**BARRIERS FACED WHEN IMPLEMENTING AN ELECTRONIC HEALTH RECORD WITHIN A BEHAVIORAL HEALTH SYSTEM: HOW TO RECOGNIZE THEM AND RECOMMENDATIONS TO OVERCOME THEM**

by

**Jennifer M. Longo**

BS in Health Sciences, James Madison University, 2013

Submitted to the Graduate Faculty of

the Department of Health Policy and Management

Graduate School of Public Health in partial fulfillment

of the requirements for the degree of

Master of Health Administration

University of Pittsburgh

2018

UNIVERSITY OF PITTSBURGH

GRADUATE SCHOOL OF PUBLIC HEALTH

This essay is submitted

by

**Jennifer M. Longo**

on

April 27 2018

and approved by

**Essay Advisor:**

Julia Driessen, PhD \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Assistant Professor

Department of Health Policy and Management

Graduate School of Public Health

University of Pittsburgh

**Essay Reader:**

Suzanne Paone, PhD \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Adjunct Assistant Professor

Department of Health Information Management

School of Health and Rehabilitation Science

University of Pittsburgh

**ABSTRACT**

Copyright © by Jennifer M. Longo

2018

Julia Driessen, PhD

**BARRIERS FACED WHEN IMPLEMENTING AN ELECTRONIC HEALTH RECORD WITHIN A BEHAVIORAL HEALTH SYSTEM: HOW TO RECOGNIZE THEM AND RECOMMENDATIONS TO OVERCOME THEM**

Jennifer M. Longo, MHA

University of Pittsburgh, 2018

This paper explores the benefits and barriers that healthcare orgianzations experience when implementing an electronic health record (EHR). Specifically, it focuses on the behavioral health side of a hospital system because behavioral health is becoming more well-known. This paper draws on the authors’ experience working at the University of Pittsburgh Medical Center Western Psychiatric Institute and Clinic (UPMC WPIC) to learn how to identify and expand on barriers. Understanding and expanding upon barriers has a public health relevance as healthcare systems are now integrating their EHRs, thereby allowing providers to effectively communicate all of a patients’ care to various doctors which provides the patient with a better continuum of care. This integration will increase patient outcomes, lower costs, and improve overall quality of life. Since patients with mental health issues are an at-risk population, this increased care should reduce their risk long-term.

TABLE OF CONTENTS

[preface vi](#_Toc527022198)

[1.0 Introduction 1](#_Toc527022199)

[2.0 Background 3](#_Toc527022200)

[2.1 How EHRs Improved Healthcare 3](#_Toc527022201)

[2.1.1 Clinical Benefits 3](#_Toc527022202)

[2.1.2 Societal and Organizational Benefits 4](#_Toc527022203)

[2.2 Barriers for Implementation of EHRs 5](#_Toc527022204)

[2.2.1 General Barriers for Implementation 5](#_Toc527022205)

[2.2.1.1 Cost 5](#_Toc527022206)

[2.2.1.2 Infrastructure (People, process, and technology) 7](#_Toc527022207)

[2.2.1.3 Provider Resistance 8](#_Toc527022208)

[2.2.1.4 Technology Limitations 10](#_Toc527022209)

[2.2.2 Behavioral Health Barriers for Implementation 10](#_Toc527022210)

[2.2.2.1 Data security and confidentiality 11](#_Toc527022211)

[2.2.2.2 Quality of Patient-Provider Relationship- Workflow Barriers 12](#_Toc527022212)

[3.0 UPMC WPIC Specific Barriers 14](#_Toc527022213)

[3.1 Clinic Coordinator Identified Barriers 14](#_Toc527022214)

[4.0 Recommendations for implementation 16](#_Toc527022215)

[5.0 Conclusion 18](#_Toc527022216)

[bibliography 22](#_Toc527022217)

preface

The first thank you goes to my parents for always being my rock throughout life and graduate school. I do not know how I would have survived these past two years without your tough love and encouragement. Thank you to Jenny Dee, my preceptor at the University of Pittsburgh Medical Center Western Psychiatric Institute and Clinic (UPMC WPIC), the clinic coordinators at UPMC WPIC for their time and help throughout my time at UPMC WPIC. To my readers, Julia Driessen, PhD, and Dr. Suzanne Paone for their time and help to my masters’ essay.

# Introduction

As new technological advances continue to bridge the gaps in service needs, more health care organizations are turning towards utilizing an electronic health record (EHR). An EHR is a continuous record of a patients’ health and health care interventions within a specific healthcare organization. It can be accessed by certain healthcare professionals and enhances the communication between providers, thereby increasing patient care and their overall health outcomes (Takian, Sheikh & Barber, 2012; “Behavioral Health EHR,” 2014). With the implementation of EHRs the consensus is there will be a “reduction in medical error rates, enhanced costs effectiveness, increased efficiency, improved consumer involvement in healthcare decision making,” as well as other benefits (Vishwanath & Scamurra, 2007). Even with these identified benefits, there are still barriers faced when implementation of a new EHR or converting over to a new EHR occurs at a healthcare organization. This is especially true within the behavioral health field (Takian et al., 2012). This paper looks at the transition of EHR systems at the University of Pittsburgh Medical Center Western Psychiatric Institute and Clinic (UPMC WPIC) from their current system to EPIC and assesses the barriers that they would face due to this transition. The old EHR was a standalone system that did not interface with the rest of the UPMC electronic system, which is on EPIC. With WPIC moving onto EPIC there will be complete cohesion between all UPMC entities so that all providers will have access to patients medical records when needed.

UPMC WPIC is considered the birthplace of the modern day UPMC brand (“About Western Psychiatric,” 2018). With the development of WPIC the brand of UPMC was built upon, creating the different hospitals and departments making way for the international healthcare system that UPMC is today (“About Western Psychiatric,” 2018). The Department of Psychiatry for the University of Pittsburgh is located within the hospital and is ranked within the top 10 of America's Best Hospitals (“About Western Psychiatric,” 2018). UPMC WPIC’s mission is to provide behavioral inpatient and ambulatory healthcare from its main location in Oakland, Pennsylvania and satellite locations, specifically at UPMC McKeesport, UPMC Mercy, and UPMC Northwest. UPMC WPIC provides consultation and liaison services, in-school support, nursing homes, community care and other services to patients (“About Western Psychiatric,” 2018). Because of UPMC WPIC’s various locations, it can be difficult to ensure that doctors have a complete understanding of past and present treatment when seeing patients who visit multiple locations. With the transition from UPMC WPIC’s old EHR system to EPIC, this limited cross communication will cease to exist and ensure that all communication between behavioral health providers and the medical treatment team will become seamless.

Examining the current literature of how EHRs have improved health care, the noted barriers of implementation of EHRs and workflow barriers to be addressed, will give a basis of where to look for hurdles that UPMC WPIC might encounter. The paper will look more in depth at UPMC WPIC to understand the reasoning behind the transition of EHR systems, resources took to prepare for the implementation, pre-identified barriers, and workflow barriers that were assessed during the pre-implementation process.

# Background

The paper will provide a background overview of the different aspects, the improvements and barriers of how EHR’s have affected healthcare. First, this paper will discuss the improvements EHRs have established in healthcare on the clinical, societal, and organization levels. The paper will look at the various barriers that are perceived when implementing a new EHR system. The barriers will be separated into two categories, the general barriers facing all healthcare specialties, and the specific barriers that would have more influence on the behavioral health specialty.

## How EHRs Improved Healthcare

### Clinical Benefits

As studies are done on the pre- and post-outcomes of EHRs implementation on patient health outcomes, there is significant evidence to support that when proper systems are in place health outcomes, specifically patient safety and quality of care metrics, improve over time. Studies have shown that healthcare systems that have an EHR that is incorporated with clinical decision support (CDS) tools have higher compliance rates with clinical guidelines and effective care (Menachemi & Collum, 2011). Even with the best intentions practitioners can still miss key guideline metrics due to extenuating circumstances. With CDS tools this becomes a less common occurrence and care becomes more effective, especially for more complex patients (Menachemi & Collum, 2011).

As stated before, patient safety is a metric to see how EHRs are being utilized. An example of a patient safety metric is medication error rates. With safety warnings to notify for drug interactions in the inpatient and ambulatory setting, there will be considerably less incorrect medication orders because of prescriptions not being able to be read correctly, and better medication management (Hillstad et al, 2005; Stewart, Kroth, Schuyler & Bailey, 2010).

### Societal and Organizational Benefits

Societal and organizational benefits can also be seen when using an EHR. Patient data, (i.e. age, gender/sex, race, geographical location, marital status) is concisely collected across specific metrics, as such a healthcare organization’s abilities to conduct research are greatly improved (Menachemi & Collum, 2011). This data can be used to understand what type of clinic services are needed, if transportation services should be explored and trends within the community are occurring. Within the community, due to the addition of CDS tools, providers will have reminders sent to them regarding preventions (i.e., vaccines) which they should recommend to their patients (i.e., if a patient would like the influenza vaccine). The CDS tools will also flag any immunosuppressed patients, that will allow the doctors to quickly inoculate them, to keep disease rates low within the community. With better patient management of chronic and preventable care there is an increase in patient health outcomes.

Fiscal and policy compliance are benefits of implementation on an organizational level. Fiscal benefits of implementation comes in the form of increased revenue from an array of resources. These areas include, but are not limited to, decreased time in which bills are in accounts receivable, a decrease in billing errors, increased billable hours and an improved cash flow. Indirectly, by freeing up staff time and by streamlining processes, a reallocation of resources can occur and the full time equivalents (FTEs) who used to manage the old paper records can be redistributed due to the computer based EHR system. Another fiscal benefit is by removing paper records, organizations can free up inventory space and supplies that were used to maintain these records, they can reduce the time and therefore cost of pulling and maintaining the paper records and can eliminate other miscellaneous costs associated with paper records (Menachemi & Collum, 2011). Lastly, the potential efficiency savings that are associated with implementation can come from decrease in redundant radiological testing, inpatient length-of-stay, and drug usage in the outpatient and inpatient settings (Hillstad et al, 2005). Policy compliance with Centers of Medicare and Medicaid (CMS) and The Joint Commission (JC), for example, has been shown to improve with the adaptation of an EHR system (Menachemi & Collum, 2011). This is due to the increase data collection and data analytics that can occur, also with a decrease in medication errors and charting errors allows hospitals to fall in compliance and meet standards(Menachemi & Collum, 2011).

## Barriers for Implementation of EHRs

### General Barriers for Implementation

#### Cost

The financial implications of implementing an EHR system are usually broken down into four categories: infrastructure, personnel, facilities, and other (Hall, 2014). In this paper, these four categories will be addressed, though not specifically within the cost section. In the cost section, cost will be broken down by the implementation costs, costs of on-going maintenance and a temporary decrease in revenue. These costs can pose as an initial barrier for healthcare organizations or sole physician practices from implementing an EHR. Implementation costs include the hardware installation and software costs, converting paper records to electronic ones, and training staff on how to use the new system. An example of these implementation costs can be found by looking at multi-physician practices. In a multi-physician practice, one could expect to spend $162,000 on implementation and $85,500 in maintenance costs in the first year (McBride, 2012). These costs do not include the hours needed for staff training, any overtime that is incurred from providers and other staff, the infrastructure set-up, and other costs from the implementation team(McBride, 2012). The hidden costs of implementation for these multi-physician practices could reach up to an average of over $6,000 for six months during the implementation and need to be accounted for while planning (McBride, 2012). For a small-scale hospital or academic hospital, the cost of implementation have been known to range from $5 million to more than $20 million (Hall, 2014). Maintenance costs of the EHR include software expenses that can occur yearly due to software upgrades and expenses from new hardware that must be compatible with the new software or that help the organization to keep current with the competition. The maintenance costs also include on-going training for all users of the system (Menachemi & Collum, 2011). These financial costs can be accounted for in a healthcare systems proforma before implementation takes place with executives working closely together with all involved stakeholders. Some stakeholders who should be consulted to understand what is expected and needed from each individual or group include:

* The Chief Executive Officer (CEO);
* The Chief Information Officer (CIO);
* The Chief Financial Officer (CFO);
* Providers and clinicians in different service lines;
* Member(s) from facility and support services; and
* Administrators.

By consulting with these individuals, a healthcare system will be better able to determine the best EHR system for the organization’s needs.

The last financial implication is the potential for a decrease in work productivity. A dip in productivity within the first three (3) months of implementation is to be expected because there is a learning curve for the staff (Menachemi & Collum, 2011). According to Menachemi and Collum, a study of “internal medicine clinics estimated a productivity loss of 20% in the first month, 10% in the second month and 5% in the third month, with productivity subsequently returning to its original levels.” With these percentages in mind, the finance team should include the decreased revenue when discussing the revenue losses and the aforementioned other expenses which will need to be covered during the implementation period.

#### Infrastructure (People, process, and technology)

As previously mentioned in the financial section, when implementing a EHR system into a healthcare system, talking to stakeholders is key. The CIO and members of facility and support services should be consulted when looking at the infrastructure barrier(s) because they will have valuable knowledge of the requirements and needs of the healthcare system. The infrastructure barriers include the physical infrastructure needs, such as office space and devices, i.e. computers and monitors, and the non-hardware needs, i.e., the specific software and the bandwidth of the organization’s internet provider (Cresswell, Bates & Sheikh, 2013). If the healthcare system does not currently have an EHR or an EHR spread throughout the system, then it will need to allocate resources for new computers, printers, scanners, docking stations, etc., to accept the new technology (Cresswell et al, 2013). This takes the coordination of multiple departments to understand what needs are to be met and if a redesign needs to take place to streamline workflow.

The software is supplied by a third-party supplier and will require regular maintenance and updates. These updates are necessary to keep in compliance with federal policies and to ensure that the system runs properly. For larger healthcare systems who have a proficient Information Technology (IT) department in place, they could utilize in-house IT support for the EHR (i.e., regular maintenance and troubleshooting issues). For smaller practices that might not have the in-house IT support, they can contract that support out to companies who have the IT capabilities to support the system and its users (Bryer, 2011).

A key piece of infrastructure that can be overlooked in this planning phase is the bandwidth speed of the organization. Depending on the size of the organization, the number of users, the number of “real-time transactions” taking place, and how they are spread out throughout the location depends on the minimum bandwidth size recommend. Working with the third-party supplier will also be a crucial step in determining bandwidth needs. If the bandwidth speed is too slow it can interfere with the day-to-day operations which will affect patients, administers, and doctors (Writer, 2010).

#### Provider Resistance

When implementing the new system, the implementation teams should expect some resistance to the change from the providers (Lin, Lin & Roan, 2012). Most of this resistance can be attributed to a lack of training with the EHR, as well as a perceived threat and perceived inequality (Lin et al, 2012; Dastagir et al, 2012). EHR training should be done prior to the implementation using a variety of different training methods, including web-based, classroom, role-playing, case studies, simulation and “real-world” training (Dastagir et al, 2012). This training has been seen as insufficient in preparing the providers in all the details of the EHR in a short time and be ready for the “real world” training and implementation (Dastagir et al, 2012). This lack of training has made learning the system while with patients complicated and disorganized (Dastagir et al, 2012). Even if an organization provides ample training to users before the implementation occurs, it is important to also provide post-implementation training for users and offer continuous education to help providers who have questions that come about through the transition period (Dastagir et al, 2012).

Along with inadequate training, perceived threat and perceived inequity play into the resistance that providers feel when faced with an EHR. It has been documented that providers’ will experience negative feelings, awareness, and a dislike/fear of facing new challenges that will be present with the adaptation of the EHR (Lin et al, 2012). These negative connotations play into perceived threat and perceived inequity. Perceived threat is looked at from the internal biases of individuals to want to learn but also protect themselves (Lin et al, 2012). The concept of “unknown,” either to change in workflow, space, or content, creates a feeling of insecurity which then feeds into the perceived threat (Lin et al, 2012). Perceived inequality is based off of the difference between effort and reward. When the new EHR is being implemented there will be an increase in workload for providers but no increase in pay which can result in perceived inequality as their work in learning to understand the new system is not reflected in their pay (Lin et al, 2012). Working against these two concepts can be difficult but understanding all of the stakeholder’s individuals needs and providing a detailed explanation of the main goals that are expected to be reached along with an expected timeline for targeted benchmarks will allow for open communication and breaking down the perceived threats and inequalities (Cresswell et al, 2013; Lin et al, 2012).

####  Technology Limitations

With the implementation of an EHR there is a certain limitation that has been highly debated topic over how much and when does screen/click time take away from patient care (Wachter & Goldsmith, 2018). Using an EHR is seen a major source of provider burnout because of the constant clicking and checking of boxes within the EHR (Wachter & Goldsmith, 2018). A study conducted at St. Like’s University Health Network showed that providers’ “mouse clicks increased as the physicians per-hour patient load increased” (Patel, Rais & Kumar, 2013). If a provider had “2 patients per hour it resulted in about 320 clicks per hour and if they had 2.5 patients per hour it would average over 400 clicks per hour” (Patel, Rais & Kumar, 2013).” With the implementation of the EHR you could expect a provider to spend 44 percent their time in front of the EHR and 28 percent in front of patients, which is consistent with the other data (Patel, Rais & Kumar, 2013). It takes about a third longer to enter patient information into an electronic chart than in paper charts. Healthcare systems should take into consideration this increased time when looking into implementing an EHR (Patel, Rais & Kumar).

### Behavioral Health Barriers for Implementation

Within the behavioral healthcare field there a select few barriers that are felt differently with EHR implementation in a psychiatric specialty as compared to non-psychiatric specialties. According to Stewart, Kroth, Schuyler and Bailey, “The patient-psychiatrist relationship is arguably more reliant on communication skills, confidentiality and psychodynamic interpretations than non-psychiatric specialties” (Stewart et al, 2010). The barriers that are examined in this section are based off of studies that have identified these barriers as concerns for the behavioral health field.

#### Data security and confidentiality

When dealing with technology and the cloud, data security and confidentiality is always an important topic. Data security and confidentiality needs increase when dealing with health-related information. The Health Insurance Portability and Accountability Act (HIPAA) and the Health Information Technology Economic and Clinical Health (HITECH) Act both impose regulations on how healthcare information is handled, transferred and used, as well as privacy and security measures (Wager, Lee & Glaser, 2013). There are required audit functions that record an individual's actions on the EHR to ensure they are not accessing files for which they are not authorized to have access (Menachemi & Collum, 2011). This is important in every specialty but specifically for psychiatry because of the sensitive nature and stigma that is still attached to behavioral health issues (Menachemi & Collum, 2011). If a breach in security was to happen at a healthcare organization and a psychiatric patient who has a diagnosis of schizophrenia had their records released to the public there could be mental and social consequences for that patient (Menachemi & Collum, 2011). The impact of potential breaches could involve but are not limited to, an increase in medication, extra therapy, family and friend troubles, or job issues (Menachemi & Collum, 2011). Patients might feel that feel that they cannot be as open with their providers because this record will follow them into every practice they visit within the healthcare system (Stewart et al, 2010). Another way this can change for psychiatric patients is how they answer screening questions (Stewart et al, 2010). For example, they could score higher for anxiety which could lead to false-positive diagnosis for other disorders because of the anxiety induced by the shift to the EHR (Stewart et al, 2010).

This issue of confidentiality with a comprehensive medical record that follows the patient throughout a healthcare system is the aspect of electronic prescribing (e-prescribing). The goal of e-prescribing is to reduce errors that arise from misread orders which will then increase patient safety and quality of care (“Ontario e-prescribing,” 2009). E-prescribing can also alert providers to potential drug interactions. If the provider and pharmacist are within the same healthcare system they can use internal messaging to correct dosage or other medication errors (“Ontario e-prescribing,” 2009). Also, the pharmacists can access the patients EHR to see other treatment or lab results that would be pertinent to the medications being prescribed (“Ontario e-prescribing.” 2009). With this advancement in technology, much of a patients’ information is already being shared by between providers and pharmacists and as such extra security measures such as double authorization methods should be used to protect patient records and well-being.

####  Quality of Patient-Provider Relationship- Workflow Barriers

In a psychiatric setting a provider accesses a patient’s mental health by verbal and non-verbal cues (Stewart et al, 2010). Some hesitation behavioral healthcare specialists may feel with implementing an EHR is that these important non-verbal cues will be lost or misinterpreted as providers enter in their notes directly into the EHR instead of relying on handwritten notes or deciding to transcribe those notes later (Stewart et al, 2010). It has been discussed how there will be a decrease in productivity when implementation first takes place in the first three (3) months, but another consideration that has to take place is where the computers are placed. Psychiatry is a communication and face-to-face based specialty and having a computer in the corner or behind a wall will hinder the observation side of the appointment (Stewart et al, 2010). A patient may sound happy and confident but small facial or hand ticks could show that the topic is causing them anxiety. The psychiatrist could miss those cues if the psychiatrist is placed behind the computer in order to type, or their position behind a computer when listening to the patient could portray disinterest in what the patient is saying (Stewart et al, 2010).

Understanding the barriers when implementing an EHR is important so that steps can be taken to quickly relieve the intra- and interpersonal issues and tackle the infrastructure barriers with the appropriate stakeholders so nothing is overlooked when your healthcare organization is implementing your own EHR. Overall communication channels need to constantly be open and checked when in the planning stages. Benchmark goals should be regularly referred back to in order to stay on task. With a understanding of these important barriers and their consequences, this paper will now focus on UPMC WPIC specific barriers and how they compared.

# UPMC WPIC Specific Barriers

The author of the paper spent her administrative residency with UPMC WPIC under Jennifer Dee, Vice President of Ambulatory Behavioral Health and Executive Administrator of the Department of Psychiatry. During her time at UPMCWPIC, the hospital was in the beginning stages of the implementation of EPIC, an EHR. As such, the author was able to interview clinic coordinators to see what barriers they felt would impede the implementation of EPIC.

## Clinic Coordinator Identified Barriers

The clinic coordinators said that with the older EHR system, the providers would take handwritten notes and then transfer them over, either manually or via dictation software, to the EHR. There is a standard with the implementation of EPIC that requires providers to type all notes into the EHR, eliminating the process of duplication. Some clinic coordinators felt that this new process would interfere with the relationship between the providers and patients, similarly to what was found in the literature review as a provider identified barrier. They felt that the duplication of notes would still occur, if not increase, at first with the new EHR. This potential increase could be caused by the learning curve of using the new system, resistance from providers, and the patients’ familiarity with technology in the room (A. Jennings, personal communication, June 15, 2017; G. Allen, personal communication, June 24, 2017).

Patient concerns and needs were another barrier that the clinic coordinators pointed out. UPMC WPIC deals with an array of behavioral health disorders where some patients might understand the use of the computers in their treatment and others cannot. Each patient will require a specialized treatment plan and, due to their diagnosis, their therapist or psychiatrist may or may not be able to bring in a computer into the room during treatment. Patient progress needs to be considered when making protocols for the use of EPIC instead of using a set standard of requiring providers to use the EHR to take their notes during a session (A. Jennings, personal communication, June 15, 2017; G. Allen, personal communication, June 24, 2017).

Lastly, the clinic coordinators were concerned that older providers would have a difficult time converting from the old EHR to the new EHR. EPIC is heavily reliant on technology as it is implemented with electronic communications, continuous use of electronic prescribing and clinical notes. This reliance on technology could be overwhelm providers in addition to their clinical responsibilities. The clinic coordinators expressed that they felt there would be pushback from providers who do not want to expressed change. These providers are used to how they operate their individual practice so they might not see the short-term and long-term benefits of fully complying with the new EHR (A. Jennings, personal communication, June 15, 2017; G. Allen, personal communication, June 24, 2017).

# Recommendations for implementation

After reviewing the literature and discussing the barriers experienced with implementation the paper will discuss recommendations that should be taken before, during and after an EHR implementation. These recommendations are there to reduce the amount of unexpected complications and costs that could arise during the process. Also, they achieve to include the top executives to facilities staff in a point of the implementation process. Below are the recommendations.

* Form a group of highly skilled personnel with different backgrounds as an “implementation team” to work closely with the healthcare system and the third-party vendor.
* Utilize stakeholders to understand all financial aspects of implementation.
	+ Stakeholders included CIO, CFO, CEO, providers in different service lines, members from facility services, and administrators.
* Perform walk-throughs of each clinic to determine infrastructure needs and wants.
* Develop a change management plan that can be adopted to the different levels of staff being impacted by the implementation.
* Have information available to patients to inform them of the impending switch, as well as how it will benefit and affect them.
* Schedule workshops for providers to work within the new EHR system, provide tutorials for users, and technical and user support before, during, and after implementation.
* Establish communication channels between the implementation team, executive team, clinical staff and other stakeholders to effectively express any comments, concerns or issues that may arise at any point in the process.
* Visually share screen(s) with patients, learn keyboard and software short-cuts, and voice-based interfaces to overcome technology limitations (Wachter & Goldsmith, 2018; Street et al, 2014).

With the recommendations working together the introduction of the EHR system will become relatively seamless. Each recommendation builds on top of the one before it, creating building blocks for a solid foundation for the entire project. All of the recommendations should be done, for the exception of the last bullet point. The organization should do the first part of the recommendation, visually share screen(s) with patients and learn keyboard and software short-cuts, but if acquiring the interfaces needed for voice-based technology is to expense that could be a long-term goal.

# Conclusion

In conclusion, implementing an EHR into a behavioral healthcare setting comes with barriers and benefits that should be identified beforehand. By consolidating a healthcare organization to use the same EHR across the system, the continuum of care for patients becomes seamless. This seamlessness increases quality and safety for patients, improves patient and societal outcomes, and reduces costs for the system. Some of these benefits can be seen soon after adoption of the EHR while others can be benchmarked for months and years after implementation.

The barriers of implementing an EHR in a behavioral healthcare system are for the most part similar to those faced in non-behavioral health. But due to the patient population served by the behavioral healthcare system, the changes to workflow, data security, and the relationships between providers and patients are more sensitive. The undertaking implementing an EHR from scratch or transitioning to a new system involves a substantial up-front investment and continuous payments for maintenance. Creating a diverse team of stakeholders from different departments, an “implementation team,” can minimize the unexpected costs during implementation. This team would talk to different clinical personnel about their expectations for the software, learn what the IT department needs to run the system, discuss with the facility department to understand what would need to be added or removed to accommodate the new system, human resources, etc., all to get the full picture of the impact of the new system will have. The implementation team should come from different backgrounds, but will work well together to communicate the needs of the healthcare system to the third-party vendor. They are the “go-to” people when any questions, comments or problems arise during and after implementation occurs. Using an implementation team keeps the process centralized to a group of people and keeps communication open during the entire process.

The infrastructure barrier can be broken down into three components: physical, software, and broadband requirements. The first part of this barrier can be overcome with proactive measures. The implementation team should do walk-throughs of clinics to understand what a patient experiences during a typical visit. This will help identify any bottlenecks of patient flow early on and can be addressed before the system goes live. The walkthroughs could also occur with a facility manager and a practice manager so decisions about placement of computers, routers, etc., can be made. An inventory of items from the old EHR system or paper system that need to be discarded can be taken during the walkthrough. The software and broadband requirements should be discussed with third-party vendor to understand what the specific healthcare system needs are and what the options are available to meet those needs.

Provider resistance and patient concerns are barriers that can be the toughest to overcome because they involve internalized beliefs which differ from the tangible ones discussed beforehand. Developing a change management plan for the providers that includes their feedback regarding the new system and its policies will help start lessening the resistance. The two (2) different change management theories that can be used to lessen resistance are Lewin’s change management model and/or Bridges’ transition model (Mulholland, 2017). Lewin’s change management model is good for large changes in an organization and provides an in-depth analysis of the organization (Mulholland, 2017). However, Lewin’s change management model is time consuming and precautions need to be taken to not alienate the staff during the process (Mulholland, 2017). Bridges’ transition model seems less intrusive then a “change” model. This model could be better if the organization’s attitude is less open to the change (Mulholland, 2017). Bridges’ model allows the gap between upper management, providers and staff to close (Mulholland, 2017). Everyone’s concerns and emotions are addressed with model, thereby creating more loyalty within the organization (Mulholland, 2017). Though there is no strict timeline provided by the model, it can be used as a tool for progression for the implementation team and not the entire healthcare system (Mulholland, 2017). Providing technical support for the providers before, during, and after implementation has shown to have a better success rate of compliance (Stewart et al, 2010). Besides the initial three (3) month decrease in productivity, providers can still maintain a healthy provider-patient relationship if the design of the room is optimal for eye contact, if the provider explains how the transition is going to positively impact the patient’s treatment, and if the provider limits screen time to important notes and shorthand.

Technology limitations have short- and long-term recommendations to help overcome the limitations that are presented. The short-term recommendations include understanding and learning shortcuts within the system and the keyboard, as well as sharing the screen with the patients. By learning shortcuts within the EHR, the providers will be able to navigate through multiple requirements/screens with ease and less clicks (Street et al, 2014). The same principle can be applied to learning keyboard shortcuts and understanding how to better utilize the keyboard to type without looking down while typing so the providers can maintain eye contact with patients as they are typing notes (Street et al, 2014). Providers could reach out to the IT department to ask for help on these recommendations. The provider sharing the screen with the patient also improves communication between the two and allows the patient to better understand what the provider is doing on the computer (Street et al, 2014). This could help the patient with any anxiety they are feeling about the provider using the technology in the appointment. Adopting a voice and/or gesture-based interface would be a long-term recommendation, however it would add additional costs to the EHR (Wachter & Goldsmith, 2018). This interface would allow for orders, communications, and searches to be accomplished by voice command (Wachter & Goldsmith, 2018). The interface would allow for better communication between the patient and provider and would require confirmation for orders by a touch or another voice command (Wachter & Goldsmith, 2018). By eliminating the excess clicking, in theory, providers will be able to see more patients and improve their patients’ quality of life.

Overall, with proper planning and open communication the implementation of EPIC at UPMC WPIC will go smoothly. UPMC WPIC should expect some issues to arise, but if planning is thorough, no major surprises should arise. From the literature review, the concerns arising at UPMC WPIC seem to be in line with what has been observed in other healthcare systems. The most important aspects of a smooth transition from the old EHR system to EPIC without disrupting patient treatment involves understanding the patient population and the use of a strong IT team to support staff.

bibliography

About Western Psychiatric Institute and Clinic. (2018). Retrieved January 6, 2018, from http://www.upmc.com/locations/hospitals/western-psychiatric/about/Pages/default.aspx.

Behavioral Health EHR Paves the Way for Integrated Care. (2014). *Managed Care Outlook, 27* (23), 1-10. doi:10.1075/ps.5.3.02chi.audio.2f.

Byer, C. (2011, June). After EHR system implementation, maintenance, service questions remain. Retrieved January 6, 2018, from http://searchhealthit.techtarget.com/news/2240020962/After-EHR-system-implementation-maintenance-service-questions-remain.

Cresswell, K. M., Bates, D. W., & Sheikh, A. (2013). Ten Key Considerations for the Successful Implementation and Adoption of Large-Scale Health Information Technology. *JAMIA, 20* (E1), E9-E13. doi:https://doi.org/10.1136/amiajnl-2013-001684.

Dastagir, M. T., MD, Chin, H. L., MD, MS, McMamara, M., MD, Poteraj, K., RN, Battaglini, S., MS, & Alstot, L., BS. (2012). Advanced Proficiency EHR Training: Effect on Physicians' EHR Efficiency, EHR Satisfaction and Job Satisfaction. *AMIA,*136-143. Retrieved January 4, 2018, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3540432/.

Goldsmith, R. W. (2018, April 03). To Combat Physician Burnout and Improve Care, Fix the Electronic Health Record. Retrieved April 12, 2018, from https://hbr.org/2018/03/to-combat-physician-burnout-and-improve-care-fix-the-electronic-health-record.

Hall, S. D. (2014, February 13). Hospitals don't factor in full cost of EHR implementation. Retrieved April 11, 2018, from https://www.fiercehealthcare.com/ehr/hospitals-don-t-factor-full-cost-ehr-implementation.

Hillestad, R., Bigelow, J., Bower, A., Girosi, F., Meili, R., Scoville, R., & Taylor, R. (2005). Can Electronic Medical Record Systems Transform Health Care? Potential Health Benefits, Savings, And Costs. *Health Affairs,24*(5), 1103-1117. doi:10.1377/hlthaff.24.5.1103.

Lin, C., Lin, I., & Roan, J. (2011). Barriers to Physicians’ Adoption of Healthcare Information Technology: An Empirical Study on Multiple Hospitals. *Journal of Medical Systems,36*(3), 1965-1977. doi:10.1007/s10916-011-9656-7.

McBride, M. (2012, July 25). Understanding the true costs of an EHR implementation plan. Retrieved April 11, 2018, from http://medicaleconomics.modernmedicine.com/medical-economics/news/modernmedicine/modern-medicine-feature-articles/understanding-true-costs-ehr-?id=&sk=&date=&pageID=2&total\_page=2.

Menachemi, N., & Collum, T. H. (2011). Benefits and Drawbacks of Electronic Health Record Systems. *Risk Management and Healthcare Policy,*47-55. doi:10.2147/RMHP.S12985.

Mulholland, B. (2017, July 24). 8 Critical Change Management Models to Evolve and Survive. Retrieved April 15, 2018, from https://www.process.st/change-management-models/.

Ontario E-Prescribing Demonstration Project Aimed at Laying Foundation for Province-Wide System. (2009). *Canadian Pharmacists Journal / Revue Des Pharmaciens Du Canada, 142* (4), 164-164. doi:10.3821/1913-701x-142.4.164.

Patel, S., Rais, A., & Kumar, A. (2013, October 11). 4,000 Clicks Per Shift: ED Physicians' EMR Burden. Retrieved April 14, 2018, from https://www.beckershospitalreview.com/healthcare-information-technology/4-000-clicks-per-shift-ed-physicians-emr-burden.html.

Stewart, R. F., Kroth, P. J., Schuyler, M., & Bailey, R. (2010). Do Electronic Health Records Affect the Patient-Psychiatrist Relationship? A Before & After Study of Psychiatric Outpatients. *BMC Psychiatry, 10* (3). doi:10.3897/bdj.4.e7720.figure2f.

Street, R. L., Jr., Liu, L., Farber, N. J., Chen, Y., Calvitti, A., Zuest, D., . . . Agha, Z. (2014). Provider Interaction with the Electronic Health Record: The Effects on Patient-Centered Communication in Medical Encounters. *Patient Education and Counseling,3*(96), 315-319. doi:10.1016/j.pec.2014.05.004.

Takian, A., Sheikh, A., & Barber, N. (2012). We are bitter, but we are better off: Case study of the implementation of an electronic health record system into a mental health hospital in England. *BMC Health Services Research,12*(1). doi:10.1186/1472-6963-12-484.

Vishwanath, A., & Scamurra, S. D. (2007). Barriers to the adoption of electronic health records: Using concept mapping to develop a comprehensive empirical model. *Health Informatics Journal,13*(2), 119-134. doi:10.1177/1460458207076468.

Wager, K. A., Lee, F. W., & Glaser, J. P. (2013). *Health care information systems: A practical approach for health care management* (3rd ed.). San Francisco, CA: Jossey-Bass.

Writer, C. (2010, June 03). EMR Internet Connectivity | Practice Fusion. Retrieved January 7, 2018, from https://www.practicefusion.com/blog/internet-connectivity-and-future-of/.