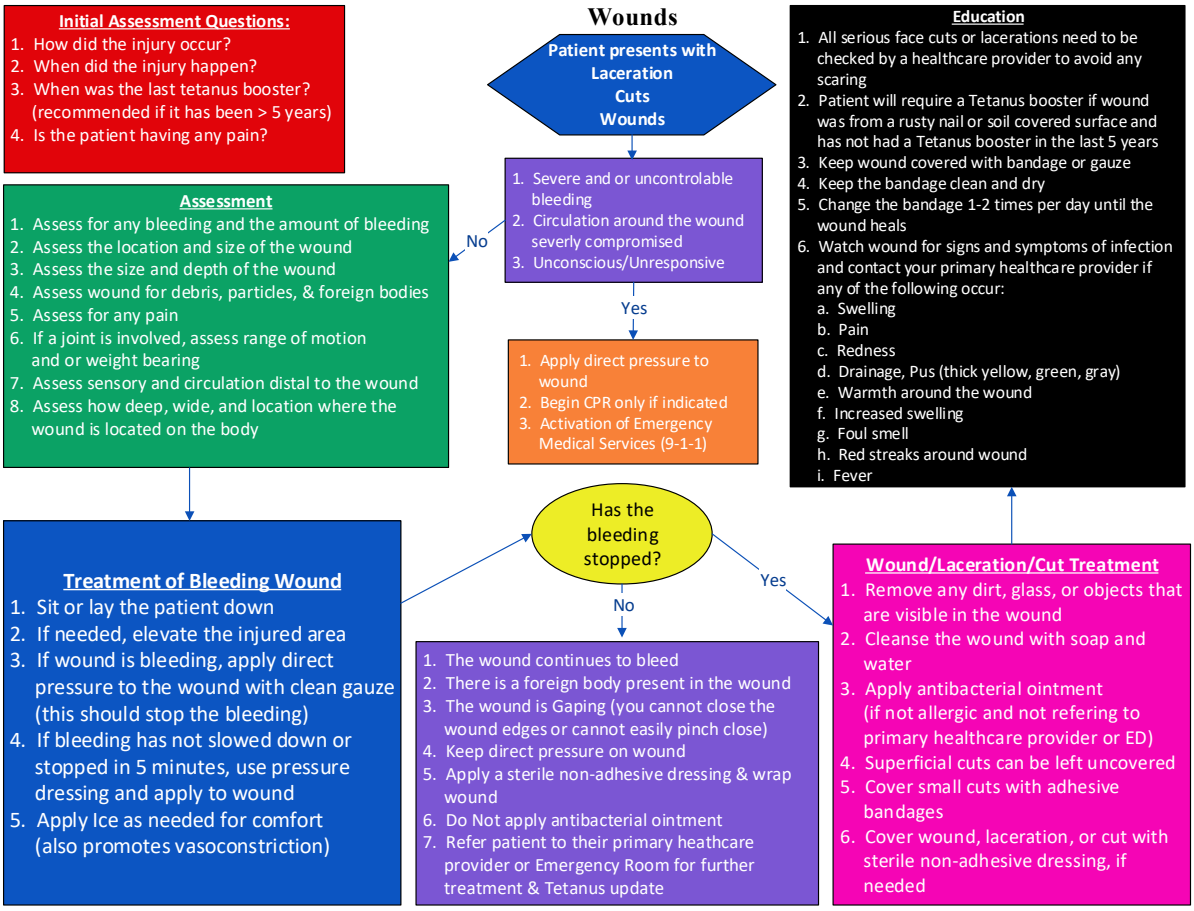
diphenhydramine (Benadryl)
Infants and Children: Oral: 5 mg/kg/day in equally divided doses administered every 6-8 hours PRN, 12.5 mg to 25mg/dose, Maxium dose: 50 mg/dose
Adolescents: Oral: 5 mg/kg/day in equally divided doses administered every 6-8 hours PRN, 25 mg - 50 mg/dose
Precautions:
CNS depression: can become drowsy, decrease mental and physical abilities, may cause excitation in young children
Contraindicated in neonates and premature infants
diphenhydramine DOES cross the placenta and is present in breast milk


1. Life-Threatening Asthma symptoms:
Life-Threatening asthma is an acute episode of worsening airflow obstruction
2. Anaphylatic symptoms:
Systemic allergic reaction (anaphylaxis) a severe response resulting in cardiovascular collapse (shock) after the injection of an antigen (ex. bee or insect sting), injestion of a food or medicine, or exposure to other allergens,animal fur, chemical irritants, pollens or molds, among others. Blood pressure falls, pulse becomes weak, and DEATH CAN OCCUR. Immediate reactions may require emergency treatment and medications
Life-Threatening Severe Allergic Reaction
Patient presents with Severe Allergic Reaction
Initial Assessment Questions
1. What are the patient's symptoms?
2. How severe are the symptoms?
3. Any trouble breathing?
4. Any trouble swallowing or difficulty speaking?
5. When did the symptoms begin? Hours or minutes ago?
6. Any difficulty speaking?
7. Do you know what the patient is reacting to?
8. Has the patient had any past history of allergic reactions?
Anaphylactic Symptoms by Body System
Any of these symptoms can occur in seconds. The more immediate reactions, the more severe the reaction may become. Any of these symptoms require several hours of monitoring:
1. Skin: warmth, itching, tingling of underarms/groin, flushing, hives
2. Abdominal: pain, nausea, vomiting, diarrhea
3. Oral/Respiratory: sneezing, swelling of the face (lips, mouth, tongue, throat), lump or tighteness in the throat, hoarseness, difficulty inhaling, shorteness of breath, decrease in peek flow meter reading, wheezing
4. Cardiovascular: headache, low blood pressure (shock), lightheadedness, fainting, loss of consciousness, rapid heart rate, ventricular fibrillation(no pulse), uresponsive
Life-Threatening Asthma Symptoms
1. Chest Tightness
2. Wheezing
3. Severe shortness of breath
4. Retractions (chest or neck looks "sucked in")
5. Cyanosis (skin, lips, or nail beds exhibit a grayish or bluish color)
6. Change in mental status (agitation, anxiety, or lethargy)
7. Hunched over position
8. Breathlessness causing speech in one-to-two word phrases or complete inablility to speak
9. Collapsed, unconscious, unresponsive
Yes
Yes
Treatment
1. Begin CPR only if indicated
2. Activation of Emergency Medical Services (9-1-1)
3. Summon FAS nurse, if available, if not summon designated trained EMS, or Zoo Staff to implement emergency protocol
4. Check airway patency, breathing, respiratory rate, and pulse
5. Administer Medications (EpiPen or EpiPen-Jr) per standing order
6. Determine cause of reaction as quickly as possible
7. Monitor vital signs (pulse, respiration, ect)
8. Lay patient flat (supine- to counteract potential circulatory collapse)
8. Contact parents, family, and physician as soon as possible
9. Any patient who is treated with epinephrine will be transfered to medical facility
Standing Orders for Response to Life-Threatening Asthma or Anaphylaxis
1. Administer EpiPen-Jr. IM for children less than 55 pounds or an adult EpiPen for any individual over 55 pounds
2. Notify and await EMS, if not better, may repeat dose times two, back-to-back
3. Administer CPR, only if indicated
4. Notify Children's ED MD of EpiPen administration and follow their instructions

Appendix C


Heat Exhaustion versus Heat Stroke
Heat Exhaustion
1. Mild to moderate dehydration
2. Core Body Temperature 100.4 to 104 F (38 to 40 C)
3. Diaphoretic- Profuse sweating
4. Excessively thirsty
5. Nausea
6. Vomiting
7. Mental status changes
8. Confusion
9. Headache
10. Feels faint
11. May have collapsed
Patient Presents with Heat Illness
Heat Stroke
1. Severly dehydrated
2. Core temperature could be >104 F (40 C)
3. Flushed face
4. Hot and dry skin
5. Dizziness, vertigo
6. Syncope
7. Mental status/Behavior changes
8. Diarrhea
9. Hypotension
10. Confusion
11. May be unconsious
12. Coma- cerebral edema
13. Seizures
14. Shock
1. Unconsious or Unresponsive
2. Seizures
3. Assess Airway, Circulation, Breathing
4. Begin Cardiopulmonary Resuscitation (CPR) if indicated
5. Activation of Emergency Medical Services (9-1-1)
Treatment
1. Immediate removal from heat source
2. Cessation of physical activity
a. Rest
b. Sit in chair
c. Sit on cart with legs elevated
3. Obtain a full set of Vital Signs and Temperature
4. Hydration: Give water or electrolyte fluids to drink
5. Rapid external cooling:
a. Apply ice packs & or cool wash cloths to neck, head, axilla, arms, legs, abdomen
b. Cooling fan source
c. Air conditioned area
Has the Heat Illness Resolved within 20-30 minutes?
Yes
No
Treatment
1. Immediate removal from heat source
2. Cessation of physical activity
a. Rest
b. Sit in chair
c. Sit on cart with legs elevated
3. Hydration: Give water or electrolye fluids to drink
4. Active and Rapid Cooling- to help decrease core body temperature to <102.2 F
a. Apply ice packs to neck, axilla, and groin
b. Apply cool wash cloths to head, neck, axilla, arms, legs, abdomen
b. Cooling fan source
c. Air conditioned area
5. Obtain a full set of Vital Signs and Temperature
6. Shock signs and symptoms that do not resolve with immediate treatment:
a. Hyperventilation- rapid breathing
b. Weak pulses
c. Hypotension- low blood pressure
Education
1. Monitor Heat Index- humidity & temperature outside
2. Provide frequent breaks and rest
3. Stay as much as possible in the shade and or air conditioning
4. Encourage adequate hydration
a. Drink adequate amount of water and or electrolyte based fluids
5. Wear light colored clothing
a. Helps to reduce the suns radiant heat absorption
b. Do not over bundle infants
6. Remove vulnerable populations such as infants, small children, and disabled individuals from environments that place them at a higher risk of overheating
7. If any of these signs and symptoms persist:
a. Advise the family/patient to contact their primary care provider
b. Vomiting, diarrhea, excessive fatigue, weakness, confusion, muscle cramps, dizziness, unreleaved, persistant headache
If Heat Stroke signs and symptoms continue:
1. Refer patient to be seen immediately at the Emergency Department
2. Activation of the Emergency Medical Services (9-1-1)

Appendix D


Wounds
Patient presents with
Laceration
Cuts
Wounds
Initial Assessment Questions:
1. How did the injury occur?
2. When did the injury happen?
3. When was the last tetanus booster? (recommended if it has been > 5 years)
4. Is the patient having any pain?
1. Severe and or uncontrolable bleeding
2. Circulation around the wound severly compromised
3. Unconscious/Unresponsive
No
Yes
Assessment
1. Assess for any bleeding and the amount of bleeding
2. Assess the location and size of the wound
3. Assess the size and depth of the wound
4. Assess wound for debris, particles, & foreign bodies
5. Assess for any pain
6. If a joint is involved, assess range of motion and or weight bearing
7. Assess sensory and circulation distal to the wound
8. Assess how deep, wide, and location where the wound is located on the body
1. Apply direct pressure to wound
2. Begin CPR only if indicated
3. Activation of Emergency Medical Services (9-1-1)
Education
1. All serious face cuts or lacerations need to be checked by a healthcare provider to avoid any scaring
2. Patient will require a Tetanus booster if wound was from a rusty nail or soil covered surface and has not had a Tetanus booster in the last 5 years
3. Keep wound covered with bandage or gauze
4. Keep the bandage clean and dry
5. Change the bandage 1-2 times per day until the wound heals
6. Watch wound for signs and symptoms of infection and contact your primary healthcare provider if any of the following occur:
a. Swelling
b. Pain
c. Redness
d. Drainage, Pus (thick yellow, green, gray)
e. Warmth around the wound
f. Increased swelling
g. Foul smell
h. Red streaks around wound
i. Fever
Has the bleeding stopped?
Yes
No
Treatment of Bleeding Wound
1. Sit or lay the patient down
2. If needed, elevate the injured area
3. If wound is bleeding, apply direct pressure to the wound with clean gauze (this should stop the bleeding)
4. If bleeding has not slowed down or stopped in 5 minutes, use pressure dressing and apply to wound
5. Apply Ice as needed for comfort (also promotes vasoconstriction)
1. The wound continues to bleed
2. There is a foreign body present in the wound
3. The wound is Gaping (you cannot close the wound edges or cannot easily pinch close)
4. Keep direct pressure on wound
5. Apply a sterile non-adhesive dressing & wrap wound
6. Do Not apply antibacterial ointment
7. Refer patient to their primary heathcare provider or Emergency Room for further treatment & Tetanus update
Wound/Laceration/Cut Treatment
1. Remove any dirt, glass, or objects that are visible in the wound
2. Cleanse the wound with soap and water
3. Apply antibacterial ointment (if not allergic and not refering to primary healthcare provider or ED)
4. Superficial cuts can be left uncovered
5. Cover small cuts with adhesive bandages
6. Cover wound, laceration, or cut with sterile non-adhesive dressing, if needed

Appendix E

Project Manager Letter of Support

Children's
HOSPITAL & MEDICAL CENTER

061021

Nursing Project Advisory Committee
c/o Amy Phillips, MSN, APRN-CNS
Children's Hospital & Medical Center
Clinical Education
7815 Farnam Drive
Omaha, NE 68114

Administrative Letter of Support

Dear Nursing Project Advisory Committee,

As Director of the Health Hut at the Henry Doorly Zoo, I support RandyLynn Becker in her project titled, "Nurse Driven Clinical Pathways for Childhood Injuries and Treatment".

I understand this support signifies that the proposed project:

- Fits the organization/area mission, vision, and values;
- Will receive the resource support necessary for successful completion (e.g., policy revision/implementation, staff education, EPIC changes/reports, staff time to complete data collection, etc.); and
- Results will be presented in a forum to the appropriate audience.

Sincerely,

D.J. Scrivner, MA, BSN, RN, NEA-BC
Director of Emergency Services, Trauma, Transport & Health Hut
8200 Dodge St.
Omaha, NE 68114-4113

Appendix F

Project Advisory Council at Children's Hospital and Medical Center QI Project Approval

Connelly, Susan C <SusanConnelly@creighton.edu>
To:

- You;
- Phillips, Amy

Thu 6/2/2022 10:04 AM

Good morning!
Thank you, Amy, for providing validation that RandyLynn's project does not require further review. I appreciate your feedback as well which I will ensure are incorporated in her project. The approval by Children's is only one step toward implementing your project. RandyLynn-Before you implement your project- you need to get approval by the College of Nursing (CON) Internal Review committee and Creighton's IRB. The CON internal review committee validates the rigor of the DNP project and confirms the evaluation of the project's intervention.

Additionally, per Amy's previous email it is preferred that you use "treatment algorithm" rather than "clinical pathway" which is still being used in your CON Internal Review Form and needs to be changed in your proposal. Also, the survey your created addresses the nurses' comfort level with the algorithms and not the actual use of the algorithm which was Amy's other request. We discussed how you could capture the actual use of the algorithm via chart review which needs to be addressed more specifically in your methods. All these items need to be addressed before you can implement as your Creighton DNP project.

Please email me your availability next week so we can meet and discuss these revisions more specifically.
Thanks,
Susan

From: Phillips, Amy <aphillips@childrensomaha.org>
Sent: Thursday, June 2, 2022, 6:26 AM
To: RandyLynn Becker <nurserandylynn13@hotmail.com>
Cc: Connelly, Susan C <SusanConnelly@creighton.edu>
Subject: RE: DNP project

Hello, it looks like the REDCap is updated, UNMC IRB stated the project is "not human subject research" so no further actions were needed, and you met the conditions outlined by the Nursing Project Advisory Committee.

Let me know if you need any help or have any questions! I'm excited to hear about your project findings. 😊

Thanks! Amy

Amy Phillips, MSN, APRN-CNS, CCRN-K
Clinical Nurse Specialist
Clinical Education

Appendix G

UNMC IRB approval for non-human subject research- Exempt Status (QI)

UNMC IRB

Kotulak, Gail D <gkotulak@unmc.edu>
To:You
Cc:Amy Phillips
Sun 5/22/2022 7:54 PM

2022 DNP Review Form-RandyLynnBecker.docx

Per the information provided, the Office of Regulatory Affairs (ORA) determined this project does not constitute human subject research as defined at 45CFR46.102. Therefore, it is not subject to the federal regulations. No further action is required. No Application needs to be submitted.

Please be advised that should anything change, which would result in the project meeting the definition of human subject research, ORA must be notified before any further research activity continues.

Should you have any questions please do not hesitate to contact the Office of Regulatory Affairs at 559-6463.

Sincerely,
Gail

Appendix H

Creighton University IRB Approval

DETERMINATION DATE:	07-Nov-2022
TO:	Randy Becker
FROM:	Social/Behavioral IRB
PROJECT TITLE:	Nurse driven algorithm pathways for childhood injuries and treatment at midwestern zoo
REVIEW CATEGORY:	Quality Improvement Project
SUBMISSION #:	2003444-01
SUBMISSION TYPE:	Initial Application
REVIEW METHOD:	Administrative
DETERMINATION:	**Acknowledged**

Thank you for submitting your Quality Improvement (QI) Project for IRB review. A list of all items reviewed with this submission can be found at the end of this letter.

The IRB has confirmed that the activities described in your protocol are for quality improvement purposes only and do not meet the definition of research established at 45 CFR 46.102(1).

Your Quality Improvement Project is acknowledged.

This project does not require ongoing IRB oversight or continuing review unless you plan to make changes to the activities described in your protocol. Please submit any proposed changes to your project prior to their implementation. Be advised that changes to the intent of the project to permit generalization beyond the initial QI setting will result in a change to the regulatory status of the project requiring additional IRB review.

If you have any questions, please contact the IRB Office at 402-280-2126 or irb@creighton.edu. Please include your project title and InfoEd submission number in all correspondence with the office.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained in Creighton University's IRB records.

Appendix I

Creighton IRB CON Internal Review Form

Creighton College of Nursing
DNP Proposal Review Form

Prior to submitting this form, the student should have the

Approval of the Written Proposal from DNP Chair:	**Chair initials: SC**
Approval of the Proposal Presentation to DNP Team:	Chair initials: SC
CITI completion:	Chair initials: SC
Approval of DNP Proposal Review Form by DNP chair:	Chair initials: SC

Student Name:	RandyLynn Becker, BSN, RN, CPN	July 30th, 2022
Clinical Track:	DNP- Pediatric Primary and Acute Care Nurse Practitioner	
DNP Project Team:	**Chair:** Susan Connelly, DNP, APRN-NP	**Practice Mentor**: DJ Scrivner, MA, BSN, RN, NEA-BC
Title of Project:	Nurse Driven Algorithms for Common Injuries Experienced at a Midwestern Zoo's First Aid Station (FAS).	
Background / Significance (Succinct paragraph)	The Midwestern Zoo hosts 2.1 million visitors annually. The FAS treats approximately 900 pediatric patients each year with heat stroke/heat exhaustion, allergic reactions, head injuries, and wounds being the four most common complaints. These conditions often result in minimal morbidity but without proper intervention may lead to significant sequelae and even death. The American Zoo Association (AZA) holds high standards on how safety is conducted at the zoo and recommends that written information be available to the zoo staff to treat emergent and non-emergent health concerns. The American Academy of Pediatrics (AAP) suggests the use of protocols and/or guidelines as an efficient approach to effectively treat the pediatric population and decreases variations in the care given to patients. These clinical guidelines reduce harm, foster cost-effective practice, and generate positive patient outcomes.	
Clinical Problem	Minor injuries or acute events are common at mass gatherings. Tourist attractions, such as zoos, are not immune to these challenges. Each year approximately 900 pediatric patients present to the FAS at a Midwestern Zoo with four common concerns: heat stroke/heat exhaustion, allergic reactions, head injuries, and wounds. These complaints may result in simple treatment, advanced treatment requiring referral to a healthcare facility, or emergent life-threatening treatment needing Emergency Medical Services. Both the American Academy of Pediatrics and zoological society encourage the use of	

	clinical practice guidelines to promote optimal patient outcomes. However, the FAS does not currently utilize an efficient, deliberate approach to manage these pediatric patients.
Summary of Literature (Succinct paragraph)	Research supports the use of nurse driven evidence-based clinical pathways and/or algorithms. Nurse-driven clinical pathways were studied in various pediatric patient settings and suggested positive patient results in the following arenas: oral rehydration therapy, antibiotic administration for febrile neutropenic patients with AML, early administration of oral corticosteroids to patients who presented with moderate to severe acute asthma exacerbations, and indwelling catheter removal protocol to reduce catheter-associated urinary tract infection (CAUTI) rates in a pediatric intensive care unit (PICU). These studies supported nurses' independent thinking and critical thinking skills to effectively and safely integrate the algorithm to manage patients who present with acute needs.
Purpose Statement	The purpose of this project is to create a systems change. The intention is to integrate an evidence-based, standardized treatment algorithm for the four common pediatric injuries and medical needs that are seen at the Midwestern zoo's FAS. This change will help the FAS nurses to efficiently assess, intervene, treat, and educate pediatric patients who are injured or in need of medical assistance.
Objectives / Outcomes	The purpose will be achieved with the following aims: 1) Develop evidence-based treatment algorithms for the top four most seen medical concerns at the FAS: Heat Illness, Head Injuries, Anaphylaxis/Allergic Reaction, and Wound Care. 2) Educate the nursing staff on the new treatment algorithms. Including documentation practices that indicate implementation of the algorithms. 3) Evaluate the systems change with PDSA cycles: • Gather FAS nurses' impressions of the usability of the algorithms using an online survey and adapt the algorithms as necessary • Analyze integration of the algorithms by reviewing the FAS nurses' clinical documentation regarding pre-determined key components of each specific algorithm.
Overview of Methods/Intervention	Sample: Six Registered Nurses at the FAS. Target Population: Pediatric patients (ages 0-19 years old) who present to the FAS with the 4 most common injuries: Heat Illness, Head Injuries, Anaphylaxis/Allergic Reaction, and Wound Care between August 15th-October 31st, 2022. Setting: Midwestern Zoo's First Aid Station, in Omaha, Nebraska. Methods: PDSA Cycles 1. Educate the FAS RNs via narrated PowerPoint regarding the purpose of the systems change and the specifics of the 4 algorithms-including expectations regarding documentation of use/patient care. 2. Implement Algorithms for 2 weeks at the FAS and survey the nurses regarding the usability of the algorithms and respond to any questions/concerns

	3. Make any changes to the Algorithms based on the online survey results and reintroduce the algorithms. 4. Perform chart reviews from the FAS RNs to determine if the algorithms were integrated into their practice by reviewing their clinical documentation for pre-determined key components of each specific algorithm.
How will outcomes be evaluated?	The 4 treatment algorithms will be evaluated for their effectiveness during the systems change using a chart review process. Pre-determined components of the algorithm should be evident within the nurse's charting. These clinical documentation measures are listed in the treatment algorithms. The specific measures for each algorithm will be listed out on an Excel spread sheet and "checked- off" as complete or incomplete as the nurse's documentation is reviewed. It is hopeful that 90% of the key documentation measures will be evident in the nurse's documentation. Descriptive statistics will also be collected and include the age of the patient and presenting condition.
How will this project be sustainable	It is anticipated that successful integration of the treatment algorithms (as evidenced by accurate charting) will promote deliberate, efficient patient care and ultimately result in positive patient outcomes. These positive results will encourage continued use of the algorithms and may even endorse the use of additional algorithms for other common concerns encountered at the FAS.

Your project has been Reviewed. Please discuss any comments with your Chair and **proceed** with IRB approval:

Sara E. Banzhaf DNP, APRN-NP, PMHNP-BC

Appendix J

FIRST AID STATION ALGORITHMS SURVEY

It has been a month since initiation of the FAS algorithms!
Now is your opportunity to provide feedback!

1. Were the algorithms user friendly?
    a. YES
    b. NO
2. Were you able to follow the algorithms pathway easily?
    a. YES
    b. NO
3. Were the algorithms visually appealing?
    a. Yes
    b. No
4. How did the algorithms change your practice?
5. What changes if any, would you make to the algorithm?
6. How did the education box in each algorithm enhance your patient education?
7. On a scale of 1-5, rate your confidence with applying the algorithm to access, treat, and educate pediatric patient's.

1- strongly disagree
2- disagree
3- neutral
4- agree
5- strongly agree

8. Was having a nurse driven treatment algorithm beneficial to help guide patient care in the event of a pediatric injury?
    a. Yes
    b. No
9. Would you like to see more pediatric treatment algorithms made for other common pediatric injuries seen at the FAS?
    a. Yes
    b. No

10. If yes to the question above, what pediatric injuries or health conditions would you like to see made into algorithms for use in the FAS?