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# Emergency Protocol Program for High School Athletes

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UNIVERSITY OF SAN DIEGO  
Hahn School of Nursing and Health Science

DOCTOR OF NURSING PRACTICE PORTFOLIO

by

Casandra Moyer, BSN

A portfolio presented to the

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DOCTOR OF NURSING PRACTICE  
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Emergency Protocol Program for High School Athletes

April 21, 2015

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## **Emergency Protocol Program for High School Athletes**

This evidence-based project (EBP) involved development and implementation of an emergency protocol (EP) education program for high school athletes and coaches at a southern California high school. A Doctor of Nursing Practice student, collaborating with health care and athletic personnel, conducted an assessment of the high school's EPs for management of asthma, anaphylaxis, diabetes, and heat illness. Then, an EP and educational program were created; coaches and athletes were educated on the protocol during a coaches' meeting and practice times, respectively. All participants completed pre- and post-tests, and mean knowledge scores were compared. The overall knowledge score increased by 10% for coaches and 5% for athletes. High school athletes' and coaches' knowledge regarding anaphylaxis increased the most. Although sports emergency data were examined, no emergencies related to the selected conditions occurred during the project period. Anaphylaxis should be an important focus of education for high school athletes and coaches.

Key words: adolescents, asthma, anaphylaxis, diabetes, heat illness, emergency, athletes, emergency protocol

## **Emergency Protocol Program for High School Athletes**

About 7.6 million high school students in the United States participate in athletics. With initiatives such as First Lady Michele Obama's Let's Move Campaign, these numbers will likely continue to increase (Olympia & Brady, 2013). In high school students, participation in athletics implies some risks to health secondary to illnesses or injuries or, less frequently, potential life-threatening events. For example, among high school football athletes, 30 heat-illness fatalities, one of the most common causes of high school athlete death, and 7 asthma-related fatalities occurred from July 1990 to June 2010 (Boden, Breit, Beachler, Williams, & Mueller, 2013). Asthma's prevalence among competitive high school athletes ranges from 10% to 50%. Heat illness cases number 5,946 annually, with the highest prevalence in male athletes 15 to 19 years of age (Centers for Disease Control and Prevention [CDC], 2011; LaBella, Sanders, & Sullivan, 2009).

Less common health emergencies in people under 20 years of age include diabetes (types 1 and 2) and anaphylaxis, but they have well-known and potentially profound consequences, such as long-term disability and/or death. Type 1 diabetes' prevalence in childhood is 1 in 400 to 500 children and adolescents under 20 years of age. Devadoss, Kennedy and Herbold (2011) found that only 50% of the American Diabetes Associate (ADA) guidelines were followed by adolescents who had type 1 diabetes, particularly athletes.

Anaphylaxis occurs at a rate of 22 per 100,000 person-years with an overall mortality rate of 0.6% and a percentage prevalence of 1.6% per 100,000 people in the

United States (Reed & Bodine, 2011; Wood et al., 2014). Based on the pediatric statistics above, diabetes mellitus and anaphylaxis may have some effect on high school student athletes throughout their season of play even though their incidences are lower than those of other conditions.

Efforts to prevent these illnesses need to occur in schools and during school-related activities. A component of prevention is being prepared to respond. Preparedness could be increased by the implementation of an emergency protocol and training to assist high school athletes, coaches, athletic trainers, and other school staff for the appropriate identification and response to selected health conditions.

At the high school setting where this evidence-based project (EBP) was implemented, occurrences of emergencies related to these conditions in the overall population of approximately 1,200 students during the 2013-2014 school year included asthma: 18 instances, diabetes: 4 instances, severe allergies: 16 instances, and heat illnesses: 30 instances.

### **Project Purpose**

The purpose of this EBP project was to develop and implement an emergency protocol (EP) education program for high school coaches and athletes related to asthma, severe allergy (anaphylaxis), diabetes, and heat illness at a southern California high school. The overall expected goals included increased knowledge among high school athletes and coaches regarding recognition and management of the selected health conditions. An unintended result could be an increased reporting of the selected health conditions due to better recognition. Early recognition and response to these health conditions may result in less profound consequences and fewer calls to 911.

## **Setting**

Approximately 200 of the 1,200 students in the school participated in fall sports, and approximately 20 coaches were involved in the fall sports program during the 2014-2015 school year. A limited number of emergency protocols were available at the site. Most of these were specific to heat illness and anaphylaxis with some information about each. However, none of these followed a flow chart format, and this information was not shared with athletes. The rest of the information available to coaches included a handbook with information regarding various illnesses and what to do when they occurred, but information was drawn from multiple sources with no consistent format.

## **Ethical Issues**

Since this evidence based project was an educational program implemented without the use of identifying information, any possible harm was mitigated. A letter of support was obtained from the principal at the participating high school. IRB approval to disseminate de-identified data was obtained from the University of San Diego.

## **Evidence-Based Practice Model**

Implementation of this project was accomplished using the catalyst model (Brown & Ecoff, 2011). The catalyst model uses the eight A's of assessing, asking, acquiring, appraising, applying, analyzing, advancing, and adopting to implement evidence-based practice. In this EBP project, the clinical problem was assessed by obtaining currently available emergency protocols and information related to the extent of high school athletes' experiences of asthma, anaphylaxis, diabetes, and heat illness. At the request of the stakeholders, a needs assessment of the athletic program was performed. Acquiring involved a review of the literature on emergency protocols for athletic settings using

databases such as Medline, PubMed, CINAHL, and Education Source. Once articles were obtained, they were appraised using the American Association of Critical-Care Nurses (AACN) evidence-leveling system (Armola et al., 2009). In addition, the project coordinator analyzed changes in high school athletes' and coaches' knowledge scores, and the incidence of the selected health conditions as well as responses to them. Finally, the coordinator sought to increase knowledge scores of high school athletes and coaches in their recognition and response through the creation and implementation of an emergency protocol educational program related to the selected health conditions. These activities represented the advancing and adopting phases of the catalyst model.

### **Summary of the Evidence for the Intervention**

The evidence for emergency preparedness in general has a long history which most likely originated long before the concept of school emergency preparedness. For schools, the first types of emergency preparedness involved fires and other natural hazards or disasters. For example, fire drills lead to decreased probability of an injury and loss of life in the event of a fire (Aspiranti, Pelchar, McCleary, Bain, & Foster, 2011; Brock, Sandoval, & Lewis, 2001; Kano, Ramirez, Ybarra, Frias, & Bourque, 2007). Greater emphasis on school preparedness arose from events such as the Columbine shootings and the terrorist acts of 9/11. As the literature has developed, such events have been shown to result in adverse health effects related to anxiety, post-traumatic stress disorder (PTSD), and decreased ability to learn (Aspiranti et al., 2011).

Evidence from the literature on school preparedness related to student health conditions provided the most support for this proposed EBP. For example, Cicutto, To, and Murphy (2013) conducted a randomized controlled trial using a public health nurse-



delivered asthma program to elementary school students and parents that resulted in increased quality of life, decreased disease-associated burden, and better self-management of asthma among children affected. Similarly, diabetes education for school staff resulted in increased knowledge and confidence in caring for students with diabetes (Smith, Chen, Plake, & Nash, 2012). Morris, Baker, Belot, and Edwards (2011) noted that over 65% of school nurses in selected California schools did not feel confident in other school staff's ability to identify and respond to anaphylaxis and that, although a legislatively permissive policy exists in California schools for stocking epinephrine, only 13% of reporting schools did so. Wahl, Stephens, Ruffo, and Jones (2015) found that training by a nurse increased knowledge and confidence in anaphylaxis identification and response in 4,818 participants. Even though similar interventions and effectiveness results were not identified in the evidence base for heat illness, the evidence for anaphylaxis supports similar interventions, such as education and provision of written materials, as potentially enhancing responses to this condition as well. Finally, because these studies originated in school settings, they can be extrapolated to the proposed high school athlete and coach population.

Literature specific to emergency protocol creation and education of students and athletic coaches and trainers provided further evidence to justify this EBP at the high school. First, in a 2007 survey, only 70% of public schools possessed an emergency protocol (EP). Similarly, even though 50% of public schools used an EP in the last year, EP implementation was practiced in only 26% of schools annually and never practiced in 36% of the schools. An efficient effective campus-wide communication system was present in only 49% of schools. Finally, athletic trainers were present at all athletic events

in only 34% of schools (Olympia & Brady, 2013; Olympia, Dixon, Brady, & Avner, 2007).

### **Implementation**

This EBP project involved the creation of an emergency protocol (EP) at a local high school for the following conditions: asthma, anaphylaxis, diabetes, and heat-related illness. The emergency protocols were based on best practice responses to the four conditions and were reviewed by pediatric healthcare experts and school officials for their adequacy and feasibility in the setting. Using Ohio Department of Health Emergency Guidelines available from the American Academy of Pediatrics, Council on School Health (2007), flow charts individualized to this program were created. Education sessions related to the protocol were provided separately for the high school coaches and athletes. Knowledge scores were collected before and immediately after the presentations. Planned data collection to assess knowledge retention approximately one month later did not occur due to changes in the sports season, failure of coaches and athletes to respond to a survey monkey questionnaire, and lack of further access to coaches and athletes.

### **Evaluation Questions and Methods**

Two outcome evaluation questions with appropriate targets/benchmarks were used to evaluate the effects of the program. An increase of 20% in knowledge scores was the benchmark set for coaches, with the benchmark for athletes set at a 15% increase. A 10-question knowledge test measuring high school athletes' and coaches' knowledge about asthma, diabetes, heat illness, and anaphylaxis was developed by the coordinator with the assistance of pediatric healthcare experts. The same knowledge test was used for

both coaches and high school athletes. No information regarding reliability and validity for the created knowledge test was ascertained.

The knowledge test was distributed to all the participants at the beginning of each EP presentation. Participants who completed the pretest were asked to complete the posttest after the education sessions.

## **Results**

Descriptive statistics were used to analyze project evaluation data. The target for participation in the education session was set at 90% for both coaches and athletes. Nineteen of twenty coaches (95%) participated in the initial program (70% male and 30% female). Sports represented by coaches included volleyball, football, lacrosse, cross country, track, golf, tennis, swim, cheer, basketball, sailing, water polo, soccer. Nineteen coaches completed the pretest and 18 completed the posttest. Among high school athletes, 107 of the 207 registered fall athletes (51%) participated in the program (51% male and 49% female) ranging in age from 14-18 years. Sports represented by high school athletes included the fall sports of volleyball, football, and tennis. One hundred seven athletes completed the pretest and 88 completed the posttest.

Figures 1 and 2 display the change in mean knowledge scores before and after the education session for athletes and coaches, respectively. As noted in Figure 1, the mean knowledge score for the athletes increased by 5%, not meeting the benchmark of 15%. Mean scores for the coaches increased by 10%, not meeting the benchmark of 20%.

Table 1 presents changes in the percentages of participants who answered specific questions correctly before and after the educational presentation. High school athletes'

knowledge regarding correct management of severe allergic reaction increased the most, from 70% to 85% correct responses. The next greatest increase in athletes' knowledge was related to correct bee sting management (78% to 92%). Finally, athletes' knowledge regarding correct initial management of an asthma attack increased from 68% to 80%.

Table 2 provides related results for the coaches. As noted in the table, coaches entered the project with relatively high levels of knowledge. Coaches' knowledge increased most regarding correct management of severe allergic reaction, with correct responses increasing from 42% to 94%. Overall, coaches' performance improved most in the anaphylaxis component of the knowledge test. No documented sports emergencies occurred during the project period, so project effects on actual emergency responses are not known.

## **Discussion**

The objective of this project was to demonstrate increased knowledge attainment in all participants: coaches and athletes. Although the increases in mean knowledge scores were modest and did not reach the intended bench-marks, the knowledge gained may result in earlier recognition of and response to athletic emergencies. Other findings related to emergency incidents in the larger school population during the project period suggest that the project could be implemented on a school-wide basis. However, this specific EBP should be reinforced at the start of each athletic season to improve knowledge and its retention among both coaches and athletes.

As noted earlier, education has been shown to increase participants' knowledge of a variety of health-related information. In this project, anaphylaxis and asthma

demonstrated the greatest increases in knowledge in the athletes. Diabetes knowledge exhibited the least change, but diabetes questions were among those least often missed on the pretest indicating fairly high levels of knowledge at the start of the project. Heat illness knowledge increased slightly. For coaches, bee sting management represented the knowledge component with the greatest change followed by anaphylaxis identification. Because coaches missed fewer questions overall, significant gains in knowledge were difficult to achieve.

This EBP project resulted in several lessons learned. First, a coordinator for this type of project should be located at the implementation site. For example, a school-based nurse or nurse practitioner would be ideally suited as a coordinator. The coordinator would be able to access coaches and athletes more readily and this could result in greater participation. Although most of the coaches participated in the project, only slightly more than half of the fall athletes participated. Another issue was differing modes of presentation of the same content to the two groups. In the coaches' presentation, the learning mode was primarily visual using a Power Point presentation. In the high school athletes' sessions, the learning modes were primarily auditory and demonstration with an Epi-pen practice device. A larger number of participants in each group might have indicated which presentation style was most effective in the population.

A lack of demonstrated reliability and validity for the knowledge test is another limitation of the project. In addition, it would have been helpful to obtain the age of each high school athlete participant to determine if any age differences in learning occurred. Finally, some high school athletes attended a semester long health education class offered

at the school covering similar material. Prior exposure to this content may have influenced these athletes' pre- and post-program knowledge scores.

As noted earlier, because no instances of emergencies occurred in the sports programs, the real-life effectiveness of the education sessions is unknown. Given the small gains in knowledge, it is probable that this material will need to be reinforced periodically among coaches and each year among students entering or returning to sports programs. In addition, since emergency incidents did occur in the larger school population, it might be of use to expand the EP program to the entire school, rather than just in the athletic programs.

### **Conclusion/Implications for Nursing Practice and Research**

This EBP implemented an evidence-based strategy of emergency protocol creation and training for relevant parties: high school athletes and coaches. The emergency protocol program that was developed was provided to the school as a hard copy and approved by supervisory stakeholders to promote future use and support project sustainability. Similar emergency protocols can be replicated in many school settings to address the urgent identification and response of high school students and staff to health emergencies in school populations. The program could cost between a few hundred to a few thousand dollars dependent upon community resources available and project goals related to more in-depth implementation. This particular school had identified community resources and volunteers that may prove beneficial. Ultimately, the cost-benefit ratio would be determined by cost of program implementation divided by the cost of the loss of any athlete's (14 to 18 years old) productivity by disability or death. While the

chances of athlete death or permanent disability occurring are low, the benefits to society, the individual and his/her family far outweigh the costs of implementing this emergency protocol with concomitant presentations to coaches and student athletes. In addition, given the high numbers of participating students in this program (107 total), bringing health educational programs to the community contributes high value compared to traditional individual student clinic visits to see a provider.

This particular EBP's objectives and materials could potentially be applied to many other athletic programs and/or schools throughout California and the United States, with the caveat of the need for regular reinforcement regarding its use. Benefits to a standardized approach to educating athletes and coaches prior to the season include reaching large numbers of participants. Anaphylaxis and asthma management should be an important focus of education for high school athletes and coaches. The potential of such an EBP cannot be overestimated in its lasting contribution to the health of all children.

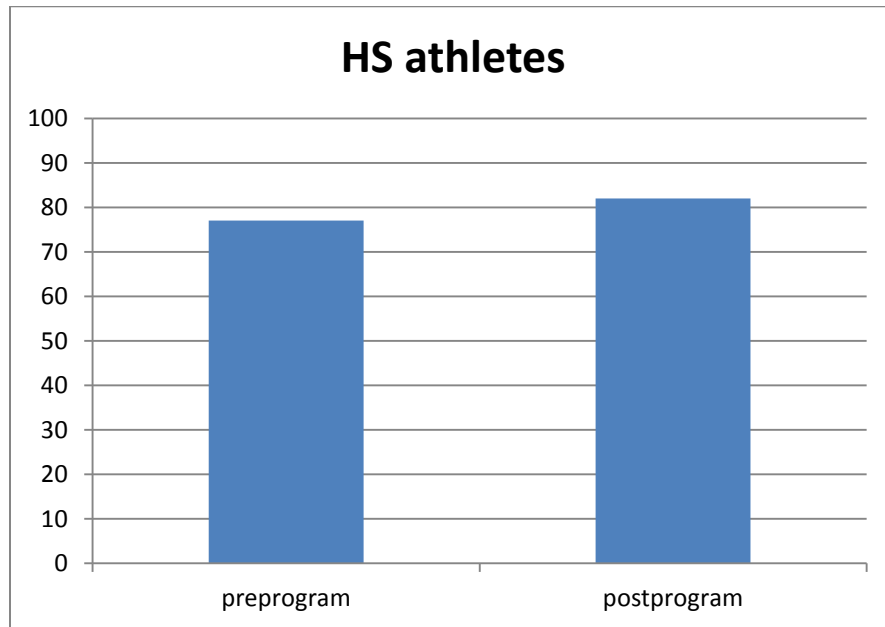
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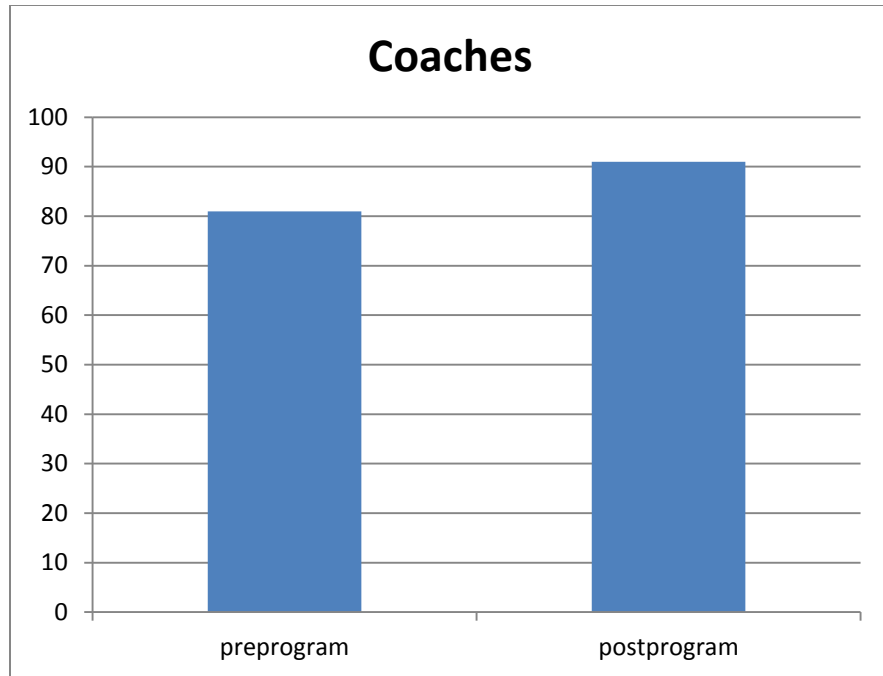


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*Figure 1.* Mean High School Athletes' Knowledge Test Scores before and after the Education Program.



*Figure 2.* Mean Coaches' Knowledge Test Scores before and after the Education Program.

Table 1

*Athlete Knowledge Test Percentage of Correct Responses*

Question	Pretest (%)	Posttest (%)
1. Anaphylaxis recognition	75	78
2. Anaphylaxis management	70	85
3. Bee sting management	78	92
4. Asthma recognition	91	85
5. Asthma recognition	70	67
6. Asthma management	68	80
7. Diabetes recognition	83	82
8. Diabetes management	82	86
9. Heat exhaustion/illness recognition	79	86
10. Heat exhaustion/illness management	74	82

Table 2

*Coaches' Knowledge Test Percentage of Correct Responses*

Question	Pretest (%)	Posttest (%)
1. Anaphylaxis recognition	52	89
2. Anaphylaxis management	52	78
3. Bee sting management	47	94
4. Asthma recognition	100	89
5. Asthma recognition	95	94
6. Asthma management	84	83
7. Diabetes recognition	95	100
8. Diabetes management	84	100
9. Heat exhaustion/illness recognition	95	83
10. Heat exhaustion/illness management	89	94

## HIGH SCHOOL ATHLETE EMERGENCY PROTOCOL PROGRAM

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**Casandra Moyer, RN, BSN**, Kathleen Sweeney, DNP, CPNP-PC, and Mary Jo Clark, PhD, RN, Hahn School of Nursing and Health Science, University of San Diego, San Diego, CA, Connie Martinez, MS, ATC, Dee Cannon, PhD, MSN

**Project Aim:** The purpose of this project was to develop and implement an emergency protocol education program for local high school coaches and athletes related to asthma, severe allergy (anaphylaxis), diabetes, and heat illness.

**Background:** About 7.6 million high school students in the United States participate in athletic. In high school students, activity in athletics implies some risks to participants secondary to illnesses or injuries or, potentially life-threatening conditions. Among high school athletes, heat illness and asthma are relatively common and fatalities for each have been documented. Less common health conditions in adolescents include diabetes (types 1 and 2) and anaphylaxis, but they have well-known and potentially profound consequences such as long-term disability and/or death if not identified and managed in a timely manner. In addition, in more recent years, food allergy and concomitant anaphylaxis has been increasing for unknown reasons. Finally, diabetes resulting from childhood obesity has also increased in prevalence.

A student Nurse Practitioner (sNP) performed a detailed needs assessment of a local high school's emergency protocols for asthma, severe allergy (anaphylaxis), diabetes, and heat illness in high school athletes. An evidence-based emergency protocol individualized to the athletes of this particular program was created. High school athletes and coaches

participated in a minute presentation regarding the emergency protocol to coach and peer recognition of these conditions. All participants completed knowledge based tests directly before and after the presentation and approximately one month. Mean knowledge scores of coaches and athletes were compared.

**Outcomes:** For coaches, the overall knowledge score percentage increased by 10%. For athletes, the overall knowledge score percentage increased by 5%. High school athletes' knowledge regarding correct management of severe allergic reaction increased from 70% to 85%. Athletes' knowledge regarding correct bee sting management increased from 78% to 92% and their knowledge regarding correct initial management of asthma attack increased from 68% to 80%. Coaches' knowledge regarding correct management of severe allergic reaction increased from 42% to 94%. The greatest increase in post-test knowledge of high school athletes was related to the anaphylaxis component of the EP program, with total increases of 15% on severe allergic reaction management and 14% on bee sting management. The greatest increase in coaches' knowledge was related to severe allergic reaction management (52%). No documented sports emergencies occurred during the project period so project effects on actual emergency responses are not known.

**Conclusions:** A school nurse or nurse practitioner is ideally suited to develop and implement this EBP in a community based setting. Benefits to a standardized approach to educating athletes and coaches prior to the season include reaching large numbers of participants. Anaphylaxis and asthma management should be an important focus of education for high school athletes and coaches.



# High School Athlete Emergency Protocol Program

Cassandra Moyer, RN, BSN, DNP student, Kathleen Sweeney, DNP, CPNP-PC, Mary Jo Clark, PhD, RN, Dee Cannon, PhD, Hahn School of Nursing and Health Science, University of San Diego, San Diego, CA



## Background

- An estimated 7.6 million high school students in the United States participate in athletic activities annually (Olympia & Brady, 2013).
- Among high school athletes, heat illness and asthma exacerbation are relatively common and fatalities related to each have been reported (Centers for Disease Control and Prevention [CDC], 2011; LaBella, Sanders, & Sullivan, 2009).
- The incidence of food allergy and concomitant anaphylaxis has increased (Wahl, Stephens, Ruffo & Jones, 2014).
- Type 2 Diabetes resulting from childhood obesity has increased in prevalence (Reed & Bodine, 2011; Wood et al., 2014).

## Aim/Purpose

- The purpose of this evidence-based project (EBP) was to develop and implement an emergency protocol educational program for high school athletes and coaches at a local San Diego High School.

## Evidence

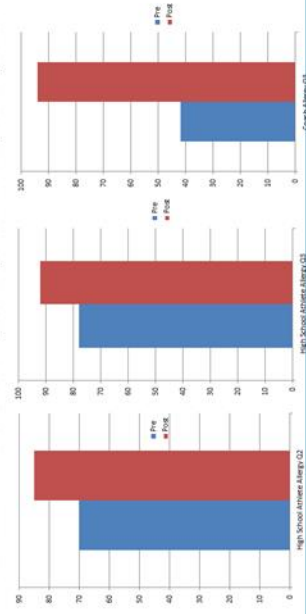
- Education and participating related to fire drills for emergencies leads to decreased probability of an injury and/or loss of life (Aspranti, PeiChar, McCleary, Bain, & Foster, 2011).
- A randomized controlled trial using a public health nurse-delivered asthma program to elementary schools resulted in increased quality of life, decreased disease associated burden, and promoted improved asthma management in school aged children (Cicuto, To, & Murphy, 2013).
- Diabetes education for school staff resulted in increased knowledge and confidence in their caring for students with diabetes (Smith, Chen, Plake, & Nash, 2012).

## Practice Innovation Process

- The project coordinator, collaborating with health care and athletic personnel, performed a detailed needs assessment of a San Diego high school's emergency protocols (EPs) for management of athletes with asthma, severe allergy (anaphylaxis), diabetes, & heat illness.
- No standardized educational program was identified for athletes. Coaches' training was limited to CPR certification, handouts distributed by the athletic trainer for varied health conditions, and concussion management.
- An evidence-based EP and educational presentation individualized to the athletes and coaches was created related to asthma, severe allergy, diabetes, and heat illness.
- Educational presentations related to the EPs were provided at a pre-season mandatory coaches meeting during a 30-minute interactive workshop.
- High school athletes were presented the EP educational session at the beginning of their regularly scheduled practice time early in the sports season.

## Tables/Graphs

- For coaches, overall pre-test mean scores were 8.1 and overall post-test mean scores 9.1. Nineteen coaches completed the pre-tests and 18 completed the post-tests.
- For high school athletes, overall pre-test mean scores were 7.7 and post-test mean scores were 8.2. One hundred seven athletes completed the pre-test and 88 completed the post-test.



## Evaluation Method & Benchmark

- Participants completed a 10-question test related to their knowledge of each of the four topics presented directly before and after the presentation.
- Mean knowledge scores for coaches and athletes pre and post sessions were compared.
- Data on the occurrence of specific emergencies and treatment for the high school athletic program was also collected.

## Demographics

- Coaches: 19 of 20 (95%) participated in the initial program, 70% male, 30% female.
- Sports represented by coaches included boys' and girls' volleyball, football, lacrosse, cross country, track, golf, tennis, swim, cheer, basketball, sailing, water polo, and soccer.
- Athletes: 107 of the 207 fall athletes (51%) participated, 51% male and 49% female.
- Ages: 14-18 years
- Sports represented by high school athletes included fall sports of volleyball, football, and tennis.

## Results

- For coaches, the overall knowledge score percentage increased by 10%.
- For athletes, the overall knowledge score percentage increased by 5%.
- High school athletes' knowledge regarding correct management of severe allergic reaction increased from 70% to 85%.
- Athletes' knowledge regarding correct bee sting management increased from 78% to 92%.
- Athletes' knowledge regarding correct initial management of asthma attack increased from 68% to 80%.
- Coaches' knowledge regarding correct management of severe allergic reaction increased from 42% to 94%.
- The greatest increase in post-test knowledge of high school athletes was related to the anaphylaxis component of the EP program, with total increases of 15% on severe allergic reaction management and 14% on bee sting management.
- The greatest increase in coaches' knowledge was related to severe allergic reaction management. (52%)
- No documented sports emergencies occurred during the project period so project effects on actual emergency responses are not known.

## Conclusions/Implications for Practice

- A school nurse or nurse practitioner is ideally suited to develop and implement this EBP in a community based setting.
- Benefits to a standardized approach to educating athletes and coaches prior to the season include reaching large numbers of participants.
- Anaphylaxis & asthma management should be an important focus of education for high school athletes and coaches.

## Reference

- Available on handout

## Stakeholders' Handout

The purpose of this evidence-based project (EBP) was to develop and implement an emergency protocol (EP) educational program regarding anaphylaxis, asthma, diabetes, and heat illness for high school athletes and coaches at CHS. This was based on a needs assessment for your institution, as well as the guidelines put forth by the American Academy of Pediatrics. Educational presentations related to the EPs were provided at a mandatory coaches meeting during a 30-minute interactive workshop. High school athletes were presented the EP educational session at the beginning of their regularly scheduled practice time. Participants completed a 10-question test related to their knowledge of each of the four topics presented directly before and after the presentation.

### Participation

- Coaches: 19 of 20 (95%) participated in the initial program. 70% male, 30% female. Nineteen coaches completed the pre-tests and 18 completed the post-tests. Sports represented by coaches included: boys' and girls' volleyball, football, lacrosse, cross country, track, golf, tennis, swim, cheer, basketball, sailing, water polo, and soccer.
- Athletes: 107 of the 207 fall athletes (51%) participated. 51% male and 49% female, Ages: 14-18 years. One hundred seven athletes completed the pre-test and 88 completed the post-test. Sports represented by high school athletes included fall sports of volleyball, football, and tennis.

### Results

- For coaches, overall pre-test mean scores were 8.1 and overall post-test mean scores 9.1 (10%).
- For athletes, overall pre-test mean scores were 7.7 and post-test mean scores were 8.2 (5%).
- High school athletes' knowledge regarding correct management of severe allergic reaction increased from 70% to 85% (15%).
- Athletes' knowledge regarding correct bee sting management increased from 78% to 92% (14%).
- Athletes' knowledge regarding correct initial management of asthma attack increased from 68% to 80% (12%).
- Coaches' knowledge regarding correct management of severe allergic reaction increased from 42% to 94% (52%). Overall, coaches' knowledge regarding the anaphylaxis component of the program demonstrated the greatest increase.
- No documented sports emergencies occurred during the project period so project effects on actual emergency responses are not known.

### Conclusions

- Large-scale educational programs related to health issues can improve knowledge regarding recognition and initial management of potentially serious conditions.
- In an attempt to ensure sustainability, the materials and educational component of this program will be provided for future use.
- Perhaps this pilot program could be extended to the whole school beyond just the fall sports' athletes. Other conditions could be added based on school needs.
- Partnerships with community resources (i.e. CHS and USD) may provide opportunities for additional program implementation and health education to the students in their learning environment.
- THANK YOU: to Connie for the mentoring that she provided, for the support of the CHS athletic department, and the CHS administration for allowing these important health issues to be presented.

Table 1

*Athlete knowledge test percentages*

Knowledge question	Pre-test % correct	Post-test % correct
1 ANAPHYLAXIS	75	78
2 ANAPHYLAXIS	70	85
3 ANAPHYLAXIS	78	92
4 ASTHMA	91	85
5 ASTHMA	70	67
6 ASTHMA	68	80
7 DIABETES	83	82
8 DIABETES	82	86
9 HEAT ILLNESS	79	86
10 HEAT ILLNESS	74	82

Table 2

*Coach Knowledge Test Percentages*

Knowledge question	Pre-test % correct	Post-test % correct
1 ANAPHYLAXIS	52	89
2 ANAPHYLAXIS	52	78
3 ANAPHYLAXIS	47	94
4 ASTHMA	100	89
5 ASTHMA	95	94
6 ASTHMA	84	83
7 DIABETES	95	100
8 DIABETES	84	100
9 HEAT ILLNESS	95	83
10 HEAT ILLNESS	89	94