SafeStart Medical: An Innovative HIT Solution to Never Events (WSPE)

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SafeStart Medical

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EXECUTIVE SUMMARY

SafeStart Medical is a health information technology company offering a healthcare system, or electronic health record, that reduces dangerous handoff and communication errors, reduces delays and cancellations in the operating room, and empowers the patient as an active member of their care team. SafeStart is an automated and digitized revenue cycle management tool that improves perioperative patient safety, quality of care, and patient throughput. They specifically aim to prevent the occurrence of Never Events, preventable and serious medical errors that occur at an alarming rate. As an intern at SafeStart, I performed research on clinical topics such as Never Events and COVID-19 in order to create thoughtful content for healthcare professionals and patients to post on social media platforms. I helped SafeStart establish themselves as thought leaders in the patient safety space.

BUSINESS CONTEXT

Electronic Health Records (EHR), a type of Health Information Technology (HIT), were created in the 60s to improve accessibility, productivity, and security to medical record systems. A little over a decade ago, Congress passed the Health Information Technology for Economic and Clinical Health (HITECH) Act and a $40 billion sum towards IT implementation in health (Landi, 2019). EHR adoption rapidly escalated after these government initiatives. The EHR industry includes sales for EHR systems, computerized physician order entry, and directly associated services, and the EHR market reached $31.5 billion in 2018, growing 6% from $29.7 billion the prior year (Landi, 2019). SafeStart Medical is a healthcare company providing a health information system that reduces dangerous handoff and communication errors, reduces delays and cancellations in the operating room, and empowers the patient as an active member of their care team. They specifically aim to get rid of Never Events, also known as WSPEs (wrong-site, wrong-procedure, wrong-patient errors). Never Events are serious yet preventable medical errors that unfortunately take place too often, costing lives, resources, and time. SafeStart believes, “continual improvement of patient engagement and the patient safety process defines [their] success” (Vazquez, 2020). SafeStart’s cloud-based playbook for preop process safety allows patients, staff, and surgeons to streamline care and make work less stressful and more efficient for all. As a business development intern, I worked amongst a team dedicated to furthering the presence of SafeStart Medical in the professional healthcare industry. I also helped create a footprint as thought leaders in the patient safety space. Working closely with both the CEO and CMO, I have researched global healthcare and never event safety and with it has created, edited, and posted high quality and professional content on the company’s Instagram page. I have also researched and authored some of the blog posts on the website.

BUSINESS PROJECT DESCRIPTION

I joined the SafeStart Medical team on May 31st, 2020, to gain valuable experience working for an innovative healthcare company and to learn more about solutions to some troubling problems facing the healthcare industry. I was employed to work on researching never event safety, current healthcare news, and creating thoughtful content for healthcare professionals and patients from my research to post in social media platforms. This research was then converted into quality visuals I created using Canva Pro for the company's Instagram, LinkedIn, and Facebook accounts. I also authored a few blog posts posted on the company's website.

My business project and work for SafeStart began with our meetings. During a week, there were 9-10 AM meetings every Monday, Wednesday, and Friday. On Mondays, the Weekly Planning Meetings were held. In these meetings, we discussed the theme of the daily posts for the week and specifically covered sources to be used while researching for the graphics. On Wednesdays and Fridays, we held "posting parties" where we would collectively review, edit, and post the graphics we created from our research. These graphics along with their captions can be seen on the company's Instagram, LinkedIn, and Facebook accounts (Figure 1, 2).

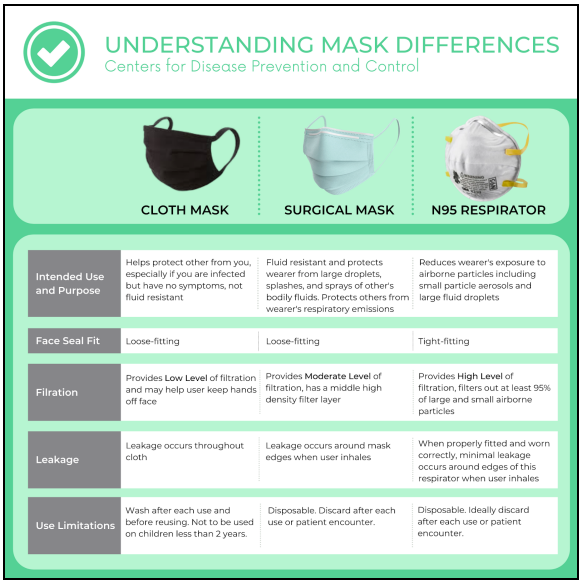
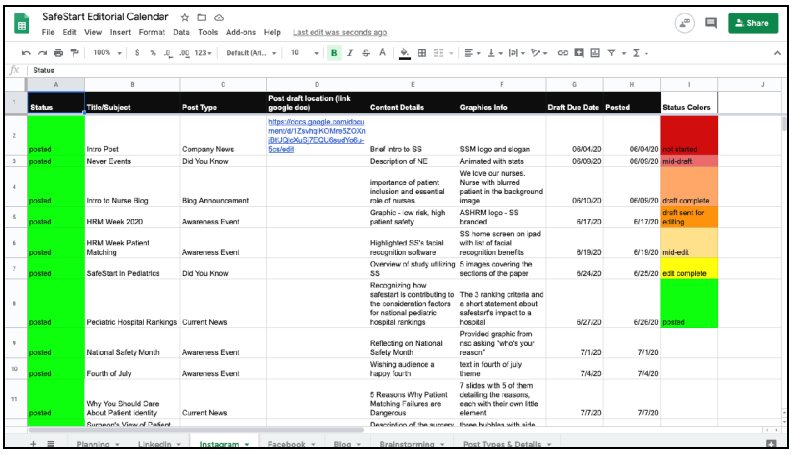


Figure 1. An example of a high-quality graphic I produced for this business project. This specific graphic showcases surgeon views on patient sentiment regarding COVID-19. The research was conducted in order to update SafeStart's audience on a facet of elective surgery, something SafeStart's product targets its use for.

Figure 2. An example of a high-quality graphic I produced for this business project. This specific graphic has the purpose of announcing another addition in the blog series *A SafeStart to One Man's Surgery*, a series covering how using SafeStart might have changed the outcome to one man's healthcare journey.

I spent much of my time researching material for social media posts. I organized the posts within two documents. The first was a tab of the SafeStart Editorial Document via Google Sheets (Figure 3). Here I listed, in a tabular format, a post's status, title, type, content details, graphics information, the due date, and the post date. Along with this, I included a legend with a color-coded system for keeping track of a post's status.



Status	Title/Subject	Post Type	Post draft location (link google doc)	Content Details	Graphics Info	Draft Due Date	Posted	Status Colors
posted	Intro Post	Company News	https://docs.google.com/document/d/1ZsvhqKOMm5ZOXnlbfJQcXuG7EQU6eudYo6J-5cs4e68	Brief intro to SS	SSM logo and slogan	06/04/20	06/04/20	not started
posted	Never Events	Did You Know		Description of NE	Animated with stats	06/05/20	06/05/20	mid-draft
posted	Intro to Nurse Ring	Ring Announcement		importance of patient inclusion and essential role of nurses	We love our nurses. Nurse with blurred patient in the background image	06/10/20	06/05/20	draft complete
posted	HRM Week 2020	Awareness Event		Graphic - low risk, high patient safety	ASHRM logo - SS framed	6/17/20	6/17/20	draft sent for editing
posted	HRM Week Patient Matching	Awareness Event		Highlighted SS's facial recognition software	SS home screen on ipad with list of facial recognition benefits	6/19/20	6/19/20	mid-edit
posted	SafeStart in Pediatrics	Did You Know		Overview of study utilizing SS	5 images covering the sections of the paper	6/24/20	6/25/20	edit complete
posted	Pediatric Hospital Rankings	Current News		Recognizing how safestart is contributing to the consideration factors for national pediatric hospital rankings	The 3 ranking criteria and a short statement about safestart's impact to a hospital	6/27/20	6/26/20	posted
posted	National Safety Month	Awareness Event		Reflecting on National Safety Month	Provided graphic from nsc asking "who's your reason"	7/1/20	7/1/20	
posted	Fourth of July	Awareness Event		Wishing audience a happy fourth	text in fourth of july theme	7/4/20	7/4/20	
posted	Why You Should Care About Patient Identity	Current News		6 Reasons Why Patient Matching Failures are Dangerous	7 slides with 5 of them detailing the reasons, each with their own little element	7/7/20	7/7/20	

Figure 3. A screenshot of the Instagram spreadsheet where posts are accurately documented for proper record keeping.

The second document was specific to the Instagram posts and includes the final graphics along with final captions (Figure 4). Each post received a page in the document, which was complete with a table of contents.

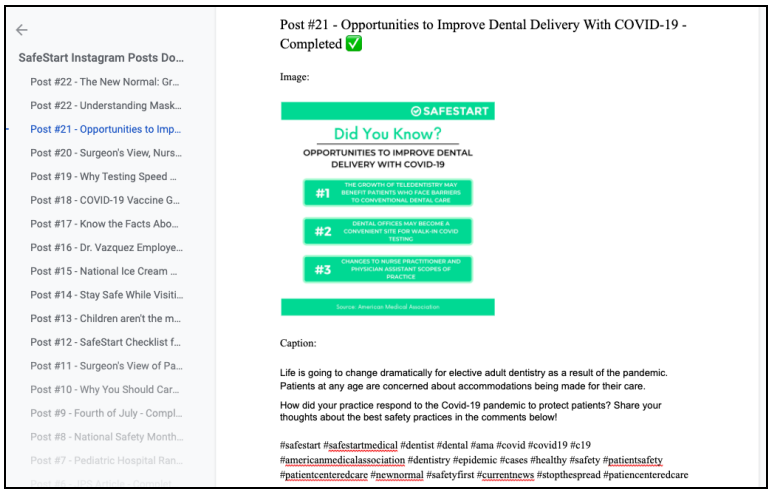


Figure 4. A screenshot of the "SafeStart Instagram Posts Document" with a page per post. Each page includes the post image along with its caption. An outline is also enabled on the left side of the screen for easier navigation.

The purpose of this business project is to present the history and impact of never events and how exactly SafeStart provides a simple solution to the problem. It aims to spread awareness of never events to the public and often vulnerable medical facilities. Objectives include informing people of this intolerable and avoidable class of errors and showing people the benefits of SafeStart. SafeStart has not socialized its product with the patients, the real beneficiaries. This project will spread SafeStart's function throughout the public and hopefully enable the patients to influence medical practitioners to use this product for patient safety. Going into the medical field, understanding health care errors and solutions to them will be a valuable tool. This internship has allowed me to conduct thorough research into these errors so that I may one day be able to save lives in avoidance of them. It has also provided me a behind-the-scenes look into the beginnings of a medical start-up and what exact pieces are required for a company to be successful, a project I hope to take on in the future.

BUSINESS PROJECT RESEARCH

The two business research questions I aimed to answer through this project were "*What are EHRs and Never Events?*" and "*How is SafeStart helping prevent the occurrence of Never Events?*" In order to answer these questions, I conducted research through two different methods. I used primary information when I conducted a personal interview with the SafeStart CEO, Dr.

Richard Vazquez, and secondary information from online articles, published papers, and industry reports. My research answering my first business question is as follows:

"An electronic health record (EHR) is a digital version of a patient's paper chart. EHRs are real-time, patient-centered records that make information available instantly and securely to authorized users" (What is, 2019). EHRs were not always the primary form of clinical record keeping. Historically, the use of paper patient records (PPR) has led to challenges for both the patient and their safety team. The first, and perhaps most frustrating, challenge is *accessibility*. The amount of on-site files required – and the number of documents inside those files – easily take up space. Staff can have trouble finding records, organizing documents, and identifying critical pieces of information. Needless to say, the ability of the clinical personnel to provide services promptly is hindered when access is not optimized. This leads to a lower quality of patient care, hindered staff, and overlooked data. To make matters worse, this lowered efficiency makes it difficult for patients to transfer data between their doctor, hospital, pharmacy, or other healthcare providers (Electronic, 2019). Secondly, the *productivity* of the department is challenged by PPR. Obviously, with more restricted access to patient information comes a loss in productivity. Departments, such as administration and billing, are often forced to "take turns." It becomes even more troublesome to match patient information with electronic health records, a process requiring document scanning (often on scanners that cannot complete high-volume, high-speed scanning), manual data entry, and other unnecessary processes. Lastly, *security* is challenged. Practices that avoid a transition to electronic patient files often do so with the belief that EHRs are more of a threat to security. According to the Office of Civil Rights website of the Department of Health and Human Services, 258 breaches have been recorded in 2015 (Logan, 2015). Of those records, 71 were paper or film records (Logan, 2015). Compare that to only 16 electronic breaches. These are just some of the difficulties posed to practices that rely on client paper files and/or medical records. It is clear to see that EHRs are a favorable alternative.

Early strides in the development of EHRs took place in the 1960s and 70s. In the mid-1960s Lockheed the very first EHR, then known as a clinical information system. Lockheed's product was then handed down to Technicon, then passed to TDS Healthcare, then to Eclipsys, and now part of Allscripts (Amatayakul, 2007). Around about the same time, the University of Utah worked with 3M to develop Health Evaluation through Logical Processing (HELP), one of the first clinical decision support systems (Dick, 1997). In 1968, the Massachusetts General Hospital began using Computer Stored Ambulatory Records (COSTAR) (Dick, 1997). The COSTAR system, developed with Harvard, gained notoriety with its innovative features. Its modular nature allowed the system to be split into sections. For example, medical information did not need to be included in the accounting portions of the system and the productivity increased without this extraneous information. The program also had a versatile vocabulary; its database acknowledged several words for the same illness, allowing users to choose a specific

condition in the health system despite terminology differences at different practices (Dick, 1997). In the 1970s, the federal government started using EHRs with the program VistA, originally known as the Decentralized Hospital Computer Program (DHCP), in the Department of Veteran Affairs (*STATEMENT*, 2009).

Since the 1980s, there have been more coordinated efforts to increase the use of EHRs. The Institute of Medicine (IOM) understood the need for critical analysis of PPRs and conducted such a study in the mid-1980s, reporting findings In 1991 and again in 1997 with revisions (Dick, 1997). This study was the first to advocate for the usability of EHRs, recognizing it as one of seven key recommendations to improve patient records and proposing a way to transition from paper to electronic records. It also identified challenges to EHR adoption (lack of regulation, security risks, expenses) and suggested for their development both public and private funding. When private corporations found the results of the IOM, sponsors established the Computer-Based Patient Record Institute (CPRI), which accelerated EHR enhancement (Dick, 1997). Technology became more inexpensive, efficient, and portable in the late 1980s and early 1990s, and the introduction of personal computers, data networks, and the Internet enabled quicker and simpler access to medical data and pioneered the usage of web-based EHRs (Salenius, 1992). The personal computer offered a mouse interface that allowed the use of pull-down lists, pop-up menus, buttons, forms, and scrolling. Certain apps provided support panels, monitoring features, and data exportation (Wormuth, 1992).

Today, most EHRs are web/client-server-based, using mouse-like scrolling and pointer navigation. In the United States, the rise in the use of EHRs was driven by the Meaningful Use program of the 2009 stimulus package. The digital transfer of patient records from one hospital to another has become more common and EHRs and health information exchange (HIE) networks have been adopted by several professional organizations (Ben-Assuli, 2015). Independent entities including physicians, hospitals, insurance providers, and patients are now creating, using, editing, and viewing EHR records. In primary care examination rooms, EHRs are commonly used to monitor and view health histories and to prescribe medications. EHRs have shifted the dynamics of patient-doctor engagement through telephone, virtual consultations, and telemedicine (Asan, 2015). Today, the EHR is a secure and efficient way for maintaining healthcare data for a patient, for communicating with patients and other members of their safety team, and for promoting the relationship between patient and doctor. No more shuffling around paper records, waiting for faxes, or locating documents to be able to supply patients with quality treatment.

In November 1999, the United States Institute of Medicine published a report titled, *To Err is Human: Building a Safer Health System*. This study identified medical errors as the sixth leading cause of death in the United States in 1999, responsible for more than 98,000 deaths per

year. Deaths related to clinical error doubled by 2010 (Institute, 2000). While EHRs were revolutionary in reducing these errors, they still experience a lack of clear information exchange today. This class of mistakes is known as handoff and communication (H&C) errors. These H&C errors cause dangerous workarounds that can lead to patient harm and a dysfunctional healthcare system (Vazquez, 2020). The issue is that EHRs do not explicitly aim to prevent some of the most shocking medical errors to exist: Never Events. Never Events, a term first applied by Ken Kizer MD in 2001, in reference to especially appalling medical mistakes - such as wrong-site surgery - which should never occur (Never, 2019). Some examples of errors include wrong-side, wrong-procedure, and wrong-patient surgeries. Few clinical mistakes are as intense and frightening as those affecting patients who have had treatment on the wrong body part, the incorrect operation, or an operation planned for another patient. These errors have been accurately deemed as wrong-site, wrong-procedure, and wrong-patient errors or WSPEs (Howell, 2017). EHRs lack the clear communication needed to avoid WSPEs from taking place. In an effort to reduce these adverse events from taking place, the World Health Organization (WHO) created the WHO Surgical Safety Checklist (WHO, 2017). Despite international adoption of this checklist, WSPEs continue to occur at a shocking rate: more than 80 per week in the US alone. Globally, the tools being used for checklists have hit a wall. Checklists are correlated with mediocre compliance and a lack of involvement from the patient in their safety process. Surprisingly, there are no reports of WSPE suppression resulting from the implementation of EHRs (Vazquez, 2020). Fortunately, SafeStart Medical has developed a digital solution for this deficiency in patient safety that directly reduces associated risks.

My research answering my second business question, "*How is SafeStart helping prevent the occurrence of Never Events?*" is as follows:

SafeStart Medical has designed a surgical safety solution that reduces dangerous handoff and communication errors, reduces delays and cancellations in the operating room, and empowers the patient as an active member of their care team. The SafeStart platform is a cloud-based SaaS (Software as a Service) safety system, compliant with HIPAA (Health Insurance Portability and Accountability Act). Clinicians use an iOS (currently available on the Apple App Store for iPhone and iPad) based application. Patients and clinicians can access their respective web-based portals using any smart device (Vazquez, 2020).

SafeStart was created to reduce WSPE occurrence by using patient information that all stakeholders have reviewed and approved. The application engages and empowers the patient, or parents of pediatric patients, in a direct and transparent manner. The surgeon and the nursing staff will create a patient record, which is then sent to the patient portal to be examined by the patient from home for their elective surgeries. The program guarantees a safety framework, open patient involvement, and the surgical safety process has been proven to improve patient and

parent satisfaction (Elger). The secure patient portal helps families and/or patients to check their records from home, while safety team members can use the SafeStart app to review patient records regardless of where they are. SafeStart eliminates upstream handoff and communication errors resulting in about 50-55 percent of WSPEs. SafeStart has the potential to lessen complications and cancellations in the operating rooms by the same process, thus decreasing the disruptions of patient flow and cancelation of surgeries. SafeStart's detailed patient safety document array is reviewed several times before the patient comes to the pre-operative zone - perfecting the documentation and streamlining medical treatment and the safety process so that operations will continue on schedule. SafeStart utilizes a patient-specific reinforced surgical safety timeout protocol in the operating room which requires an image of the prepped and draped surgical site along with the initials of the surgeon and a mark in the operating area. SafeStart also takes the image of the planned surgical site taken at patient admission to the photo already captured by the surgical team for visual comparison.

SafeStart aligns with established standards and is in accordance with the WHO Surgical Safety Checklist, which is followed internationally by most advanced surgical and accreditation societies. For any intrusive surgical treatment, SafeStart may be used. SafeStart prevents left-right disorientation (spatial confusion) and dyslexia by utilizing surgeon-annotated images of the planned surgical location. SafeStart presents the patient with annotated surgeon images of the planned surgery location taken from the viewpoint that the medical staff would have in the operating room. The individual operating the checklist on timeout takes a snapshot of the surgical site prepped and draped right before the incision is made. The team then matches the photograph taken from the office of the planned surgical site with the snapshot taken shortly before the incision proceeds. SafeStart can account for the surgeon's markings being blurred or omitted during the preparation period by utilizing the image matching, ensuring the surgery is conducted at the planned operation site. In addition, SafeStart leverages the human quality of increased visual retention versus textual retention (Koć-Januchta). Such operations may vary from, orthopedics to epidurals, from dental procedures to neurosurgery, which includes, but are not restricted to, nerve blocks, cardiovascular interventional procedures, etc. in any healthcare setting.

In order to complete this business project, I spent around 100 hours completing research for the business development team. Some of the skills I improved included online research. Spending time researching has taught me how to extract important information in a quicker and more useful manner. It has also further familiarized me with scientific articles and helped me practice efficient information extraction techniques. One of the largest limitations I experienced during this project was a communication gap. Due to the current pandemic, communication has been a struggle. In our digital environment, not everyone was always available or present compared to the physical setting this internship would have taken place had the pandemic not

struck. This affected our team efficiency and productivity. However, due to the nature of my assignment, I was able to spend my time researching rather than waiting. Along with this, I worked a job during the Summer which affected my hours working for this internship. However, I compensated by working until a later hour to keep on track with my ideal 4 hours a day (see appendix).

BUSINESS PROJECT KEY LEARNINGS & RECOMMENDATIONS

One of the greatest things that I learned during this internship was how many issues face our healthcare system. Simple yet preventable issues such as WSPEs are very easy to overlook and are often considered something to not worry about. Even though "never" is in its name, Never Events are occurring at a much more alarming rate than we like to think. My research covering the history of EHRs and Never Events made me aware of the fact that these adverse events occur more than we want and many people still have not created a solution to them. Luckily, my second thing learned during this internship, SafeStart has a solution that I believe can prevent these errors from occurring. Along with learning more about the healthcare system, I also learned quite a bit about research and graphic design. I was always familiar with research having written many papers of my own but hard skills like graphic design have never been something I have touched upon. Designing these graphics taught me a lot about my style and what the audience wants. For example, I began my work by creating text-based graphics that included lots of reading. After noticing the engagement, I decided to use more images in the posts in order to better appeal to my audience.

Some of the key pieces of advice I would provide to SafeStart is to focus on their marketing strategies even more. Entering this internship program, they had barely begun their social media journey. I recommend continuing creating content and maybe even increasing the production schedule. Ideas such as blogs, articles, videos, etc. are great to stay relevant in a large industry. Managing the Instagram account and creating their graphics, I helped SafeStart gain their first exposure in the popular social media platforms. I hope that my work created a solid foundation for them to continue growing their amazing company. I also think that increasing intern involvement in the product development process would help improve the internship program along with increasing the overall quality and exposure of the product. Overall, these are very minor recommendations as I had a transformative time at my first internship opportunity and will forever be grateful for Dr. Vazquez's mentorship.

SOURCES

Amatayakul, M. (2007). Electronic health records: A practical guide for professionals and organizations. Amer Health Information Management.

Amatayakul talks at length about the history of electronic health records in their guide to EHRs. There is a lot of detail specifically about the first EHRs to exist. Thoroughly written, Amatayakul's guide is certainly informative but not what I specifically needed for this report. I used some information about the history of EHRs along with the specific ones that existed. I also reported about the changes they went through.

Asan, O., Young, H. N., Chewning, B., & Montague, E. (2015). How physician electronic health record screen sharing affects patient and doctor non-verbal communication in primary care. Patient education and counseling, 98(3), 310–316. https://doi.org/10.1016/j.pec.2014.11.024

This report explores the relationship between clinician screen sharing and patient engagement. They tested three different levels of screen sharing and measured results in gaze patterns. As patient engagement is something very important to SafeStart, this study came into play. SafeStart prides itself on high levels of patient engagement. Every patient receives a copy of the preoperative check to approve allowing for them to stay involved in their safety journey. I used some of their descriptions of the current state of healthcare and how patient engagement can be improved in the healthcare system.

Ben-Assuli, O., Shabtai, I., & Leshno, M. (2015). Using electronic health record systems to optimize admission decisions: the Creatinine case study. Health informatics journal, 21(1), 73–88. https://doi.org/10.1177/1460458213503646

This report on the effects of electronic health records on hospital admissions provides great evidence that EHRs save money for hospitals. One of the most costly things is readmissions. This study proves that when EHRs are implemented to optimize admissions decisions, things are more efficient and save money. This shows how diverse the use of EHRs can actually be. I used some of their information about health information exchange and on how EHRs can help hospitals do more than just manage patient files.

Dick, R. S., Steen, E. B., & Detmer, D. E. (Eds.). (1997). The computer-based patient record: an essential technology for health care. National Academies Press.

This report published in the National Academies Press discusses the extensive history and application of electronic health records. It also covers the future of EHRs. They provide

highly detailed and useful information about the history of EHRs, complete with specific details on which exactly EHRs existed at the time and their individual features. I used quite a lot of information about the EHR systems that are notable that changed the history of our healthcare system.

Electronic Health Records Infographic. (2019, August 29). Retrieved from https://www.healthit.gov/infographic/electronic-health-records-infographic

This Health IT government source provides a great description of how exactly EHRs help connect patients to their doctors. It is in an easy-to-read infographic form. The infographic provides the reader with lots of statistics about the positives of EHRs when it comes to helpful information management. The facts are separated off into four appropriately titled sections, each referring to a point in the history of EHRs and connection. This source is particularly useful to this report because it provides great facts about how EHRs have helped the healthcare field.

Elger, Breanna M., et al. "Engaging the Patient and Family in the Surgical Safety Process Utilizing." Journal of Pediatric Surgery, vol. 55, no. 4, 2020, pp. 597–601., doi:10.1016/j.jpedsurg.2019.06.012.

This study published in the Journal of Pediatric Surgery discusses the implementation of SafeStart in an actual hospital setting with results on its success. It was implemented at the Children's Hospital of Illinois and was used on 100 pediatric general surgery patients. It was written in favor of the SafeStart application and is the first study of its kind to promote our product. Because of this, it was very helpful when marketing SafeStart to our consumers because seeing actual results in a hospital is much more compelling than a pitch.

Howell, E. (2019, September). Wrong-Site, Wrong-Procedure, and Wrong-Patient Surgery. Retrieved from https://psnet.ahrq.gov/primer/wrong-site-wrong-procedure-and-wrong-patient-surgery

This article on the Patient Safety Network website covers a brief but full explanation of what WSPEs are. They cover the definition and current context with easy to read and useful detail. I specifically used the piece about its definition because the term is widely used among SafeStart publications as it is not as known to the general public.

Institute of Medicine. 2000. To Err Is Human: Building a Safer Health System. Washington, DC: The National Academies Press. https://doi.org/10.17226/9728.

Notoriously published by the Institute of Medicine, To Err is Human was a study evaluating the state of paper patient records in the US in the 70s. The IOM highlighted the vulnerability of PPRs and the benefits that EHRs offered. This was essentially the first study advocating for widespread use of EHRs. It was so well written that industry leaders took notice and helped spur a nationwide switch to electronic health records. As this paper covers lots about the development of EHRs, this study was a great source to use.

Koć-Januchta, Marta, et al. “Visualizers versus Verbalizers: Effects of Cognitive Style on Learning with Texts and Pictures – An Eye-Tracking Study.” Computers in Human Behavior, vol. 68, Mar. 2017, pp. 170–179., doi:10.1016/j.chb.2016.11.028.

Koć-Januchta’s study on the cognitive eye-tracking results when visualizers and verbalizers learn, is relevant to SafeStart because we specifically utilize the increased visual retention quality of humans. This means that SafeStart is designed to be highly visual in order to increase retention and ultimately patient safety. A textual application is less attractive and less efficient which can harm the safety of the patients. I specifically used some of the information from the results that showed visual retention is a better tool to use for healthcare professionals.

Landi, H. (2019, July 08). Global EHR market hits $31B but faces usability, interoperability challenges. Retrieved from https://www.fiercehealthcare.com/tech/global-ehr-market-hits-31-billion-but-faces-usability-interoperability-challenges

Author Heather Landi's article summarizing an industry report of the EHR market in 2018 serves to highlight the peaking $31 billion market and how much the technology has grown. Landi focuses on the unpredictable nature of the EHR industry and not too much about its current state. Because of this, I used specifically pieces and statistics on the industry's current state.

Logan, K. (2015, July 07). 3 Challenges of Paper Records. Retrieved from https://www.milnertechnologies.com/company/blog/blog/2015/07/07/3-challenges-of-paper-records

This article, written by Milner Technologies, offers explanations into the 3 largest challenges that paper medical records face. Kristin Logan authors this article in hopes to promote Milner Technologies but also highlights, in great detail, issues such as accessibility, productivity, and security. These fit perfectly into my paper and I made

wide use of this source because it helped me discuss why paper records were not the best option.

Never Events. (2019, September). Retrieved from https://psnet.ahrq.gov/primer/never-events

This article on the Patient Safety Network website covers a brief but full explanation of what Never Events are. They cover the history, examples, and current context with easy to read and useful detail. I specifically used the piece about its history because the specific errors that classify as a Never Event are always changing and not necessarily relevant to my report.

Salenius, S. A., Margolese-Malin, L., Tepper, J. E., Rosenman, J., Varia, M., & Hodge, L. (1992). An electronic medical record system with direct data-entry and research capabilities. International journal of radiation oncology, biology, physics, 24(2), 369–376. https://doi.org/10.1016/0360-3016(92)90693-c

This study, affiliated with the Department of Radiation Oncology at the University of North Carolina Hospital, introduces the advent of a new EHR system that makes things easier for clinicians with many customizable features. As another healthcare system just like SafeStart, they offer great description on EHRs. I specifically used the piece on the monumental transition to EHRs.

STATEMENT OF THE HONORABLE ROGER W. BAKER, HOUSE COMMITTEE ON VETERANS' AFFAIRS SUBCOMMITTEE ON OVERSIGHT AND INVESTIGATIONS Cong. (July 14, 2009) (testimony of Roger W. Baker).

Roger W. Baker spoke to a congressional subcommittee regarding the history and future of medical records in the Department of Veterans Affairs. The testimony was delivered on July 14, 2009, as a way to also thank the subcommittee for allowing them to reflect on their transition to EHRs. The testimonial was well organized and light-hearted however most of it was not of great use to me. I wrote about the history of EHRs, and Baker's piece on the history of the VA was the only used piece.

Vazquez, R., MD. (2020, July 15). Interview with Dr. Vazquez on SafeStart Medical [Telephone interview].

In this interview, I spoke with Dr. Richard Vazquez about his company SafeStart Medical. An intern of this company, I already had an understanding of the product, however, Dr. Vazquez shed more light onto SafeStart's goals and beliefs. He provided great detail into the company and an understanding stance on what the company means to him. Obviously, as this paper is oriented around his company, it was extremely appropriate to

interview Dr. Vazquez to produce an official description of the company from the person who knows it best. His testimony allowed for me to properly describe SafeStart in this report.

What is an electronic health record (EHR)? (2019, September 10). Retrieved from https://www.healthit.gov/faq/what-electronic-health-record-ehr

The HealthIT government website offers a very detailed description of an electronic health record (EHR). They cover their key distinguishing features along with providing even more external explanation. One interesting thing to note is that the website also provides an explanation as to why EHRs and EMRs are not the same. While providing the description of EHRs, the site describes them in a very positive light and continuously promotes its usefulness. This may come off as one-sided, however, for the uses of this report, a positive stance on EHRs is favorable.

WHO Surgical Safety Checklist. (2017, June 08). Retrieved from https://www.who.int/patientsafety/safesurgery/checklist/en/

The WHO Surgical Safety Checklist is a widely accepted checklist for use during the surgical timeout phase. It was seemingly perfected to prevent errors such as Never Events but has obviously not done so due to the current number of these errors. Because SafeStart is modeled after this checklist, it was appropriate and necessary to use this as a source.

Wormuth D. W. (1992). SCUT: clinical data organization for physicians using pen computers. Proceedings. Symposium on Computer Applications in Medical Care, 845–846.

Wormuth's study is about a development in clinician EHR accessibility. Oftentimes, clinicians are only able to use cumbersome computers that only accept a keyboard input. This is not practical when medical care can extend all the way to the bedside for our dedicated healthcare workers. Laptops are becoming an increasingly popular choice for EHR use but still have limitations as a keyboard input is once again necessary. Wormuth is advocating for a switch to pen interface technology to allow for more efficient accessibility for clinicians. This applies to SafeStart as it is a mobile application that also advocates for heavy tablet use. I used their pieces about the cumbersome reality of computers for EHR access.

APPENDIX A

IMSA
Illinois Mathematics and Science Academy

IMSA INTERNSHIP | ATTENDANCE FORM

Students must have no less than 160 verified hours by the end of the academic year for credit.

ADMINISTRATION

Student Name:	**Shikhar Gupta**	**Student No:**	**122069**
Organization:	**SafeStart Medical**	**Mentor:**	**Dr. Richard Vazquez**

ATTENDANCE LOG

Date	Time	Mentor Signature	Time	Mentor Signature	Hours Remote
6/15	9:00 AM	RV	1:00 PM	RV	4
6/16	9:00 AM	RV	1:00 PM	RV	4
6/17	9:00 AM	RV	1:00 PM	RV	4
6/18	10:00 AM 2:00 PM	RV	12:00 PM 4:00 PM	RV	4
6/19	9:00 AM	RV	1:00 PM		4
6/22	10:00 AM	RV	1:00 PM	RV	3
6/23	9:00 AM	RV	1:00 PM	RV	4
6/24	9:00 AM	RV	1:00 PM	RV	4
6/25	9:00 AM	RV	1:00 PM	RV	4
6/26	3:00 PM	RV	6:00 PM	RV	3
6/29	9:00 AM	RV	1:00 PM	RV	4
6/30	9:00 AM	RV	1:00 PM	RV	4
7/1	9:00 AM	RV	1:00 PM	RV	4

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7/2	9:00 AM	RV	1:00 PM	RV	4
7/3	10:00 AM	RV	1:00 PM	RV	3
7/6	9:00 AM	RV	1:00 PM	RV	4
7/7	9:00 AM	RV	1:00 PM	RV	4
7/8	9:00 AM	RV	1:00 PM	RV	4
7/9	9:00 AM	RV	1:00 PM	RV	4
7/10	10:00 AM	RV	2:00 PM	RV	4
7/13	12:00 PM	RV	4:00 PM	RV	4
7/14	9:00 AM	RV	1:00 PM	RV	4
7/15	12:00 PM	RV	4:00 PM	RV	4
7/16	12:00 PM	RV	4:00 PM	RV	4
7/17	9:00 AM	RV	1:00 PM	RV	4
7/20	1:00 PM	RV	5:00 PM	RV	4
7/21	12:00 PM	RV	4:00 PM	RV	4
7/22	1:00 PM	RV	5:00 PM	RV	4
7/23	12:00 PM	RV	4:00 PM	RV	4
7/24	12:00 PM	RV	4:00 PM	RV	4
7/27	12:00 PM	RV	4:00 PM	RV	4
7/28	1:00 PM	RV	5:00 PM	RV	4
7/29	12:00 PM	RV	4:00 PM	RV	4
7/30	12:00 PM	RV	4:00 PM	RV	4
7/31	9:00 AM	RV	2:00 PM	RV	4
8/3	12:00 PM	RV	4:00 PM	RV	4
8/4	12:00 PM	RV	4:00 PM	RV	4
8/5	12:00 PM	RV	4:00 PM	RV	4
8/6	12:00 PM	RV	4:00 PM	RV	4

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8/7	1:00 PM	RV	1:30 PM	RV	0.5
8/7	4:00 PM	RV	7:30 PM	RV	3.5
8/10	12:00 PM	RV	4:00 PM	RV	4
8/11	12:00 PM	RV	4:00 PM	RV	4
8/12	3:00 PM	RV	7:00 PM	RV	4
8/13	12:00 PM	RV	4:00 PM	RV	4
8/14	12:00 PM	RV	4:00 PM	RV	4

At the completion of your Internship, you are required to submit this form to the IN2 Internship Team or Google Classroom

Date submitted: 08/15/20 **Print Student Name:** Shikhar Gupta

Student Signature: 

APPENDIX B


SAFESTART
A multifunctional cloud-based playbook for managing communication and safety of the perioperative patient.
SafeStart helps surgery centers lead in patient safety by:
Reducing costly handoff and communication errors to increase facility throughput and decrease patient harm
Optimizing patient engagement in a transparent safety process in the entire pre-invasive procedure patient journey
Leveraging AI with facial recognition for patient identity authentication and insurance denial reduction
Streamlining care to make work less stressful, easier and efficient for all
Interested?
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