Senior Project Proposal Sarah Weber

I. Are We Prepared to Stop the Bleed?

II. Contact Information:

- BASIS Advisor's Name: Trent McDowell
- Internship Location (Site Name & City/State/Country): Northern Arizona Healthcare Flagstaff/Arizona/United States of America
- Off-Site Advisor's Name: Shawn Bowker and Paula McAllister
    - Title: Injury Prevention/Outreach Coordinator, Trauma Services and IRB Administrator, Office of Research & Grants

III. Thesis:

The Stop the Bleed program is a program that teaches the general public to control bleeding. This program was initiated because bleeding is one of the leading causes of preventable deaths. The training includes how to put on various types of tourniquets, packing wounds, how to apply direct pressure, as well as when it is appropriate to apply any of these techniques.

In this project, I will explore how prepared Stop the Bleed training program participants feel after completing the training. I will be doing this by creating and distributing a survey through this internship with Northern Arizona Healthcare.

IV. Background:

I am interested in the healthcare field and I want to explore the various aspects of what people do at a hospital. I am also interested in jobs outside the hospital setting, such as jobs that entail conducting surveys and sorting data about people's health.

I am currently participating in a program called "Future Faces of Family Medicine" to help explore the field and solidify my interest.

I have taken AP Statistics, which will facilitate data collection and organization. I have also taken multiple biology classes throughout the years.

V. Identify Central Issue or Question and Responsibilities:

No one is able to predict how big, when, or where mass casualty events will be so it is important that the medical professionals and bystanders are prepared for the worst. One example is on October 1st 2017: The Las Vegas Massacre. This resulted in 58 people being killed and injured and over 800 others were either injured as a direct result of gunfire or the chaos that ensued. People started running in the direction of major roads blocking traffic leading to further delays in the multidisciplinary teams arriving at the scene to both help people and arrest the shooter. People can die of uncontrolled hemorrhage in 5 to 7 minutes and is the leading cause of preventable deaths so it is important that the public knows how to control bleeding. That is what Stop the Bleed hopes to achieve.

I have already attended multiple Stop the Bleed trainings and will continue to attend and assist other trainings as the year goes on. In early January, we will begin the draft of the survey with the goal of sending out the survey by the end of january or early february. Some of the survey questions will include: length of time since last taken a class, why the participant took the class, what they got out of taking the class, did they buy a Stop the Bleed kit/tourniquet/other materials. This survey will be multiple choice along with free response questions. The survey will be sent out multiple times (one original and two reminders). During February, I will research types of qualitative analysis and decide on methods to use for the project. When March comes, I will help the hospital analyze the responses to the surveys.

VI. Performance Factors and Measures of Success:

My performance will be graded on the quality of work, organization, communication, teamwork, and problem-solving with a scale from one to five, with five being the highest score. My advisors will also sign a timecard that tracks how long I work and meet the minimum requirement.

I will be creating a survey that will be used in future years at Northern Arizona Healthcare. I will also be analyzing the data that will add to the studies on how to improve Stop the Bleed classes.

Measurements of Performance

Quality	1	2	3	4	5
Organization	1	2	3	4	5
Communication	1	2	3	4	5
Teamwork	1	2	3	4	5
Problem -solving	1	2	3	4	5

Timecard:

Northern Arizona Healthcare
Week of:

Supervisor name:
Intern name:

Day	Date	Start Time	Finish Time	Total Hours
Monday				
Tuesday				
Wednesday				
Thursday				
Friday				
Saturday				
Sunday				

Total hours for week:

Intern signature:_____ Date:_____

Supervisor signature:_____ Date:_____

VII. Internship Ties

This internship allows me to work in a hospital setting which would be helpful because I would like to work in a hospital after college. I will be working with the things that normally wouldn't be able to in a hospital setting like creating and distributing surveys. This will give me a deeper understanding and more experience with the work of people who I am doing the internship with. I plan on going to medical school and take opportunities that let me explore the field more than I have so far. I would love to do similar work in college and after. The survey is important to get more information on how the whole system can improve to save more lives. Even if it may not be the same work such as surveys, I would like to improve the other factors of the process with other types of research when an opportunity shows.

VIII. Review of Literature:

Mass casualty events/incidents (MCEs/MCIs) are characterized as "multiple fatalities and a sudden temporal surge of injured patients necessitating emergency services."[1] To understand how the Stop the Bleed initiative works, we first have to understand how hospitals respond to MCEs. After such an event, a multidisciplinary team, which includes emergency medical services (EMS), local law enforcement, government agencies, and city officials, heads to the event site. The first step for EMS is to identify and prioritize the injured before emergency transport, a process known as triage and there are multiple triage systems, including Sort, Assess, Lifesaving Intervention, Treatment/Transport (SALT) and Simple Triage and Rapid Treatment (START). The objectives of casualty distribution are "to bring the right patients to the right clinics and avoid unnecessary overwhelming health care centers."[2]

According to one systematic review, although the allocation of patients and materials is important, there are several problems with the identified triage systems .[3] One problem is the current triage systems are not accurate and lead to the misallocation of patients. Furthermore, many of the studies do not focus on actual MCEs where stress and chaos play a substantial role. A more specific study that was not included in the systematic review due to its broad set of search terms, but in a separate study including the ability of nursing students to triage. Because nursing students rarely experience disasters, the case accuracy rate was 26% with 73% attributed to undertriage and 27% attributing to overtriage.[4] Triage requires a reliable system and experienced; however, when an MCE occurs, there are generally not enough trained healthcare personnel to ensure effective and accurate triage for a high volume of injured patients. This is why the triage systems are flawed. There are not enough experienced people available to determine the degree of injuries quickly. These studies are trying to figure out a way to come up with better systems to accommodate that. Furthermore, the amount of blood that can be distributed is limited: blood has a limited shelf life and, in MCEs, must be type O. On average, EMS units take 7 minutes from the time of a 911 call to arrive on the scene of

the incident, not including delays or taking into consideration the time required for triage and tourniquet application. Because of this, the real first responders are the people who are already there.

Another study notes that tourniquet application is not intuitive.[5] In this study, 236 participants applied three different types of tourniquets. The rates of successful tourniquet application for the Ratcheting Medical Tourniquet(RMT), the Stretch Wrap and Tuck Tourniquet (SWAT-T), and the Combat Application Tourniquet (CAT) were 23.4%, 10.6%, and 16.9%, respectively. The most common error was inadequate tightness: 74.1% of participants made this mistake followed by improper placement technique, and incorrect positioning. Tightness is the most common error[6,7,8] and the second most common in one specific case.[9] There were also mistakes that were specific to each type of tourniquet like not using the windlass with the CAT and not knowing how to use a ratchet for the RMT.

Researchers also examined whether people who have not attended a Stop the Bleed class have the chance to attend a class would be ready to apply a tourniquet when provided with instructions.[6] One study developed just- in-time (JiT) instruction card consisting of eight steps and six photographs and examined how much the card helped a layperson apply a tourniquet. The participants were randomized into two groups at a ratio of 3:1, 3 being the JiT instruction group and 1 being the no-instruction control group. The participants had to apply a CAT to the lower limb of a mannequin with or without instructions as they were timed and assessed on the application after they left. The success rate of participants who received JiT instructions was 44.14% compared to the 20.41% success rate of participants who did not receive instructions.[6] Because use of the JiT cards doubled the success rate, other studies were conducted to determine what kind of instructions can further increase the success rate and to compare the card instructions to actual classes. The participants received different treatments: auditory instructions, website instructions, JiT instructions, a class, and a combination of treatments. As in the other tests, an observer timed and assessed the application.[6,7] The JiT instruction cards yielded similar rates of success, whereas the audio instruction did not significantly improve the success rates. The classes yielded the most improvement with 88% applying the tourniquets successfully. As the instructions need improvement, classes currently provide the most effective training for bleeding control. Whether the participants retain the skills is a different story.

Numerous studies of the Stop the Bleed initiatives have been conducted, but the most important ones focus on retention: the point of educating laypeople is for them to be able to use the instruction in real events. Retention was tested by reexamining laypeople

3-9 months after undergoing The Bleeding Control Basic (B-Con) course. This study revealed they were able to see a significant decay in skills.[8] Graded on an accuracy scale of 0 to 100 percent, the baseline score on the bleeding control skill test was 100%, but at 6 months, the mean test score was significantly lower at 69%.[9]

None of these studies focused on how to identify someone who needs a tourniquet, except for a brief mention of a quiz that participants took after a class to identify whether a tourniquet is needed. The average score on the quiz was approximately 4 out of 5. This leads to additional questions about why people who take the class and say on surveys that they are comfortable using the Stop the Bleed methods in actual situations did not buy the necessary materials to use in real events. Some of these reasons included time, cost, and accessibility so pre-placement of these materials in public arenas may be more appropriate than relying on individuals to acquire the materials.[10]

Even though there have been many general studies on MCEs in general, other than retention studies, there have been few to no studies on school shootings and how parents or people who have already taken the class perceive the Stop the Bleed classes.

IX. Bibliography:

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