Northern Illinois University

Huskie Commons

4-25-2021

EHR/EMR/PHR Technology Impact on the Medical Community and Public Opinion

Jason T. Queen

Follow this and additional works at: https://huskiecommons.lib.niu.edu/studentengagement-honorscapstones

Northern Illinois University

EHR/EMR/PHR Technology Impact on the Medical Community and Public Opinion

A Capstone Submitted to the

University Honors Program

In Partial Fulfillment of the

Requirements of the Baccalaureate Degree

With Honors

Department of

Liberal Arts and Sciences

By

Jason Queen

Dekalb, Illinois

June 6th, 2021

University Honors Program
Capstone Faculty Approval Page

Capstone Title (print or type)
**EHR/EMR/PHR Technology Impact on the Medical Community and
Public Opinion**

Student Name (print or type): **Jason Queen**

Faculty Supervisor (print or type): **Dr. Virginia Naples**

Faculty Approval Signature: **Approval Emailed by Professor**

Department of (print or type): **Liberal Arts and Sciences**

Date of Approval (print or type): **February 2ⁿᵈ, 2021**

Date and Venue of Presentation: **4/19/2021 – 4/23/2021
 Symposium by ForagerOne Platform**

Check if any of the following apply, and please tell us where and how it was
published:

    Capstone has been published (Journal/Outlet):

_____

    X Capstone has been submitted for publication (Journal/Outlet):
 NIU Huskie Commons

Completed Honors Capstone projects may be used for student reference purposes,
both electronically and in the Honors Capstone Library (CLB 110).

If you would like to opt out and not have this student's completed capstone used for
reference purposes, please initial here: _____ (Faculty Supervisor)

Abstract

Electronic charting and record keeping is a relatively new practice in terms of health care documentation. Electronic medical charting has evolved into electronic health records (EHR), electronic medical records (EMR), and personal health records (PHR). These records theoretically present tremendous upside and potential to improve patient care, engagement, and communication. An assessment of public opinion regarding this technology and their experiences can determine if these online platforms are the future of health care, or if it is impractical and other avenues should be explored. Secondary research was conducted through peer-reviewed scholarly articles to provide an overview on the effectiveness, impact on health care, and risks and challenges of electronic charting technology. Primary research was conducted through a survey to assess public opinion on electronic charting and its benefits and future outlook. Findings of this research discovered many positives for this technology, with a few weaknesses, and an overwhelming amount of public support for this technology. Health care should exclusively look to use this technology in the future and continue to develop and improve it to reach new heights in the medical community.

Introduction

As society progresses to a more digital and technological age, so does medicine and health care. The modern age has brought forth advancements in medicine, technology, communication, and information accessibility. Documentation for quality of care and records in health care has traditionally been accomplished through physical copies on paper, but recently with technology and software improvements, electronic data keeping has been used and explored. In order to address patients' complex needs, access to good sources of information and facilitate effective communication between a multidisciplinary team of professionals and specialists are needed. Electronic record technology is a tool that has improved access to information and relationships and has transformed how medicine is practiced (Manca, 2015). EHRs, EMRs, and PHRs contribute to electronic charting, but they present different aspects and can reside on different platforms under various technologies and standards.

EHRs store medical records in computerized storages and are used by physicians to improve quality of care and contain costs, as an inter-organizational system (Heart et al., 2016). EMRs are very similar to EHRs but differ by being considered an internal, organizational system (Heart et al., 2016). This means EMRs are unique to the medical institution for record keeping, and EHRs are more connected to other institutions and can communicate and document care across different networks. PHRs are online systems used by patients and are designed for better transparency of information to the patients to enable them to be more informed and engaged (Heart et al., 2016). These systems exist independently but can intertwine to improve patient care and create the best record keeping system possible with a collective massive database. EHR and EMR use has been shown to be valuable in medical care, and PHR have been shown to increase

engagement, involvement, interest, awareness and understanding among patients (Heart et al., 2016).

Electronic Health Records

The primary purpose of EHRs is the documentation of individual patient care, along with validation and examination of underlying limitations that are critical for research and quality data improvement (Coleman et al., 2015). EHRs support healthcare and maintain its quality by providing a platform for a cross-institutional and longitudinal compilation of patient's medical data (Heart et al., 2016). EHR systems create Health Information Exchange networks, or HIEs (Heart et al., 2016). HIE networks provide the building blocks of interoperability between different health care entities and enable the sharing of data and information about patients' medical and health history (Heart et al., 2016). Interoperability represents the ability for a computer system or software to exchange or make sense of information across differing platforms or servers. EHRs have boosted the successful use of Patient-Centered Medical Home (PCMH) model which emphasizes accessible, continuous patient-oriented as well as team-based care delivery for the patient's family and community (Heart et al., 2016).

EHR portal adoption is a growing field in the United States that finds itself in many government-level discussions (Tavarez & Oliveira, 2016). However, with current medical legislation, no one EHR is used or universally accepted across the nation (Tavarez & Oliveira, 2016). A recent survey of United States health care providers reports that 57% of heath care institutions already have an EHR portal in place and 71% value an EHR system and expressed interest in implementing one (Tavarez & Oliveira, 2016). Common EHRs used by health care clinics and hospitals include Epic, eClincalWorks, Allscripts, Cerner, and Practice Fusion

(Kehsta & Odeh, 2020). EHR portals help make the health care system be more effective and sustainable, not just from a patient care standpoint, but also through a financial aspect due to rising health care costs and budgets in many countries (Tavarez & Oliveira, 2016).

Electronic Medical Records

The main drive of EMR system implementation is the concept that it would significantly reduce clinician workload and medical errors, all while saving the U.S. healthcare system money (Kumar & Aldrich, 2010). EMR technology enables health care providers access to information in formats that were not possible with paper charts (Manca, 2015). Primary care providers can more efficiently view and print graphs containing values such as weight, cholesterol levels, or blood pressure and track the changes over time (Manca, 2015). EMRs improve attainment of chronic disease management and prevention, as they introduce aspects of screening targets and improved quality measures (Manca, 2015). Treatment goals and alerts can be set up to remind providers when certain prevention, screening, or procedure maneuvers are due or out of date (Manca, 2015). EMRs offer access to information and resources that point physicians to the best direction of treatment toward a wide variety of conditions they encounter. Treatment plans can be viewed and the records of other patients with similar conditions and their results can serve as references with HIPAA considerations (Manca, 2015). This technology also enables improved laboratory data and testing, as it allows for the instance upload of results and reductions in duplications and costs (Manca, 2015). The very structure EMRs offer improves access to point-of-care data and improves disease outcomes as a result (Manca, 2015). In simplistic terms, EMRs give medical providers the ability to be better informed.

Common EMRs used by health care clinicals and individualized institutions include DrChrono, AdvancedMD Practice Management, Greenway Health, Care Cloud, and Athenahealth (Abdekhoda et al., 2016). These EMR systems improve communication and relationships between family physicians and their multidisciplinary team members (Manca, 2015). The introduction of chart summaries, medical notes, and consultation letter templates provide consultants with clear, structured information (Manca, 2015). Prescriptions are in clear formats to reduce medical and pharmacy errors and scheduling appointments have never been easier from the obvious access through the system by clinical staff (Manca, 2015).

EMRs have a beneficial effect on workflow. The largely favorable perceptions of EMRs by family physicians is an indication of the positive effect these systems have on their workflow (Manca, 2015). EMRs allow clinicians to see a larger number of patients with the decreased time spent on documentation and chart pulling, and additional benefits include remote access to patient charts, improved laboratory result availability, reminders for preventative care, and medication error alerts (Manca, 2015). These reasons offer a great deal of support of how EMRs improve quality of care and patient outcomes.

Personal Health Records

PHRs revolutionized electronic records as, for the first time, patients can access and maintain their own medical data and information. According to Señor et al., a PHR should include all relevant information about the user's life, including but not limited to the following list: problem list, procedures, major illnesses, allergy data, family history, home-monitored data, social history and lifestyle, medications, immunizations, genetic information, and laboratory tests (2012). Patients can access PHRs online and view test results, prescription information, allergies,

plan of care, medical libraries, and others (Heart et al., 2016). PHRs introduce a new aspect of health care transition where patients are encouraged to participate more in their therapeutic process by adding medical history and personal information. Also, patients can monitor their own health and participate in patient-doctor interactions. While PHRs were an idea in the early 2000s, the concept of making medical records more accessible to the public gained popularity recently with the addition of services such as appointment scheduling, selecting or differing physicians, drug-drug interactions, prescription reminders and refills, doctor's appointments, and many more.

A PHR can take multiple forms, such as an independent software application running on a single computer, a web service belonging to a single organization, a general web service as a platform that collects different types of health information, or a USB-based PHR (Señor et al., 2012). Common PHRs systems include Google Health, MyChart, MedicAlert, MediCompass, and NoMoreClipBoard (Señor et al., 2012).

PHRs and patient portals improve communication with patients and grant them the ability to effectively engage the patient in their own care (Manca, 2015). This technology has become very user friendly in the recent years, becoming easier to use and navigate even for the older users more set in their traditional ways. It also can cut costs for patients by preventing unnecessary visits to the clinic and allows for easier prescription refills with less insurance miscommunications (Heart et al., 2016).

Weaknesses of Electronic Charting

Electronic documentation has pushed the accessibility of medical records and health care to new heights, but with these advancements it also presents potential concerns and weaknesses.

One of the main issues with technology of this caliber is the system complexities that present potential challenges to achieving interoperability. Since no one operating system is universally used or accepted, there are discrepancies among different software. There are several system providers that are accepted as generic and usable, but health information system providers have not agreed on one common universally accepted platform (Heart et al., 2016). Physician's perception toward EMR adoption is essential for worldwide interoperability, as if the factors are understood regarding physician's attitudes toward using and adopting EMRs, a nationwide system could be implemented and thus achieve higher potential benefits from the technology (Abdekhoda et al., 2016).

Other concerns that need to be considered are adoption costs and the staff training needed. Estimates of costs can be as high as $28 billion per year during the 10-year deployment, with $16 billion per year after this span, of a broadly adopted, interoperable EMR system in U.S. healthcare (Kumar & Aldrich, 2010). Initial costs of EMR systems yield estimates for widespread connectivity that are as high as $2.5 billion (Kumar & Aldrich, 2010). However, this source is a bit dated being 11 years old. EMR technology still presents a significant cost investment but it could be significantly less expensive nowadays.

Comprehensive staff training is needed to successfully operate EMR systems. Extensive staff training programs, along with coordination and planning to train staff from all sections across the hospital, are required during implementation of many EMR systems (Kumar & Aldrich, 2010).

Common concerns, especially regarding PHRs, are potential privacy and security breaches. Maintaining data privacy is difficult with both PHRs and EHRs, as administrative staff could access information without the patient's explicit consent (Señor et al., 2012). In

compliance with privacy policies, PHR systems do not provide an in-depth description of the security measures each platform uses (Señor et al., 2012). As PHRs are relatively new, their use of standards and regulations are still low, and some third-party companies design PHR systems that are not covered by HIPAA (Señor et al., 2012). This makes PHRs the most susceptible to data breaches, but most of the platforms endorsed by major medical institutions are supported by HIPAA and receive the high security ratings among the plethora of different PHR software (Señor et al., 2012). Electronic charting systems typically use three security safeguard themes of physical, technical, and administrative (Keshta & Odeh, 2020). The administrative safeguard is the first safeguard that utilizes relevant techniques like performing audits, employing an officer in charge of information security, installing contingency plans, and implementing proper security procedures and policies (Keshta & Odeh, 2020). Physical safeguards focus on protecting the health information physically to ensure their software or hardware are not accessed by unauthorized persons (Keshta & Odeh, 2020). The third safeguard, technical, carries out protection of the whole information system found in the network of the health organization (Keshta & Odeh, 2020). While security threats should always be taken seriously, often these claims of security or privacy risks from this software are benign when considering the entire security infrastructure of the systems.

Integration into Medical Community

Many institutions have turned to using EHRs, such as Epic, for their charting purposes and allow for patients to see test results and order prescriptions through PHRs, such as MyChart. Integrating health information from all three types of electronic charting sources can benefit patients, care providers, and policy makers. This integration combines demographic, lifestyle,

and behavioral data with health records, and then provides a comprehensive view that furthers the concept of patient centered care (Heart et al., 2016).

While this technology does need a significant startup cost, in the long run it does seem to keep health care costs down. EMR technology at a VA hospital in 2002 spent approximately 30% less in their expenses than compared to the national Medicare average at the time (Kumar & Aldrich, 2010). This differential grew to around 45% in 2004 (Keshta & Odeh, 2020). By extrapolating this growth trend, EMR technology could be saving health institutions significant money today in 2021. Without a comprehensive EMR plan, health care costs will continue to rise exponentially, due to higher insurance rates, insurance companies, and the public with its growing population and need for healthcare (Keshta & Odeh, 2020). By using EMR technology, institutions can contain costs and can allocate this extra money toward advancing medicine where it belongs.

With improvements in technology and software, the need for education and further training to be able to effectively operate the systems occur. Today, both undergraduate and graduate medical education are learning how to operate EMRs to manage patient care (Tierney et al., 2013). Educational institutions now instruct the competencies of medical knowledge, practice-based learning and improvement, patient care, communication skills, professionalism, and systems-based practice (Tierney et al., 2013). It is precisely this systems-based unit where individuals learn how to operate, manage, and utilize EMR technology. This point-of-care education through EMRs allows for easy access to relevant and up-to-date medical literature where providers can formulate diagnosis and management plans (Tierney et al., 2013). Also, a fully implemented and updated EMR can facilitate current and "up and coming" practices and

education to allow physicians and their teams to remain up to date in medicine with these continuing education opportunities (Tierney et al., 2013).

Public Opinion of EHR/EMR/PHR

Primary research was conducted through a survey to a large random sample. The survey asked a series of 12 questions to collect their opinions on EHR/EMR/PHR technology and an additional 3 questions regarding the participant's demographic background. The survey was distributed through an online Qualtrics link and collected data randomly and anonymously. An example of the survey is included in *Appendix A*.

Approximately 127 participants submitted completed surveys. These participants consisted of randomly sampled individuals of different genders, occupational backgrounds, and age ranges from 18 to 71+ years old.

These electronic records have become popularized recently with the improvement of health care communication and patient accessibility. There are claims that electronic charting has positively impacted the medical community by improving efficiency of the health care system, increasing personalized care, improving documentation and accessibility, and improving communication and patient engagement. Based on this trend, a hypothesis can be predicted that individuals will prefer EHR/EMR/PHR technology and support its use exclusively in the future.

Table 1

Do you support taking the majority of health care charting and operating systems to online platforms exclusively for the future?		
Answer	Percentage	Count
Strongly Agree	22.05%	28
Agree	53.54%	68
Neutral	18.11%	23
Disagree	5.51%	7
Strongly Disagree	0.79%	1
Total	100%	127

Table 2

How often do you use or see EHR/EMR/PHR technology when in a health care setting? (Sign in, scheduling, charting, prescription use, MyChart use, etc.)		
Answer	Percentage	Count
Always	24.41%	31
Often	35.43%	45
Sometimes	21.26%	27
Rarely	14.17%	18
Never	4.72%	6
Total	100%	127

Table 3

You believe EHR/EMR/PHR technology results in better health care organization and increases access to patient files?		
Answer	Percentage	Count
Strongly Agree	29.13%	37
Agree	53.54%	68
Neutral	14.96%	19
Disagree	1.57%	2
Strongly Disagree	0.79%	1
Total	100%	127

Table 4

You believe EHR/EMR/PHR technology has improved both communication between health care institutions and physicians to patients?		
Answer	Percentage	Count
Strongly Agree	22.83%	29
Agree	49.61%	63
Neutral	21.26%	27
Disagree	5.51%	7
Strongly Disagree	0.79%	1
Total	100%	127

Table 5: Relationship Between Clinic Usage and Individual Usage

	Does your primary health care clinic utilize electronic health records (EHR)/electronic medical records (EMR)/personal health records (PHR) technology to your knowledge?		
		Total	Yes	No
You have used personal health record technology (PHR), such as MyChart or online medical portals.				
	Total Count (Answering)	127.0	122.0	5.0
	Yes	83.5%	85.2%	40.0%
	No	16.5%	14.8%	60.0%

Table 5: Relationship Between Electronic Charting and Better Quality of Care Outcomes

	You have used personal health record technology (PHR), such as MyChart or online medical portals.		
		Total	Yes	No
To what extent do you agree with the following: Because of electronic medical records, medical personnel were able to give you better quality of care.				
	Total Count (Answering)	127.0	106.0	21.0
	Strongly Agree	18.1%	19.8%	9.5%
	Agree	42.5%	41.5%	47.6%
	Neutral	32.3%	32.1%	33.3%
	Disagree	6.3%	5.7%	9.5%
	Strongly Disagree	0.8%	0.9%	0.0%

Table 6: Relationship Between Time Use and Efficiency of Electronic Charting

	PHR/EMR online platforms have saved you time during the medical process (Sign in, reminders, less paperwork, calling in prescriptions, etc.).					
		Total	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
You believe that EHR/EMR/PHR technology improves the efficiency of the health care process? (Less wait time, able to get through more							
	Total Count (Answering)	127.0	36.0	58.0	27.0	5.0	1.0
	Strongly Agree	29.1%	72.2%	15.5%	7.4%	0.0%	0.0%
	Agree	49.6%	27.8%	74.1%	33.3%	20.0%	0.0%
	Neutral	17.3%	0.0%	10.3%	55.6%	20.0%	0.0%

| patients faster, etc.). | Disagree | 3.1% | 0.0% | 0.0% | 3.7% | 60.0% | 0.0% |
| | Strongly Disagree | 0.8% | 0.0% | 0.0% | 0.0% | 0.0% | 100.0% |

Table 7: Relationship Between Privacy Concerns and Times of Inconvenience for Charting Technology

You have been significantly inconvenienced by EMR technology (Times it was down for maintenance, difficulty navigating and seeing results, difficulty signing up, etc.).	You are concerned that PHR and other electronic medical charting presents privacy and security concerns (Hackers, access without consent, etc.).					
		Total	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	Total Count (Answering)	127.0	9.0	23.0	36.0	44.0	15.0
	Strongly agree	1.6%	11.1%	0.0%	0.0%	2.3%	0.0%
	Agree	13.4%	11.1%	21.7%	19.4%	9.1%	0.0%
	Neutral	33.9%	33.3%	60.9%	36.1%	25.0%	13.3%
	Disagree	35.4%	33.3%	17.4%	30.6%	50.0%	33.3%
	Strongly Disagree	15.7%	11.1%	0.0%	13.9%	13.6%	53.3%

Participants reported that 96.06% (122/127) had a primary care clinic that utilizes

EHR/EMR technology, with another 83.46% (106/127) of participants reporting having used

PHR technology. In terms of frequency of seeing this technology being used in clinics,

approximately 24.41% (31/127) of participants always see clinicians using electronic charting,

with another 35.43% (45/127) reporting often. Another 21.26% (27/127) of participants reported

sometimes, adding up to a total of 81.1% (103/127) of participants frequently seeing electronic

record technology use.

In order to assess the negatives of this technology, questions regarding times of

inconvenience and privacy or security concerns were asked. Approximately 15.75% (20/127)

and 35.43% (45/127) strongly disagree and disagree, respectfully, about being inconvenienced

by this technology. Another 33.86% (43/127) of participants declared neutral, which makes for a total of 85.04% (108/127) not inconvenienced. Adding on to this, participants were not concerned with privacy or security risks as 11.81% (15/127) and 34.65% (44/127) of participants strongly disagree and disagree, with another 28.35% (36/127) declaring neutral, making a total of 74.81% (95/127) not concerned.

Next, an assessment was needed to see the possible benefits of this technology and clarify if the public supports the claims the secondary research aspect stated. Approximately 74.02% either strongly agree or agree (28.3% strongly agree, 45.7% agree) to these platforms saving the participants time in the medical process, and 78.74% either strongly agree or agree (29.1% strongly agree, 49.6% agree) to this technology improving the efficiency of their health care experiences. Another 82.67% (29.13% strongly agree, 53.54% agree) either strongly agree or agree to this technology resulting in better health care organization and increasing access to patient files. Approximately 72.44% either strongly agree or agree (22.83% strongly agree, 49.61% agree) to these platforms creating an improvement in both communication between health institutions and physicians to patients.

The main targets of this survey were to assess opinion for this technology to enable medical personnel to give better quality of care and assess support for the continuation of this technology and its utilization in the future. Approximately 60.63% either strongly agree or agree (18.11% strongly agree, 42.52% agree) to these platforms enabling medical personnel to give better quality of care. A special takeaway from this question was that approximately 96.77% (123/127) of participants who work in health care or come from a health care background supported this claim that electronic charting enabled medical personnel to give better care to their patients. Overall, 75.59% (22.05% strongly agree, 53.54% agree) of participants strongly

agree or agree on taking health care charting systems to online platforms and using these online platforms exclusively in the future.

Discussion

Based on the results of the survey, an overwhelming amount of support for this technology is observed. Every question resulted in a positive majority consensus for these online charting platforms. The hypothesis in question, individuals will prefer EHR/EMR/PHR technology and support its use exclusively in the future, is supported after analyzing the results from the survey.

The common arguments against these platforms include security or privacy risks, inconveniences due to maintenance, or difficulty using or signing up. The participants did not seem to be concerned with these potential risks or burdens, as 85.04% indicated they were not inconvenienced and 74.41% were not worried about privacy or security risks. Any software or application does present the potential risk of hackers stealing information or security breaches, but modern electronic charting technology usually meets high security standards and have firewalls that make unauthorized access very difficult. Thus, it was interesting to see the participants understand these security threats are usually theoretical arguments and do not hold much weight.

The most important questions from this survey were encouraging for the future use of this technology. Approximately 60.63% of participants support this technology enabling medical personnel to give the best quality of care possible. Also, 75.59% of the participants support taking health care documentation exclusively to these online platforms for the extended future. A substantial takeaway from these results were the support of electronic charting from those who

have worked with them before, those individuals who came from a health care occupational background. Approximately 96.77% of the participants from this demographic supported the statement that electronic charting enabled medical personnel to give better quality of care. These individuals work with these platforms often and were educated on how to use them. Their vast support for this technology is an indication of the positives it is doing for the medical community, as it most likely makes their jobs easier and saves them time in the documentation process.

The secondary research aspect was intended to provide background and insight into each of the three electronic charting platforms. The information gathered from these sources also dictates support for this technology. Based on the extensive number of positives, and the few number of weaknesses of this technology, an argument can be made that this technology's worth outweighs any possible negatives it presents. It is a testament to how this technology can improve quality of care and save the medical industry money in the long run.

With future uncertainties possible, like today's COVID-19 pandemic, it is comforting to know that EHR/EMR/PHR technology exists to keep the health care system not only operational but thriving, despite a potential decrease in face-to-face communication. The public support for this technology reflects the benefits it has made in the medical community and presents a green light to further explore the possibilities that this technology can offer.

References

Abdekhoda, M., Ahmadi, M., Dehnad, A., Noruzi, A., & Gohari, M. (2016, May 11). Applying electronic medical records in health care: Physicians' Perspective. *Applied Clinical Informatics*. 7(2). 341-354.

Coleman, N., Halas, G., Peeler, W., Casaclang, N., Williamson, T., & Katz, A. (2015). From patient care to research: a validation study examining the factors contributing to data quality in a primary care electronic medical record database. *BMC Family Practice.* 16(11).

Heart, T., Ben-Assuli, O., & Shabtai, I. (2016, August 20). A review of PHR, EMR and EHR integration: A more personalized healthcare and public health policy. Health Policy and Technology. 6(1) 20-25.

Keshta, I., and Ammar Odeh. (2020). Security and privacy of electronic health records: Concerns and challenges. *Egyptian Informatics Journals*. https://doi.org/10.1016/j.eij.2020.07.003

Kumar, S., & Krista Aldrich. (2010). Overcoming barriers to electronic medical record (EMR) implementation in the US healthcare system: A comparative study. *Health Informatics Journal*. 16(4) 306-318.

Manca, D. P. (2015). Do electronic medical records improve quality of care? Yes. *Canadian Family Physician. 61*(10), 846–851.

Señor, I. C., Fernández-Alemán, J. L., & Toval, A. (2012). Are personal health records safe? A review of free web-accessible personal health record privacy policies. *Journal of Medical Internet Research*. 14(4).

Tavarez, J. & Tiago Oliveira. (2016). Electronic health record patient portal adoption by health care consumers: An acceptance model and survey. *Journal of Medical Internet Research.* 18(3).

Tierney, M. J., Pageler, N. M., Kahana, M., Pantaleoni, J. L., & Longhurst, C. A. (2013). Medical education in the electronic medical record (EMR) era benefits, challenges, and future directions. *Academic Medicine*. 88(6). 748-752.

Appendix A

EHR/EMR/PHR Opinion Survey

Request for Survey Participation

You have been chosen as a possible participant in a survey conducted by Jason Queen of Northern Illinois University (NIU). This survey is for a senior capstone project for the NIU Honors Program. The purpose of this particular study is to analyze the opinions and attitudes of United States citizens toward current electronic health record (EHR)/electronic medical record (EMR)/ personal heath record (PHR) technology and potential. EMR software allows patient medical history to be stored electronically, keeping it historically accurate, up-to-date, and easily accessible. EHR refers to all existing information about a patient, combining all data collected from any doctor or facility, and is predominantly used to relay medical information about a patient by using a shared database. PHR are personal and only the patient (or whoever have been granted access by the patient) can view the medical records. This technology, such as MyChart, is commonly used to medically chart patient information digitally and interact with medical professionals in an online setting.

You are eligible to take this survey if you are 18 years or older. This questionnaire should only take approximately 5 minutes or less to complete, and your participation is completely voluntary. Your responses will be recorded anonymously, and this data will only be used toward this research project for informationally purposes only.

If you are interested in participating, please complete this survey by no later than March 31st. You may also forward this survey to others, if interested.

Your participation is greatly appreciated. If you have any additional questions or concerns, please feel free to contact Jason Queen, Z1813798@students.niu.edu, or Dr. Virginia Naples, vnaples@niu.edu.

Thank you for your participation.

Continue with survey: I am eligible to complete this survey and would like to continue.
Exit survey: I am not eligible for this survey or would not like to continue.

Questions

Does your primary health care clinic utilize electronic health records (EHR)/electronic medical records (EMR)/personal health records (PHR) technology to your knowledge?
                    Yes   No

You have used personal health record technology (PHR), such as MyChart or online medical portals.
                    Yes   No

How often do you use or see EHR/EMR/PHR technology when in a health care setting? (Sign in, scheduling, charting, prescription use, MyChart use, etc.)

Always   Often   Sometimes   Rarely   Never

You have been significantly inconvenienced by EMR technology (Times it was down for maintenance, difficulty navigating and seeing results, difficulty signing up, etc.)

Strongly Agree   Agree   Neutral   Disagree   Strongly Disagree

You are concerned that PHR and other electronic medical charting presents privacy and security concerns (hackers, access without consent, etc.).

Strongly Agree   Agree   Neutral   Disagree   Strongly Disagree

PHR/EMR online platforms have saved you time during the medical process (Sign in, reminders, less paperwork, calling in prescriptions, etc.)

Strongly Agree   Agree   Neutral   Disagree   Strongly Disagree

You believe that EHR/EMR/PHR technology improves the efficiency of the health care process? (less wait time, able to get through more patients faster, etc.)

Strongly Agree   Agree   Neutral   Disagree   Strongly Disagree

You believe EHR/EMR/PHR technology increases health care organization and access to patient files?

Strongly Agree   Agree   Neutral   Disagree   Strongly Disagree

You believe EHR/EMR/PHR technology has improved both communication between health care institutions and physicians to patients?

Strongly Agree   Agree   Neutral   Disagree   Strongly Disagree

To what extent do you agree with the following: Because of electronic medical records, medical personnel were able to give you better quality of care.

Strongly Agree   Agree   Neutral   Disagree   Strongly Disagree

Do you support taking the majority of health care charting and operating systems on online platforms exclusively for the future?

Strongly Agree   Agree   Neutral   Disagree   Strongly Disagree

What is your gender identification?

        Male   Female   Prefer not to answer

What is your age?

18-21   22-25   26-30   31-35   36-40   41-45   46-50   51-55   56-60   61-65   66-70   71+

What is your occupation field?

Health care   Business   Marketing   Engineering   Education   Liberal Arts   Other