Master of Public Health

Integrative Learning Experience Report

IMPLEMENTATION OF AN ELECTRONIC MEDICAL RECORD SYSTEM FOR LAFENE HEALTH CENTER'S ATHLETIC TRAINERS

by

Jamie Elizabeth Gallagher

MPH Candidate

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Graduate Committee:
Dr. Emily Mailey
Dr. Mary McElroy
Dr. Gina Besenyi

Public Health Agency Site:
Lafene Health Center
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Site Preceptor:
Michael P Campbell, MD

KANSAS STATE UNIVERSITY
Manhattan, Kansas

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Abstract

Electronic medical records (EMRs) are important tools that allow medical care professionals to communicate. One aspect of the healthcare industry that has not been frequently studied is the communication between athletic trainers who work with recreation athletes and physicians in a university setting. Through my Applied Practice Experience at Lafene Health Center at Kansas State University, I implemented an EMR system in order to improve the communication of recreation athlete injuries evaluated by an athletic trainer and the physicians who provide follow up care. I evaluated the initial and potential impact of the implementation of the EMR system for both clinicians and patients. I collected qualitative data through interviews with athletic trainers and physicians who were involved with the implementation process. Additionally, quantitative data were collected to investigate if there was a change in documented athletes and corresponding follow up rates.

The results suggested implementation of this EMR elicited an increase in communication between athletic trainers and physicians. Consequently, physicians reported more efficient evaluations because of known injury history. Furthermore, doctors were able to spend more time discussing injury education and treatment plans within an appointment because of additional time. Athletic trainers were also able to assist athletes more effectively by providing them with injury and rehabilitation handouts through the EMR. This EMR created a more cohesive communication environment for the medical staff involved with the evaluation and treatment of recreation athletes at Kansas State University.

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Chapter 1- Background

Introduction:

Because of high risk of injury occurrence while playing intramural sports, institutions like Kansas State University employ athletic trainers to improve the quality of care to these recreation athletes. According to Arthur-Banning et al (2018), very little is known about the injury rates of intramural athletes because of miscellaneous reporting tools and recreation facilities do not have to report their injury rates to intramural sport governing bodies such as the National Intramural-Recreational Sports Association (NIRSA). This study also reported that over a two-year period from campus recreation, intramural sports reported 539 injuries.

Typically, the injured athletes at Kansas State University are evaluated by an athletic trainer to obtain a clinical diagnosis of their injury and then follow-up at Lafene Health Center's Sports Medicine Clinic to receive a medical diagnosis. For over a decade, communication between athletic trainers and follow up doctors at Lafene has been minimal because there were no communication devices or policies in place. As an athletic trainer, and Master of Public Health Student, I identified these communication gaps and how they affected both clinicians and patients at Lafene. Then, I proposed a solution of an EMR system and learned the implementation process within a healthcare facility. I studied the patient and clinician outcomes of this EMR and related this experience to my MPH competencies as well.

Literature Review:

EMR Benefits

The communication of patient health information is a priority in any health care setting. Well-organized communication amongst health care professionals allows for a more efficient patient care process. *Pending Studies at Hospital Discharge: A Pre-post Analysis of Electronic Medical Record Tool to Improve Communication at Hospital Discharge* is a prospective quality-improvement study that highlights the significant gaps in healthcare documentation performed by Kantor et al. (2015). Kantor et al. (2015) implemented a new tool utilizing a hospital electronic medical record (EMR). This EMR tool opened the door for more communication between providers in different care settings such as ambulatory, tertiary, and primary care practices.

Kantor et al. (2015) main area of study is communication of pending studies for discharged patients. These pending studies comprised of lab work and other diagnostic testing. The purpose of the EMR was to improve the communication of pending studies records in a patient's discharge summary. The article begins by emphasizing the outcomes of communication failures such as delays in diagnoses and treatment as well as increased rehospitalization rates. The study was conducted in a small tertiary care hospital in California. The pre-intervention discharge summary, which included pending studies, was prepared by the discharging intern or resident and finalized by the attending physician. Their goal of this implementation was to better

understand the frequency of patients who had pending studies discharge rates and the quality of communication of these pending summaries in the discharge summary.

The data collected for this study comprised the comparison of frequency, category, and results of pending studies. Kantor et al. (2015) additionally surveyed hospital staff about their attitudes towards and awareness of the documentation and communication of pending studies in discharge summaries. Categorical variables and proportions were analyzed using the chi-squared test.

The results of this data displayed that there were no statistical differences between pre- and post- intervention data for frequency of patients discharged with pending studies. The most significant change could be seen when measuring the communication of pending studies. Pre-intervention only 18% of the pending studies were communicated on the discharge summary. After the implementation of the EMR tool, the communication of pending studies increased to 43%. When reviewing the staff surveys post-intervention, it seemed that there were variable responses when discussing the frequency of communicating pending studies and who was responsible for reporting them in the discharge summary. They reported that that out of a score of 100, 64.2 was the score when rating of the frequency of communication of pending studies. Additionally, many believed that the responsibility of reporting pending studies in the discharge summary fell on many people, where it was not designated to just one person. This demonstrates the underlying issue that assumption of responsibility can cause communication failures, which could negatively affect patient care.

When discussing the outcomes of this study, Kantor et al. (2015) state that though there has not been a significant number of other studies that have investigated the same tool, they found that the EMR tool significantly increased the communication of studies that were pending at the hospital. The study indicates that this EMR tool has created a more reliable source for patient communication rather than relying on human memory. Patient safety was another cornerstone of this implementation. Kantor et al. (2015) believed they had increased patient safety by creating a more systematic approach to make sure that their pending studies were communicated at the time of discharge and were not forgotten about. Forgetting to relay pending studies to a patient could be dangerous and lead to delays in care.

There were multiple limitations to this study. In particular, because this study was performed in a small institution, the generalizability was limited. Other outliers were the small sample size as well as the limited time frame of the study. Kantor et al. (2015) also explained that because clinic staff utilized a premiere EMR program software, other hospitals and institutions may not be able to operate a sophisticated system exactly like theirs. Because of this, replication of the study could be difficult.

In conclusion, this study demonstrates that Kantor et al. were able to increase communication amongst healthcare professionals because of an EMR based tool. Thus, an EMR based tool increases patient safety and care. "EMR based tools can enhance the transition of care between inpatient and outpatient setting by improving communication, but standardized practices

of work incorporating such tools into routine practice and results management systems to facilitate result follow-up are necessary."

Athletic Trainer Communication

When researching literature specially regarding athletic trainers, Nottingham et al (2017) conducted research on the reasons why athletic trainers document injuries. They found through individual telephone interviews that the 3 main reasons that athletic trainers document injuries are communication, monitoring patient care, and legal implications. Nottingham et al (2017) further emphasized that quality patient care documentation by health care professions is important for both clinicians and patients.

Communication was one of the biggest reasons why athletic trainers reported they document injuries. One athletic trainer who was interviewed by Nottingham et al (2017) stated their frustration on how there are inconsistencies within patient care:

> "[Without documentation], it's tough to get consistency of care…the person [patient] sees the physical therapist. Then [the patient] comes to me once their insurance runs out. So I feel like that, if there was a good documentation system…or if there was a way that [other health care professionals] could communicate easily with me through my documentation, that the consistency of care that these patients need could be achieved."

Many additional interviews that were similar to this were reported in the study. Athletic trainers report that documentation allows them to know the story for each patient so during their evaluations they do not have waste time going over the full history of the athlete. Even clinicians were interviewed and stressed the importance of knowing previous pain levels, rehabilitation progress, and treatment plans. All of these are vital parts of patient care.

Furthermore, a study performed by Todaro et al (2017) examined the relationship between athletic trainers in secondary schools and nurses through surveys. They stated that "communication and trust were keys for positive working relationships." Todaro et al (2017) additionally emphasized the importance of documentation between providers as well. This study concluded that when these clinicians collaborate and communicate effectively, there is enhanced patient care.

Arthur-Banning et al. (2018) examined documentation of intramural athletes while attempting to track injury rates among recreation athletes. They stated that they recorded injuries through incident reports written by athletic trainers and through other medical care professionals using EMR systems. The study emphasized the need for documentation of injuries through an organized system in order to understand injury rates and patterns through recreation sports.

Structure of Public Health Agency:

Lafene Health Center (Lafene) is a professionally accredited outpatient healthcare facility located in Manhattan Kansas. Providers at Lafene treat students and faculty of Kansas State University (K-State) and deliver a wide range of services. Because of privilege fees, Lafene is able provide free office visits and consultations to students.

One specific sector of Lafene Health Center is their Sports Medicine Clinic. Lafene's Sports Medicine Clinic performs evaluation and treatment of sports-related injuries and medical conditions. Furthermore, providers are able to advise patients on injury prevention, fitness, and effects of exercise on health and heart disease. They staff a clinic athletic trainer who works within their Rehabilitation Services. Additionally, they provide athletic training services for students at the Recreation Complex (Rec).

Athletic training services at the Rec is a free service offered to all students and allows them to be given a clinical diagnosis and a referral to one of Lafene's physicians, if necessary. According to the National Athletic Trainers' Association (2015), "Athletic trainers (ATs) are health care professionals who collaborate with physicians. The services provided by ATs comprise prevention, emergency care, clinical diagnoses, therapeutic intervention and rehabilitation of injuries and medical conditions." The athletic trainers at the Rec act as a first responder, evaluator, and advisor to many athletes on a daily basis. They are the first health care providers that interact with many of K-State's recreational athletes. The medical documentation that they gather after performing a musculoskeletal exam is a crucial part of creating a medical diagnosis in collaboration with their supervising physician.

Communication between athletic trainer and supervising physician is crucial when examining patient outcomes. Because many of these athletes are injured during the evening, they are not able to seek care at Lafene until the following day. As a result, patients' initial symptoms can change drastically from the time of injury until they see a physician the following day. This in turn can alter the physician's evaluation. An example of this can be seen while examining a knee injury. When an athletic trainer examines a knee immediately following an injury, they are able to perform certain special tests in order to evaluate the integrity of a ligament. Once swelling sets in, it is difficult for clinicians to perform these exams because swelling does now allow the joint to move as it did for the athletic trainer. Additionally, being able to provide a physician with an accurate history creates a more efficient appointment with a patient.

In the spring of 2018, I evaluated Lafene's communication system between athletic trainer and physician. Through interviews with three sports doctors, two athletic trainers, staff feedback, along with my personal experience, I found that there was a remarkable gap in the communication between the two providers. I reported my findings to my preceptor, Michael Campbell, MD. Dr. Campbell is a board-certified family practice physician and additionally is the Assistant Medical Director of Lafene. Dr. Campbell works within the Sports Medicine Clinic at Lafene and evaluates multiple recreational athletes on a daily basis. Dr. Campbell and his colleagues at Lafene agreed that there was a flawed communication system and in order to enhance patient care and provider communication, I was tasked with implementing an electronic medical record (EMR) tool, that would bridge this gap in the system. When speaking with Dr. Campbell on multiple occasions, it became clear that he wanted to treat patients with the highest quality of care that he and the other sports medicine staff could provide.

Overview of Integrated Learning Experience:

        My time at Lafene Health Center comprised of numerous tasks in order to successfully implement the EMR system. I first began by examining the original documentation system that was in place. Once I examined the original system, I began to create my proposal for an EMR system. This proposal grew into formal meetings with Lafene Staff. My meetings with staff were a critical part of my project where I organized materials, templates, IT support, patient privacy, and much more. I focused on creating a tailor-made system for athletic trainers. After the implementation, I gathered qualitative and quantitative data in order to assess my outcomes. The implementation process and products that I created for Lafene are also echoed throughout my MPH competencies.

Chapter 2- Learning Objectives and Project Description

Learning Objectives and Expectations:
- Create a needs assessment for Lafene Health Center to address gaps of the communication system between athletic trainers and physicians. Learn how this gap affects both clinicians and patients.
- Implement a new tool in order to bridge the communication gap.
- Learn about the different sectors and employees at this public health institution and who is involved with policy and procedure process.
- Work alongside these employees in order to create tool.
- Examine how this implementation has affected Lafene Health Center and its patients.

Activities to be Performed:

The first activity that I performed at Lafene was consulting with Lafene staff about the significant communication gaps of Rec athlete injury information between athletic trainers and physicians. I gathered what they would desire in a new policy and implementation that would benefit both the patient and the clinic itself. After shadowing physicians and physical therapists at Lafene, I noticed that the providers used an electronic medical record (EMR) while documenting their encounters with patients. Physical therapists could easily communicate their findings to physicians, nurses, and other applicable staff and vice versa. However, the athletic trainers at the Rec complex did not utilize this system. Being a Lafene athletic trainer myself who works at the Recreation Complex, allowed me to provide a relevant and honest opinion about what was needed.

Once I decided that incorporating an EMR for athletic trainer use was an efficient way to resolve Lafene's communication issue, I had to prepare a needs assessment to present to executive staff. I prepared a thought-out overview of what I have encountered while analyzing the communication systems through personal observations. I compiled reasons why this should be implemented along with supplies and those who would need to be involved in the process. I distributed this flyer (Appendix 1) to Lafene's staff. Once I received feedback from this assessment, I made necessary adjustments that employees suggested. Once completed, I approached Jim Parker, who is the director of Lafene Health Center alongside other administrative staff. Jim Parker urged me to call a meeting with appropriate staff in order to propose my idea to all who would be involved.

On September 28th, 2018 I met with Lafene's administrative staff including the director, associate director, nursing coordinator, director of rehabilitation services, Dr. Campbell, IT support specialist, and assisting nurses. In this meeting, I proposed my idea for implementing an EMR for athletic trainers to utilize at the Rec. I stated the benefits, supplies needed, short term goals, long term goals, and much more. I additionally addressed the gaps in communication from a personal point of view as well as anecdotal evidence other athletic trainers and physicians that treat athletes who sustain injuries at the Rec. I additionally stressed the importance of the

patient's privacy of health information and how the current system utilized by athletic trainers at the Rec, did not make privacy a priority, though it was maintained.

Because these staff members at the meeting do not typically interact directly with athletic training staff at the Rec, I explained the current documentation system to them. This was a huge communication to the staff which opened their eyes to the dated system their remote employees were using. In particular, the dated system used by athletic trainers was to use an Incident Form (Appendix 2) to write a complete medical note. These notes were then brought to Lafene Health Center in order to document different statistics of injured athletes such as injury rates, follow-up rates, and more. This happened about once a week. The problem with this system was that physicians did not receive these Incident Forms until many days or sometimes weeks after they examined the corresponding patients. Because of this lack of information, physicians examine these patients without knowing exactly what the athletic trainer witnessed and concluded during their evaluation. If Sports Medicine Physicians at Lafene had access to the athletic trainer's evaluation note before an appointment with a recreation athlete, they would be able to conduct a more efficient exam by having pertinent information such as mechanism of injury, musculoskeletal exam test results, and other details that an athletic trainer routinely writes in their medical note.

At this meeting, the staff agreed that adopting an EMR template for athletic trainers would be a solution to the issues they have been facing. I was then introduced to one of Lafene's nurses, Susan Shankweiler, who was in charge of the EMR software system programming. She would be my EMR liaison throughout this process. Additionally, Robin Millington who is Lafene's IT support specialist became an important asset to the EMR implementation team because she was a main administrator on the current documentation software. The director of rehabilitation services, Jeff Kreuser, was deemed in charge of checking the software every day and making sure the patients were being documented correctly. In further meetings, he was also designated to call patients who were injured at the Rec and needed an immediate appointment at Lafene. This was an important addition to the new policy and plan of documenting athletes injured at the Rec. The reasons behind this addition are explained within my competences in Chapter 5.

Days after the initial meeting, I began reaching out to separate entities of Lafene and also the Rec. I had to schedule a meeting with Steve Martini, who is the director of Recreational Services at K-State. I had to update him on the new procedures that were being implemented and needed to see if he had any suggestions or modifications. We learned that Mr. Martini uses the incident reports for statistics as well, so the athletic trainers would still need to document injuries, but not in as much detail as they had done previously.

Throughout the next couple months, I began the preparation phase for this implementation. I scheduled a meeting with Shecky Davis who is the associate director of Lafene in order to discuss athletic trainer needs for a certain documentation device and what Lafene was able to provide. We came to the conclusion that a Panasonic Toughbook would be a

perfect fit. Along with the laptop, we would need a Wi-Fi hotspot during outside intramural sports such as football, soccer, and softball.

In coordination with Susan Shankweiler, I spent months working with her in order to create a user-friendly interface for athletic trainers to document injuries. Since athletic trainers have specific needs, I interviewed the other athletic trainer that works at the Rec, Kasi Bardouche, and asked her what she would want in an EMR interface. Aspects such as field numbers, names of assisting athletic trainers, specific musculoskeletal tests, and more were all incorporated into the template. Once we had the list of medical documentation necessities, I worked with Susan to design templates and learn about the inner workings of the system software.

While waiting to finish the EMR templates, I had to discuss other implications of this implementation. Speaking with Jim Parker, director of Lafene, gave me an eye-opening experience of the interworks of a health care facility. We discussed whether I would be able to survey the patients whose injuries were documented through the EMR. Jim explained the grueling process of developing surveys, getting permission to use them, making sure they are un-biased, coordinating with IT as to how to measure the answers, and so on. He stated that the likelihood of patients answering two surveys was low. Robin Millington additionally agreed with these statements as she is the IT support specialist and stressed the importance of HIPPA protocol. He believed he may start implementing other questions related to athletic training services once we reach a sustainable protocol.

By December, the preparation process was almost complete. I had to undergo some training sessions with Ms. Shankweiler in order to make sure I was able to properly navigate the EMR. Because of these informal training sessions, I decided that there should be a more systematic way to train athletic trainers on how to use the EMR properly. Therefore, I created a training module for all new athletic trainers who will be utilizing the new system. This training module has been approved by Robin Millington and Shecky Davis. This is another way to improve Lafene's communication strategies.

In January, the use of the EMR began. However, there were many technical issues that needed to be resolved by Lafene's staff daily. Athletic training staff reported that certain changes needed to be in order to accommodate their needs. For example, adding certain musculoskeletal tests and important intramural sport information. By February, I began examining certain statistics such as follow-up rates. I additionally communicated frequently with Dr. Campbell about the progress we were making with the EMR.

Because of submission deadlines, I was only able to gather follow-up data during the months of February and March. I compared these rates to previous years in order to evaluate if there was an increased follow-up rate as a result of the EMR. All other data collected were qualitative and were documented from meetings, emails, and interviews by Lafene staff. Below are two flow charts describing the original documentation system and the new EMR system that I implemented.

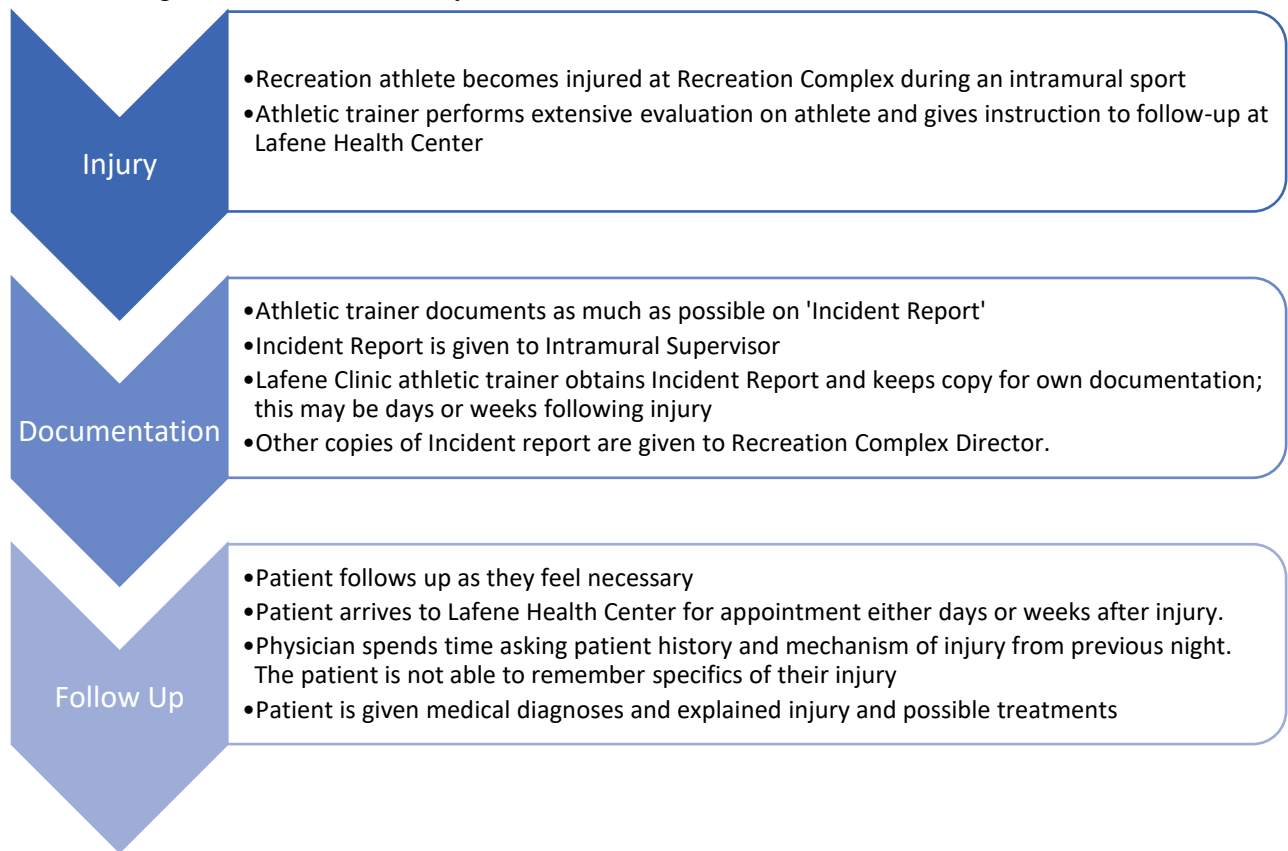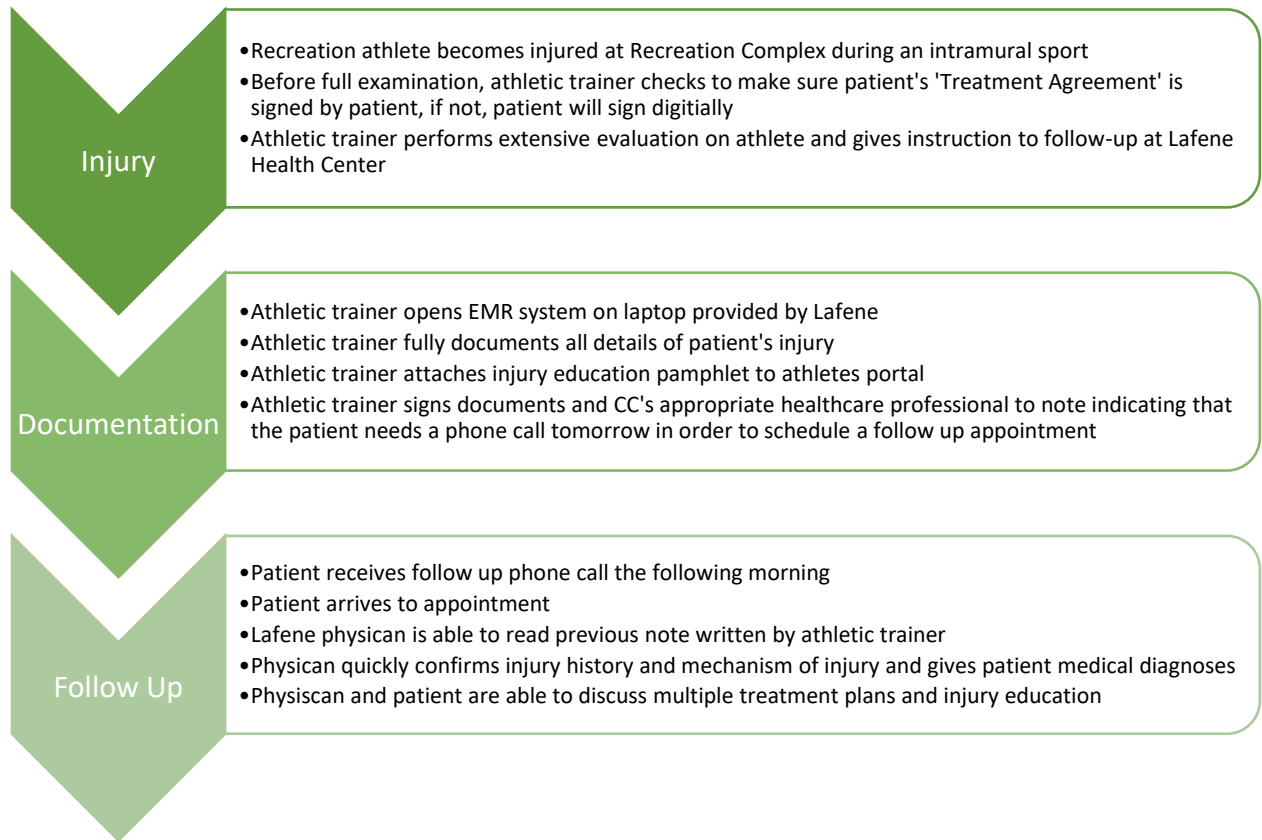Chart 1: Original Documentation System used for decades at Lafene

Injury
- Recreation athlete becomes injured at Recreation Complex during an intramural sport
- Athletic trainer performs extensive evaluation on athlete and gives instruction to follow-up at Lafene Health Center

Documentation
- Athletic trainer documents as much as possible on 'Incident Report'
- Incident Report is given to Intramural Supervisor
- Lafene Clinic athletic trainer obtains Incident Report and keeps copy for own documentation; this may be days or weeks following injury
- Other copies of Incident report are given to Recreation Complex Director.

Follow Up
- Patient follows up as they feel necessary
- Patient arrives to Lafene Health Center for appointment either days or weeks after injury.
- Physician spends time asking patient history and mechanism of injury from previous night. The patient is not able to remember specifics of their injury
- Patient is given medical diagnoses and explained injury and possible treatments

Chart 2: New EMR implementation documentation system

Injury
- Recreation athlete becomes injured at Recreation Complex during an intramural sport
- Before full examination, athletic trainer checks to make sure patient's 'Treatment Agreement' is signed by patient, if not, patient will sign digitially
- Athletic trainer performs extensive evaluation on athlete and gives instruction to follow-up at Lafene Health Center

Documentation
- Athletic trainer opens EMR system on laptop provided by Lafene
- Athletic trainer fully documents all details of patient's injury
- Athletic trainer attaches injury education pamphlet to athletes portal
- Athletic trainer signs documents and CC's appropriate healthcare professional to note indicating that the patient needs a phone call tomorrow in order to schedule a follow up appointment

Follow Up
- Patient receives follow up phone call the following morning
- Patient arrives to appointment
- Lafene physican is able to read previous note written by athletic trainer
- Physican quickly confirms injury history and mechanism of injury and gives patient medical diagnoses
- Physiscan and patient are able to discuss multiple treatment plans and injury education

Chapter 3- Results

The results of the project contain mostly qualitative data from pre- and post-implementation interviews and conversations. I wanted to investigate both practitioner and patient outcomes. I conducted interviews with one athletic trainer who utilized the system as well as Dr. Campbell who treated the bulk of recreation athletes who had their injury information documented through the EMR.

Clinician Outcomes:

Dr. Campbell first spoke about his clinical evaluation process. He stated the EMR was a great evaluation tool because he was more quickly able to narrow down a differential diagnosis. He is now able to obtain a more accurate picture of the mechanism of injury, which the patient often cannot describe very well. Dr. Campbell praises the new system because he now has more time during an appointment for patient education on the diagnoses and treatment plan. Kasi, the other athletic trainer states that the EMR has improved her clinical evaluation process by being more efficient. She additionally mentioned the time saved during evaluations when documenting.

Patient Outcomes:

When discussing patient outcomes, Dr. Campbell stated that the EMR has enhanced patient care for numerous reasons. Because of the new system, Lafene received patient information more quickly after the injury occurred. Then, Lafene was able to contact patients that needed to be evaluated quickly. These phone calls give the patient a sense of urgency. In the past, patients would typically wait to make an appointment at Lafene when their injury did not resolve on its own. Because of this, patients were not getting the accurate care that they needed, especially for serious injuries that require surgery.

Personally, I saw many differences with patient outcomes. In the past, many patients did not have a sense of urgency with many injuries, even though I had explained that an appointment with a physician would be beneficial. I have seen patients who need emergency surgeries because of ligament tears that they sustained from an intramural sport but did not get the proper follow-up care. I believe by patients receiving a phone call the next day, increases their chances of having a quicker recovery than waiting to be seen.

Patient Privacy:

Both Kasi and Dr. Campbell commented on how this EMR has improved privacy. Instead of having paper copies circulating from different providers, now only those who are HIPPA certified are able to utilize the EMR tool. Patients are still able to control how their health information is communicated.

Lafene Outcomes:

Dr. Campbell explains that the EMR has greatly enhanced communication between athletic trainers and physicians. He describes how the seamless transition of patient information allows Lafene to triage patients to the appropriate provider. Now, the Lafene clinic athletic trainer is able to look at all of the injuries from the previous night and is able to schedule them either in rehabilitation services, a medical provider, or even an orthopedic surgeon. In turn, this is actually creating less appointments with Lafene physicians, yet more appointments with their physical therapist or athletic trainer.

I examined follow-up rates amongst Rec athletes who were injured in February and March of 2017, 2018, and 2019 (Appendix 3). When studying these follow-up rates, there is not a significant difference between these past 3 years. Pre- and post- implementation data are the same in 2018 and 2019. Lafene provided me with the follow-up data.

Sustainability:

Dr. Campbell agreed that this is a sustainable protocol from a physician's perspective. He explains that the time he spends looking over the medical notes written by the athletic trainer is very brief and ultimately saves him time during his examination. Kasi also agreed that this is sustainable and stated that she would prefer to use this tool permanently because of the drastic differences from the hand-written protocol.

Other staff members have commented on the ease of looking over a patient's injury history. So far, there have been no complaints from either patient or practitioner on this new EMR. As a clinician utilizing this EMR, I believe it is a sustainable communication system. With more advances in technology, this system can evolve to become even more of a tool for patient care and communication within Lafene Health Center.

Long-term Outcomes:

Increased injury tracking is one of the biggest outcomes Dr. Campbell stated when commenting on long-term outcomes of this EMR. He states that the EMR could be used on a population-health basis to make broader changes in preventing injuries. He said he could examine aspects of injury prevention like equipment, rules, uniforms, injury patterns and so on. From this data, Lafene could ultimately begin implementing strategies to prevent injuries in recreation athletes. Kasi believes that a long-term outcome of this would be the overall organization of injury documentation. She explains that now we are able to efficiently communicate to physicians that the transition of care will be more effective overall.

Chapter 4- Discussion

When reviewing patient and clinician outcomes from this implementation, I believe a huge step has been taken forward for Lafene Health Center. Through this experience, I learned that the communication of medical information plays a major role in healthcare. As Kantor et al. (2015) explained, creating a more efficient EMR system can result in increased patient safety and care. When examining feedback from physicians at Lafene and athletic training staff at the Rec, the results are parallel to the Kantor et al. (2015) study.

While working alongside Lafene staff for 7 months, I learned that communication is the cornerstone of healthcare establishments. I witnessed how even clinicians play an important role in the administrative sector of Lafene. Listening and participating in multiple meetings at Lafene allowed me to see first-hand how hard a staff works towards creating a better healthcare environment for patients. Watching Jim Parker value his employees' thoughts and suggestions showed me an efficient way of communicating within a healthcare facility.

Recreation athletes are a special population within public health care. These athletes do not have a training staff or a team physician like most collegiate and professional athletes have. Therefore, when injury occurs, this population has to seek care and treatment on their own volition. By having a documentation system like the athletic trainer specific EMR communication system I created, athletic trainers and physicians are able to treat these athletes quickly and efficiently. If some injuries are not treated quickly and efficiently, there could be life-threatening consequences.

One example of a life-threatening consequence of an athlete not being treated is the effects of exertional rhabdomyolysis. Exertional rhabdomyolysis is a condition that can arise when an unconditioned athlete, like the some of the population at the Rec, performs a high-intensity workout. After their workout, the athlete will experience certain symptoms like extreme muscle soreness, dehydration, and abdominal pain. To an untrained eye, these could be symptoms that do not necessarily worry a recreation athlete. Further, if presented to an athletic trainer who refers them to a physician, they may not follow-up because they do not believe it is a serious condition. If left untreated, exertional rhabdomyolyses can progress into severe liver dysfunction and even failure (Pearcey et al. 2013).

By creating this EMR, we are now able to document a patient who displays symptoms of exertional rhabdomyolysis, for example. Not only are they receiving advice from an athletic trainer to seek further medical care, but now they will receive a phone call the next day urging them to be seen by a physician. Through these phone calls made by the clinic athletic trainer, Lafene is now able to check-up on the patient to see if their symptoms have worsened. They will then be urged to schedule an appointment with a physician in order to prevent any further injury.

This is a form of patient centered care. When you implement patient centered care into a healthcare program you increase patient adherence. Adherence is part of the self-determination theory which states a person is more likely to be autonomously motivated and change behavior if health care settings maximize the patient's satisfaction of the needs for autonomy (Saebu et al. 2015).

As Dr. Campbell explained, he believes that patient education is an important aspect of an appointment with an injured athlete. The EMR is now allowing the athlete to receive education on multiple levels of care. Furthermore, the athletic trainer is now able to send the athlete rehabilitation worksheets as well as certain injury information to injured patients through their patient portal. Lafene's clinic athletic trainer is able to call the patient and give them education. Finally, the physician now has more time within a scheduled appointment because they have a more accurate picture of the mechanism of injury. All of these factors help enhance the patient's autonomy, so they are able to understand their injury and return safely to physical activity when appropriate. Thus, in theory, increasing their adherence to physical activity. Athletes who do not receive this care could be unsure when to return safely to sport; therefore, taking longer to resume healthy physical activity.

The training module that I created for future athletic trainers is another form of communication that will assist athletic trainers. The module focuses on the basics of the software system and the importance of how to communicate specific findings to one of Lafene's physicians. This also will save Lafene administrative staff time because the module will be provided online. Therefore, Lafene employees do not have to spend multiple hours attempting to train new employees with the system. The athletic trainers are able to complete the training module remotely and online. This is another way the EMR is increasing efficiency at Lafene Health Center.

Overall, the EMR had a wide effect on Lafene Health Center. Both patient and clinician outcomes have improved according to clinician and athletic trainer observations. Though follow-up rates did not increase, this could be for many reasons. One reason would be because I was only able to document 2 months of this EMR and track follow-up rates, this is only a small snapshot of a much larger picture. Additionally, Dr. Campbell also stated that Lafene Health Center may result in seeing fewer patients because some athletes are referred to orthopedic surgeons, which Lafene does not have on staff.

In conclusion, from observations to personal experience utilizing this EMR clinically, there has been a significant change in the communication system of Lafene Health Center. The result of this more efficient communication is improved patient and clinician outcomes. There are many long-term goals that are now attached to this EMR that the physicians at Lafene will intend to investigate, such as injury tracking in order to create a safer environment for recreation athletes. This EMR will not only continue to improve patient and clinician outcomes, but overall clinic efficiency as well.

Chapter 5- Competencies

Table 5.1 Summary of MPH Foundational Competencies

Number and Competency		Description
7	Assess population needs, assets, and capacities that affect communities' health	Through meetings, Lafene administrative staff and myself assessed how we could improve the treatment and care process of the recreational athletes.
9	Design a population-based policy program, project, or intervention	My main intervention at Lafene Health Center was creating an EMR that was accessible by athletic trainers in order to increase communication to physicians in order to increase patient and physician outcomes.
12	Discuss multiple dimensions of the policy-making process, including the roles of ethics and evidence.	I was behind every step of this implementation process. The EMR served as a new policy for all staff at Lafene and new procedures were implemented. I was tasked with making sure all steps taken were ethical and realistic.
18	Select communication strategies for different audiences and sectors	I improved Lafene's communication strategy between athletic trainer and physician because of the importance of quick and efficient information needed to treat the athlete. Additionally, by creating a training module, this is an efficient communication device for Lafene to train their incoming athletic training staff.
21	Performs effectively on interprofessional teams	I served as the liaison between all department staff at Lafene regarding the implementation of the new EMR.

Competency 7 – Throughout my experience at Lafene, I attended various meetings with staff assessing how we can improve communication strategies for the physicians and athletic trainers. The staff agreed that this improved communication strategy would in turn, benefit the recreation athlete population at Kansas State University. Through mostly qualitative assessment, because there has not been a sophisticated documentation system at Lafene to obtain quantitative data, we investigated the gaps in the current communication system.

The first population I assessed was the physicians and athletic trainers. I gained feedback from all three Sports Medicine Clinic physicians at Lafene when asking them what they were looking for in a new communication strategy and EMR. After taking their comments into consideration, I began formulating my plan for what the EMR would consist of and how it would be user friendly to all who would utilize it.

The second population I assessed was the recreation athletes whose care the EMR is based around. I spoke with the Rec athletic trainer as well as Lafene's clinic athletic trainer and we assessed how an EMR would benefit the patient. Increased patient care and education was our main goal throughout the whole process. We believed by creating an efficient communication system, we are able to provide the patient with better quality care.

Competency 9 – The population-based policy program I developed was an EMR system to be utilized specifically by athletic trainers at the Rec facility in order to improve communications with physicians at Lafene Health Center. I created this EMR based on my two populations that I assessed which were clinicians and patients.

I designed the EMR with physicians in mind so that they are able to effectively and efficiently treat recreation athletes. The EMR was implemented because of the physicians' needs to understand mechanism of injury, musculoskeletal test results, and other important signs and symptoms that the patient presented with. In conjunction with athletic training staff, physicians are now able to look at the "full picture" when treating a patient who was injured at the Rec.

The second population whose needs were impacted in this new intervention was the recreation athlete. When designing this new intervention, I used personal experience as well as guidance from other professionals in the field and created what we believed would benefit the athlete the best. This intervention was intended to enhance patient care by creating a sense of autonomy through education of injury by appropriate clinicians.

Competency 12 – The policy-making process at Lafene involved numerous staff members within different departments. First, I created a needs assessment for the EMR tool. I gained feedback and then began the implementation process by approaching the appropriate staff. The first and most important authorization I needed was from Jim Parker, who is the director of Lafene. Once I gained his approval and understood what guidelines I would follow during the process, I moved down the ladder of Lafene staff. Within each department of Lafene, I learned about different sections and considerations of the policy making process.

In MPH720, we learned about the policy making cycle which is broken down into 5 steps: Issue raising, policy design, public support building, legislative decision making and building, legislative decision making and implementation. Though this is typically used on the government level it still mirrored the cycle of how I implemented the EMR. First it begins with issue raising, which is what I did when I created my needs assessment. Next, I accomplished policy design by designing the EMR's format and how it would be applicable to fit physician, patient, and athletic trainer needs. Then public support building was applied when I approached different sectors of Lafene such as nurses, IT staff, physical therapists, and more about my idea and how they can be involved in the implementation process. When it came to decision making

and building, I would meet with each department individually to see what they needed added to the EMR in order to meet ethical and technical standards. Policies such as HIPPA were reviewed frequently. Finally, decision making and implementation occurred. During this time all staff members who were a part of the cycle were updated during the first week of the implementation process. This allowed staff to make changes to obstacles we were facing during the first week of implementation.

   Competency 18 – At Lafene, I learned that communication strategies come in many shapes and sizes. Communication strategies were the root of my project and I believe they are what makes a healthcare facility more efficient. The first form of communication I initiated with Lafene Health Center was to communicate the urgency for a new policy regarding documentation of recreation athletes between athletic trainers and physicians. This initial communication to Lafene staff ignited the response I needed in order to implement the EMR.

   Once the EMR was in place, Lafene's staff, both administrative and clinical, saw what a difference a more streamlined communication system can make within the healthcare setting. I received much praise for the new organization and detail-oriented policy. Clinicians informed me that this has drastically improved the documentation system of recreation athletes compared to what it has been for over a decade. As discussed in my results, I have learned an increase in communication can cause a very large positive impact within a healthcare facility.

   Competency 21 – Managing and running an efficient patient-centered student health facility requires teamwork and support amongst all staff members. Teamwork is the biggest skill I acquired during my time at Lafene. Because of Lafene's supportive staff, I was able to feel comfortable and welcomed on their interprofessional team. This interprofessional team consisted of physicians, IT personnel, nurses, directors, associate directors, and more. Being a part of this team was one of the most valuable experiences I have encountered in my academic career. Learning meeting structure and how to communicate with others during a meeting was one of the many skills I learned while working with this group of professionals. Being placed in a setting like Lafene has helped develop my professional skillset that I will be able to take with me in my future career as a healthcare professional. Working as a team has a large impact within a healthcare facility.

Table 5.2 Summary of MPH Emphasis Area Competencies

MPH Emphasis Area: Physical Activity	
Number and Competency	**Description**
1 Population Health	Examine and evaluate evidence-based knowledge of the relationship between physical activity and population health
2 Social, behavioral and environmental influences	Investigate social, behavioral and environmental factors that contribute to participation in physical activity
3 Theory application	Exam and select social and behavioral theories and frameworks for physical activity programs in community settings
4 Developing and evaluating physical activity interventions	Develop and evaluate physical activity intervention in diverse community settings
5 Support evidence-based practice	Support public health officials and other community partners in the promotion of physician activity with evidence-based practices

Competency 1: Population Health – Population health was emphasized in many of my classes throughout the MPH program. Classes such as KIN 610, KIN 612, and KIN 805 are just some of the many that stressed the importance of the population when implementing different programs and policies. I incorporated this knowledge into my experience at Lafene. Core concepts such as individual level control and influences played a major role in my project. I learned that when assessing a population like recreation athletes, who typically workout by themselves and not with a team, I would have to use individualistic theory applications that are appropriate for this population.

Secondly, KIN 612 made me aware of physical activity guidelines and how not following them could have consequences. This heightened my urgency when developing the EMR. I realized if recreation athletes are injured and do not know when to safely begin exercising again, they could wait too long and not be getting the recommended guidelines reported by the United States Department of Health and Human Services (USDHHS 2019).

My experience at Lafene has emphasized the importance of population health, specifically college recreation athlete health. This population has different needs than a faculty member or a student-athlete. My classes have taught me to analyze the population and create a plan that will help keep them healthy, in this case injury free and meeting USDHHS guidelines.

Competency 2: Social, behavioral and environmental influences – Integrating these 3 factors within a new policy can sometimes be challenging. I have learned throughout the program, especially in KIN 805, that health behaviors are influenced at multiple levels. As public health professionals, we often categorize these levels in the social ecological model (Appendix 4). MPH 818 highlighted the social ecological model as an integral part of understanding the multiple layers of motivation that an individual will have. Additionally, we can breakdown levels of social influence and support such as social support and informative support. I implemented both of these sub-categories into my project for Lafene. By Lafene's athletic trainer calling a patient the day after they were injured is offering social support and the education feedback that Lafene now offers would be included in informational support. Theoretically, these factors can help a patient get seen by a physician faster and hopefully return to physical activity quickly.

When examining behavioral influences, examining the behavioral change process within the recreation athlete was an integral part of the EMR. Part 2 of this change is self-regulation. I had to implement a portion of the EMR that would give the athlete skills to make sure they continue their healthy behaviors of physical activity. The portion of EMR that displayed this is the "handout" section of the documentation process. I requested that the athletic trainers via the EMR are able to send athletes educational information about their injury. With this document, they are able to learn what exercises they are still able to perform without fearing further injury.

Lastly, environmental factors are the overarching portion of the social ecological model. Environmental factors that I implemented in my project was creating a strategic communication environment for the benefit of the patient. Now, the patient has a whole team of health care professionals who have knowledge about their injury history and much more. With the implementation of the EMR, they are now able to receive sufficient injury education that will promote a safer and individualized return to sport protocol.

Competency 3: Theory Application – A theory that highlights both the behavioral and social aspects of health and healthcare is the self-determination theory (SDT). Saebu et al. (2013) stress the importance of SDT when it relates to the clinician-patient relationship. When practitioners facilitate autonomous motivation and perceived competence, for example giving them injury rehabilitation education, can help the increase the likelihood that they will participate in their rehabilitation program on their own volition. By making time for these conversations to occur at Lafene, I believe patients will walk out of their appointments with more autonomous motivation to engage in sport again because of the support that they received from Lafene's staff.

Competency 4 - Develop and evaluate physical activity intervention in diverse community settings: Developing and evaluating physical activity interventions in diverse communities was specifically taught in KIN 805 and KIN 612. In both of these classes, in groups, we had to develop and evaluate physical activity interventions in diverse community settings. In KIN 805, based off of multiple theories, we created an online physical activity intervention to improve graduate student physical activity rates. In KIN 612, we created a workplace physical activity initiative where our group had to reach out to a local policy maker and discuss our policy and

how we plan to implement it. Because both of these experiences exposed me to diverse settings, I easily implemented what I learned from KIN 805 and KIN 612 into my policy strategy at Lafene.

  Competency 5: Support evidence-based practice – Evidence based practiced played a major role in my project at Lafene. Evidence strengthened my argument for the need for the EMR at the Rec. In my literature review of Kantor et al. (2015) implementation, I concluded that EMR tool usage can drastically increase communication within a healthcare facility. This consequently increases patient care outcomes. Using this evidence along with other evidence learned in classes such as the self-determination theory as explained in Saebu et al. (2013), by giving the patient education and confidence in their skills, we could assume that they would resume to physical activity more quickly than someone who did not receive educational materials. Evidence based practice, I learned, should be the backbone of all implementation projects. It allows practitioners to learn about a desired outcome and how they can initiate that specific outcome through evidence.

Chapter 6- Summary and Recommendations

With this new experience of expediated communication between athletic trainers and physicians, we can now continue to investigate the impact on patient and clinician outcomes. By setting up athletic trainers for success with sophisticated EMR software, they are able to accurately and effectively document injuries of recreation athletes. As the literature reflects, there is not much information regarding the injury tracking and patterns of recreation athletes. By incorporating this system, one long-term outcome is that physicians at Lafene are now able to track injury patterns. After gaining this information, Lafene will be able to implement injury prevention programs and policies. These programs could range from ACL prevention landing programs to changes in rules and regulations that typically cause injuries.

This Applied Practice Experience projected that when there is a direct link of communication between athletic trainers and physicians, injured recreation athletes receive improved care. It is important to incorporate all available tools when treating athletes. Now, this implementation of an EMR allows athletic trainers to effectively communicate with physicians which in turn, allows physicians to have more efficient examinations. Thus, physicians have more time within an appointment to answer injury questions which will allow recreation athletes to return to sport sooner.

Making sure individuals are meeting physical activity guidelines is a goal of public health professionals, especially in the physical activity sector. With the implementation of this new documentation system, the clinical as well as administrative departments of Lafene Health Center aimed to assist these recreation athletes in order to allow them to return to physical activity quickly and safely. These tools can be implemented within many healthcare facilities that utilize athletic trainers who work remotely at different athletic sites. For example, athletic trainers can use the same EMR system the corresponding physician's clinic utilizes. Gaining materials such as a laptop or tablet allows this transition to be effective. Other materials such as hotspots and training modules should be considered while implementing a new documentation system.

Working alongside IT personnel is critical when implementing a new EMR documentation system for athletic trainers. Making sure that the templates are created for the specific sport and personnel involved is crucial to the outcomes of the new system. IT personnel can also assist with the tracking of injury patterns among a certain set of athletes. This data can be very beneficial in the implementation of injury prevention programs within a specific sport. All of these factors can help improve patient outcomes.

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Appendix

Jamie Gallagher
Proposal
Intramural Sports Electronic Medical Record Implementation System

Goal: To implement an Electronic Medical Record System (EMR) for documenting injuries sustained by recreational athletes at the Chester E. Peters Recreation Complex (REC)

Projected Outcomes
- Allows athletic trainers to document the injuries of REC athletes who sustain injuries while utilizing the facility.
- Provides a secure and private medical interface for athletic trainers to document injuries and incidents.
- Includes an online referral system between Lafene staff physicians, physical therapists and Via Christi Hospital staff.
- Grants Lafene physicians access to a patient's REC injury history before Lafene visit.
- Allows physicians to schedule appointments with athletic trainer at REC facility for certain rehabilitation programs that would not need to go through the physical therapy department at Lafene.
  - i.e.: Concussion return to activity protocol, basic rehabilitation exercises, and proper stretching techniques.

Supplies Needed to Implement EMR
- Tablet
- Access to Point and Click system
  - Possible encryption for system

Advisory Board
- *Head Advisor*: Dr. Mailey
- Dr. McElory
- Dr. Besenyi
- Dr. Campell

Involved Staff
- *Director of Lafene Health Center*: Jim Parker
- *Rec Complex Director*: Steve Martini
- *Rec Complex Associate Director*: John Wondra

Reasons to Implement EMR
- Will improve communication between Lafene staff and REC athletic trainers.
- Will enhance the current REC documentation system, which does not currently allow appropriate SOAP note documentation of certain injuries.
- Will allow REC student athletes to utilize athletic trainers for rehabilitation.
- Will strengthen patient confidentiality in REC records.

Appendix Figure 1: EMR Proposal

Appendix Figure 2: Old documentation system

PATIENT FOLLOW-UP OUTCOMES

■ Documented ■ Followed-Up

Year		
2019	Documented: 34	Followed-Up: 10
2018	Documented: 34	Followed-Up: 10
2017	Documented: 32	Followed-Up: 11
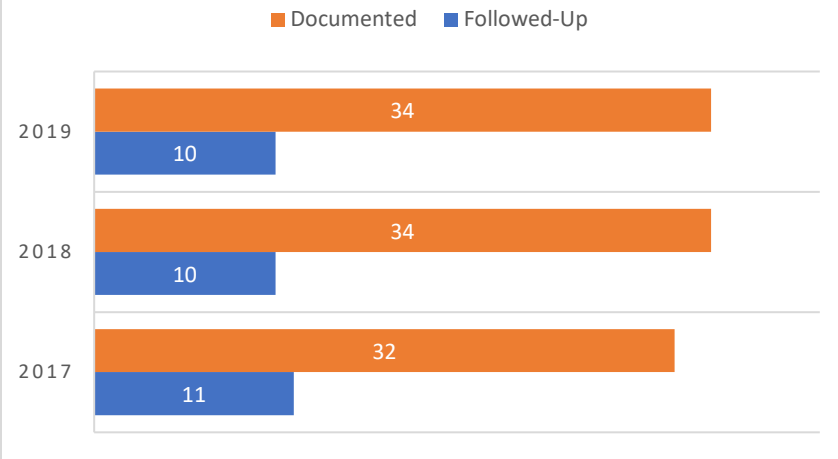
Appendix Figure 3: Patient follow-up rates

Socio-Ecological Model

Public Policy national, state, local laws and regulations

Community relationships between organizations

Organizational organizations, social institutions

Interpersonal families, friends, social networks

Individual knowledge, attitudes, skills

Appendix Figure 4: Socio-Ecological Model