

2014

# Antiquated paperwork processes in hospitals: the problems and solutions with health information technology systems

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*Boston University*

BOSTON UNIVERSITY  
SCHOOL OF MEDICINE

Thesis

**ANTIQUATED PAPERWORK PROCESSES IN HOSPITALS: THE PROBLEMS  
AND SOLUTIONS WITH HEALTH INFORMATION TECHNOLOGY SYSTEMS**

by

**ANDREW YOON**

B.A., Boston College, 2011

Submitted in partial fulfillment of the  
requirements for the degree of  
Master of Arts

2014

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# **ANTIQUATED PAPERWORK PROCESSES IN HOSPITALS: THE PROBLEMS AND SOLUTIONS WITH HEALTH INFORMATION TECHNOLOGY SYSTEMS**

**ANDREW YOON**

ABSTRACT

## Background

The United States healthcare system is one of the most expensive in the world, equaling approximately one trillion dollars. However, the quality of healthcare is low, as indicated by mortality rates, prevalence of diseases, rates of readmission to hospitals, dissatisfaction rates, and much more. One of the inefficiencies in the healthcare system that is causing errors and a decline in patient care to occur is the current paperwork system. Physicians and nurses spend much more time taking care of patient paperwork rather than giving direct treatment to patients themselves, and it's been shown that patient dissatisfaction levels rise and errors occur more frequently as a result of current physician/nurse workload. In order to change from paperwork to electronic files, hospitals must invest the time and money to look for alternative mechanisms that would decrease turn-around time of paperwork completion by leveraging digital solutions. A study was carried out to observe log back of paperwork by counting the amount of papers for each physician before and after an electronic email message intervention.

## Results

The results were as expected: a simple email message did not drastically affect the amount of paperwork back log by residents, and numbers stayed consistent throughout. More than 50% of patient paperwork for residents in year 1 and 3 was more than 28 days old, which signifies the lack of paperwork availability and accessibility to the residents while off-site.

## Conclusion

Addressing the problem of paperwork burden to residents requires alternative solutions that include changing the entire paperwork system to a paperless, electronic system. Other solutions that require less effort, time and cost are possible, such as an email reminder as was done in this study, but will most likely not be as effective as switching to a paperless system that allows for physician-patient communication on a more consistent basis even though they may be off site. These changes would significantly improve quality of patient care as well as decrease administrative costs and waste.



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## ABBREVIATIONS

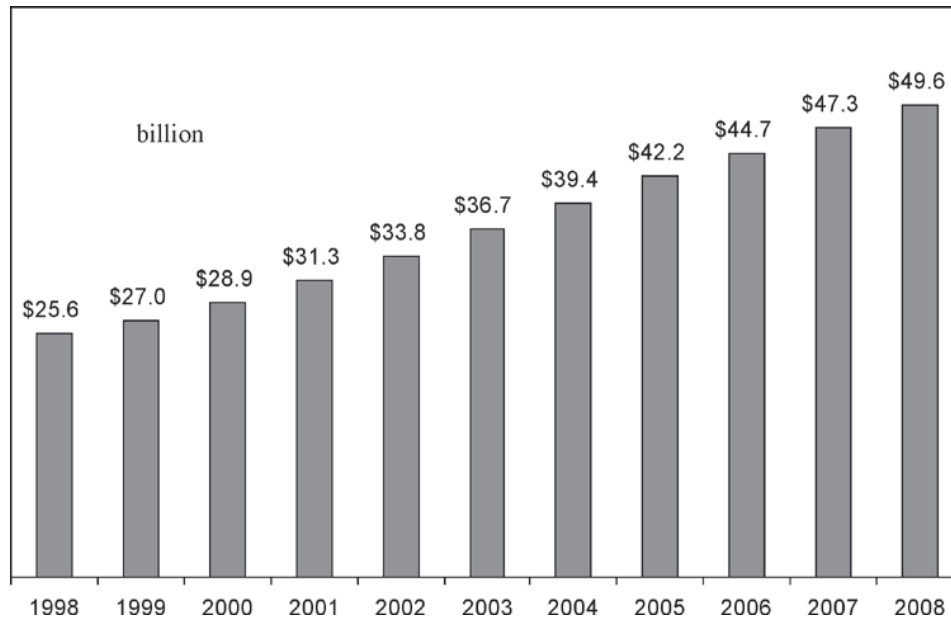
AA	Administrative Assistant
BMC	Boston Medical Center
CDHP	Consumer Driven Health Plan
CT	Computed Tomography
EMR	Electronic Medical Records
GDP	Gross Domestic Product
HIT	Health Information Technology
HHS	The Department of Health and Human Services
ICU	Intensive Care Unit
IRB	Institutional Review Board
IT	Information Technology
MRI	Magnetic Resonance Imaging
OECD	Organisation for Economic Co-operation and Development
PACS	Picture Archiving and Communication Systems
PCMH	Patient Centered Medical Homes
PCP	Primary Care Physicians
PGY	Post Graduate Year
PI	Principal Investigator
US	United States
VA	Veterans' Affairs

## INTRODUCTION

### Nationwide Dilemma

The current healthcare industry faces many challenges as it transitions into a new era of managing patients. Change is important healthcare costs are rising, and the quality of care continually remains mediocre in comparison with other industrialized countries (Comanor, Iii, & Jr, 2006). The United States (US) is spending more capita per national gross domestic product (GDP) on health care expenditures, but life expectancy remains below the Organisation for Economic Co-operation and Development's (OECD) average (Fuchs VR, 2013). The past has been more or less the same: 1997 expenditures for health care exceeded one trillion dollars, around 13.5% of the GDP, and even with much spending, more than 16% of Americans were uninsured (Frisse, 1999). This underachieving result is just one of many reasons why there is a need for changes to be made in the healthcare system. Another important reason for a shift in the system is to address the risk of adverse events when transitions between levels of medical care occur for patients (Neufeld, Hoyer, Cabahug, Fernandez, Mehta, Walker, Powers, Mayer, 2013). To address these issues, a shift from a system of paperwork to a system of Electronic Medical Records (EMR) remains crucial because it will help to reduce healthcare costs while increasing quality. Without these necessary changes, the domestic healthcare system will continue to be inefficient: the U.S health care system currently

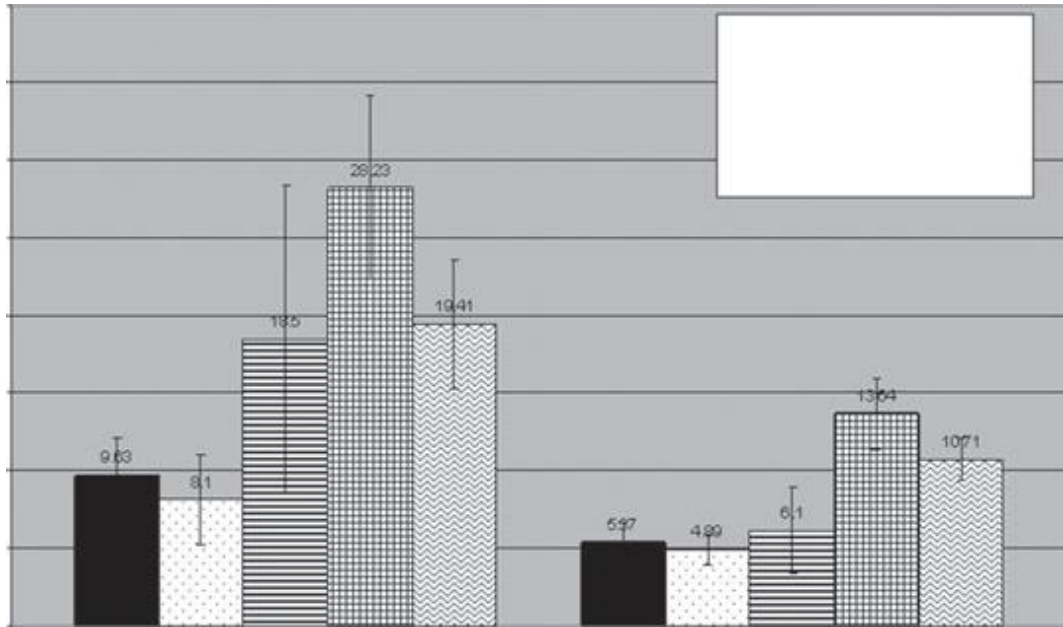
spends up to \$800 billion in waste per year, and paperwork redundancy accounts for 18% of that health care waste (Figure 1)(Manchikanti, Singh, & Boswell, 2010). According to the same study, physicians spend approximately 8 hours per week on paperwork, and they hired 1.66 clerical workers for every doctor, and that every physician spends around \$68,000 per year to deal with paperwork for insurance companies. Statewide statistics show similar trends to the national averages: paperwork alone accounted for approximately 21% of California's healthcare expenditure, with paperwork costing 21 cents per every dollar spent on healthcare in California (Benko, 2005). Many hospital, insurance, and medical groups in California region spend 34% of their revenue on healthcare administration alone. As the numbers show, paperwork is one of the biggest factors of healthcare waste, which puts a spotlight on medical organizations to take more advantage of technology available that would eventually decrease costs and increase patient care quality.



**Figure 1: Fee-For-Service (FFS) Medicare Expenditure.** This chart shows the expenditure for physician services from years 1998-2008 on Medicare FFS spending. The X-axis represents the time period, and the Y-axis represents the cost in billions of dollars (Manchikanti et al., 2010)

### **Statistics in Hospitals**

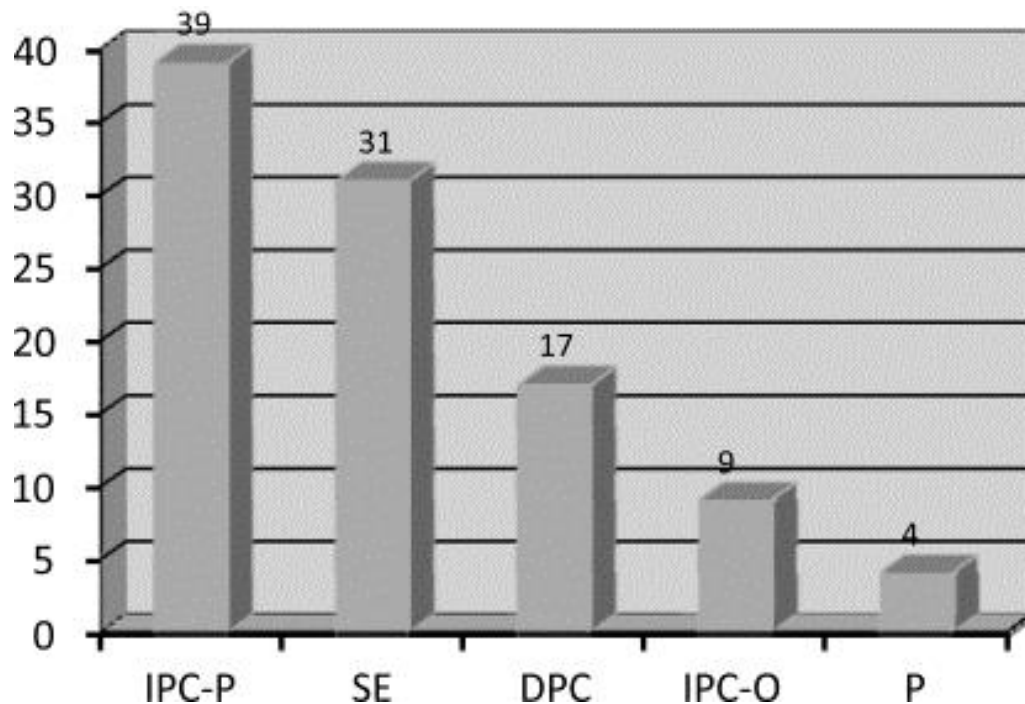
The place of biggest concern in terms of inefficiency in paperwork is in the hospital setting. It's becoming more apparent that physicians and nurses are spending too much time away from direct patient care and more toward administrative tasks. In a study performed by Thibodeau, Geary, & Werter, 2010, third year residents in the emergency department at Albany Medical Center saw sixty to eighty percent more new patients per hour than their first year resident counterparts, and this was directly a result of spending less time on indirect patient care activities. More time was needed for first year versus third year residents (9.6 minutes vs. 5.4 minutes per patient, according to Figure 2 below).



**Figure 2: Workflow Comparison.** This chart shows the difference of workload and types of work between PGY1 (Post Graduate Year) and PGY3 residents. The Y-axis represents minutes spent, and the X-axis represents PGY1 on the left and PGY3 on the right. The black bars represent paperwork time per patient (Thibodeau et al., 2010)

In another study, it was recorded that resident physicians spend around 34 minutes per patient reviewing and documenting patient medical records and paperwork associated with the visit; the same study also emphasized a previous survey in which 68% of internal medicine residents reported to spending more than 4 hours per day for patient documentation (Alromaihi, Godfrey, Dimoski, Gunnels, Scher, Baker-Genaw, 2011). The same study highlights that residents are spending more time at workstations than taking care of patients (43% vs. 20%), and that only 15 minutes signify a direct patient to physician interaction (percentage of time spent in Figure 3).





**Figure 3: Time residents spent in tasks, percentage.** Display of the proportion of time spent by residents in the following categories from left to right: indirect patient care by physician (IPC-P), structured education (SE), direct patient care (DPC), indirect patient care for other healthcare workers (IPC-O), and personal activities (P); indirect patient care by physicians take up the most time in a physician’s day-to-day schedule. (Alromaihi et al., 2011)

In a German hospital, an average of 1 hour and 22 minutes in an 8-hour work day was spent on administrative tasks, and 16.2% of the work day composed of multitasking (Mache, Busch, Vitzhum, Kusma, Klapp, Groneberg, 2011). In an abdominal pain clinic, of the 45% families that noted some type of challenge associated with getting their abdomen evaluated, 40% of those issues arose from the volume of paperwork, which was the most of all the other issues (Schurman & Friesen, 2010). A reason for such high volumes of paperwork might be that clinics prefer that they take care of patient paperwork for logistical

purposes, as 72.2% of surveyed practices reported preferring paperwork to avoid confusion, but also reported that only 30% of patient programs require patients to complete a part or all of the application (Buell & Gesme, 2009). Many forms and paperwork in the hospitals, although mandatory, are being taken up mostly by physicians and nurses, which decrease the time allotted to take care of patients.

Outpatient clinics and patient centered homes face similar types of burden because of their antiquated paperwork system. Palliative care homes, which have used the old paperwork system, tried to implement a new framework to improve end of life care, only to find out that one of the biggest perceived barriers was additional paperwork (Hall, Goddard, Stewart, & Higginson, 2011).

### **Physician Opinion on Paperwork**

Patients seem to be the most outspoken group that is demanding cheaper and better clinical care. However, physicians and staff are just as frustrated with their current documentation system, no matter what kind of hospital or clinic the healthcare professional is working in. In a pediatric care facility, from a total of 209 total physicians, 65% of them claimed that paperwork is a significant barrier to delivering the best type of care to infants and youth (Minkovitz, Mathew, & Strobino, 1998). A survey completed in Melbourne, Australia evaluated general practitioners; both men (33%) and women (37%) practitioners noted reduced paperwork as an overriding theme to improve work satisfaction among general practitioners (2<sup>nd</sup> and 1<sup>st</sup> highest ranked among all themes) (Walker & Pirota,

2007). Family physicians also had the same response as many others: a strong percentage of family physicians in Canada (63.9%) agreed that the amount of paperwork is too much and was the greatest concurrence of family physician stress factor (Lee, Stewart, & Brown, 2008). For some physicians, answering these types of surveys and questionnaires was impossible because the paper survey was lost in a pile of their clinical paperwork, and attributed this growing amount of paperwork as the biggest reason for not participating in satisfaction surveys (Kaner, Haighton, & McAvoy, 1998). Some general practitioners also noted that paperwork and administration were frequent work concerns that effected their own physical and mental health (Appleton, House, & Dowell, 1998). The clinical staff includes not just the physicians but all the individuals caring for the patients. The large back-log of paperwork and regulations not only decreases their ability to care for patients, but also affects their own health negatively.

Another factor affecting overall physician and nursing staff stress is the future merging of practice sites; administrative requirements to combine all paperwork under one similar form will bring about additional stress and likely a decrease of well-being to the clinical staff members. A merging of New Mexico's public-funded behavioral health services to one private organization gave numerous sources of stress to its workers. The main source of stress was the overwhelming paperwork and the organizational understaffing while physicians commented on not having enough time to complete daily tasks because of

extensive paperwork during the transition (Willging, Waitzkin, & Lamphere, 2009).

In all cases, a major factor affecting physician dissatisfaction consistently comes from inefficiencies of the paperwork system. Paperwork seems to be getting in the way of quality patient care and the work that physicians and nurses were originally trained to perform.

### **Patient's Opinion on Paperwork**

Although the bulk of the paperwork issue lies behind the scenes in hospital and clinical settings, patients are also responsible for the completion of paperwork for their health insurance claims, disputes, and their own medical records. Compared to adults of other countries, the US adults were more likely to report spending more time on paperwork or disputes (17% verses an average of 8% in high-income countries); this was the highest in its category (Schoen et al., 2010). Also, 31% of US adults encountered some sort of problem or concern with insurance paperwork; this was the highest rate compared to other countries. One of the newer insurance ideas, termed consumer-driven health plan (CDHP), makes patients more involved in their health care decisions in relation to cost and quality and as such experience their share of the paperwork burden. A survey by Christianson et al. of patients with CDHPs and other traditional insurance plans noted that CDHP enrollees had more contact with paperwork than traditional insurers (52% versus 43%), and that these enrollees reported a problem with

paperwork more than traditional insurers (Christianson, Parente, & Feldman, 2004). Aside from personal time spent with insurance paperwork, patients also face a decrease in satisfaction and a decrease in quality care because of waiting times associated with paperwork and the amount of time spent on direct versus indirect care (Alromaihi, Godfrey, Dimoski, Gunnels, Scher, Baker-Genaw, 2011). Overall, patients are dissatisfied with the current amount of paperwork that burdens not only them but also physicians and clinical staff members.

### **Paperwork Disrupting Clinical Research**

The burden of paperwork seems to be infiltrating not only in the arena of hospital and direct patient care, but also in clinical research and the advancement of medicine. As research rules and governance systems become stricter, expensive delays from paperwork are piling up because of the lengthy applications, procedures, and the inability to make consistent decisions (Shaw, Boynton, & Greenhalgh, 2005). Written participation to follow rules and consent guidelines undermines participation by patients, and therefore can increase selection bias; this is especially significant for randomized clinical studies (Jamrozik, 2004). Paperwork and documentation for cancer trials is longer than for regular clinical trials: one full-time research assistant is needed just to take care of paperwork (Vickers, 2008). Clinical researchers thought paperwork was burdensome but necessary (52.8% of them); also, 31.7% thought the paperwork for Institutional Review Board (IRB) submission and approval was too much work

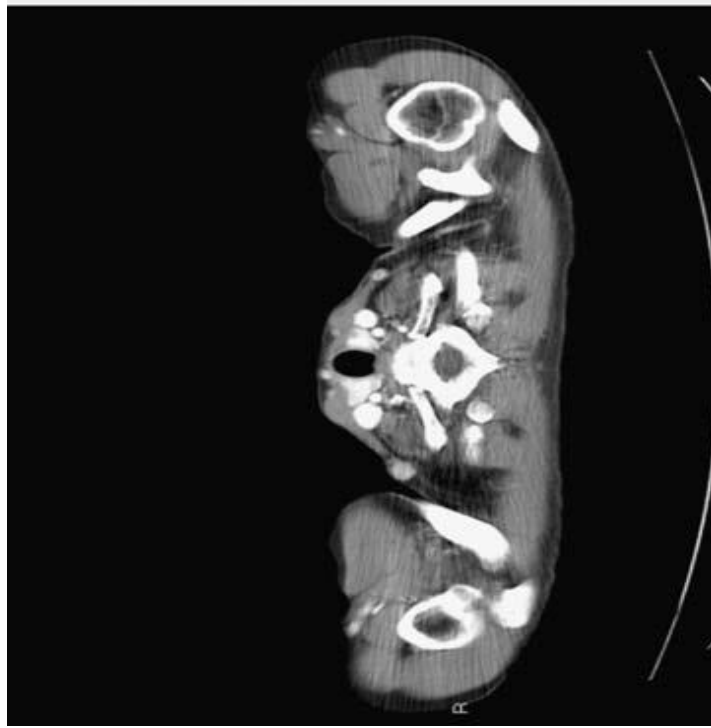
and/or thought that it delayed and halted scientific advancement (Fischer & George, 2010). Many resources are being channeled into an old system that is still in effect, and therefore the studies take longer for both the providers and the patients.

Besides the piles of paperwork that clinical research requires, another inefficiency of paper-based regulation is the loss of paperwork that tangibly halts the progress of the trial. Process failures such as lost paperwork or difficulty obtaining forms are one of the major causes that increase expenditure, staff time and work load (Green, Lowery, Kowalski, & Wyszewianski, 2006). The present inefficiencies in the IRB system have had a costly impact on administrative capacity and have led to delays in health services research studies. Research staff is also burdened by paperwork, and since many principal investigators (PI) are physicians or nurses, this can also take time away from patient care. Paperwork is a separate but also an interconnected problem within different spheres of the medical world.

### **Current Examples of Health Infosystems in Action**

Some hospitals and clinics have already begun to assess the effectiveness of switching to the EMR system, and have started to track the benefits. One type of clinical site that benefited greatly was imaging centers that went to a paperless protocoling of Magnetic Resonance Imaging (MRI) and computed topography (CT) scans. Patient exams were at times delayed due to

paperwork loss, but through exam scanning, the protocol process improved and has decreased interruptions in the daily operations of imaging clinics. In one imaging center which evaluated 85,000 cases per year (22% are MRI exams and 24% are CT scan exams), as many as 100-150 pieces of paper were being scanned at a rate of 15 seconds per case, and 10% were unable to be protocolled via mistakes and errors with the paper system (Bassignani, Dierolf, Roberts, & Lee, 2010). With the switch to paperless processes, less than 1% of the cases were unable to be protocolled (image of new protocol shown in Figure 4). In another imaging center that transitioned from paperwork system to a Picture Archiving and Communication Systems (PACS), the clinic was able to reduce the waiting time for each scan. Ralston et al. reported turnaround time with the paperwork system was between 50-100 hours, but with the improved electronic system, the turnaround time was reduced to 30-50 hours on average (Ralston, Coleman, Beaulieu, Scrutchfield, & Perkins, 2004). With these updates, exams had fewer errors and fewer delays, especially in laboratory.



Referring Clinician/Office Where Request Should Be Sent		35	
Surgery		Phone Number of Contact Person Name	
		Charlton 4-9479	
STUDY DESIRED (Circle Sides if appropriate)		Box & Piece #	
		244-75	
X Study	CT Study		
CT Brain	CT Visual Cortex/Spine		
CT Brain	CT LIP		
CT Facial Bone/Orbits	CT Ankle Hand		
CT Temporal Bone	CT Ankle Neck		
X CT Sinus	CT Ankle Chest		
CT Both Thighs Neck	CT Ankle Abdomen		
CT Cervical Spine	CT Ankle Pelvis		
CT Thoracic Spine	CT Ankle Upper Extremities	LT	RT
CT Lumbar Spine	CT Ankle Lower Extremities	LT	RT
X CT Chest	CT Ankle Ankle/Heel/Ankle	LT	RT
CT Abdomen	CT Upper Extremities	LT	RT
CT Pelvis	CT Lower Extremities	LT	RT
	CT Lower Extremities	LT	RT

Any Exam Not Listed/Specify:

CT SCANS PAH.

Unless Specified, If contrast will be decided upon by

Clinical Indications for Exam (Mandatory):

Pt 2 hx of breast CA - now 3 new small lesions in chest wall

Dizziness thought to be related to sinus E bulbar need to "Sina in nose"

ICD9/10 Code (Mandatory):

602.01 V10.3

Protocol (Internal Use ONLY):

**Figure 4: Paperless Protocol.** Display of a prior MRI image of a patient on the left, and an image of a scanned request loaded onto the monitor system (Bassignani, Dierolf, Roberts, Lee, 2010)



Electronic medical record system not only has helped to increase quality and care of patients, but has helped to also save patient lives by integrating emergency care with real-time data. Some major hospital organizations such as the Veterans Affairs (VA) and the Kaiser Permanente Northern California have already switched to health information technology (HIT) in order to generate reliable approximations of risk of death within 30 days of patient admission by pulling in real-time data of lab results, demographics, pre-existing conditions, vital signs, and other such factors (Chen, Kennedy, Sales, & Hofer, 2013). Another study utilized an algorithm for electronic health records data to develop a chronic pain management plan for each patient for the chronic pain clinic (Tian, Zlateva, & Anderson, 2013). This use of EMR technology will be an advantage to physician decision making aiding them in admitting and releasing patients from the intensive care unit (ICU) and in managed care.

Physicians and nurses have reported to be far more satisfied in their jobs as paperwork becomes minimalized and electronic record keeping increases. According to a satisfaction survey, 98% of anesthesiologists noted that the new information management system was more effective than paper-based record system (Avidan & Weissman, 2012).

There is great feedback and support building around the shift from paper records to electronic systems. The inefficiency of paper records leading to reduced quality in patient care has challenged hospitals and other healthcare organizations to find innovative solutions to address this local and national

dilemma. The current study will assess one area of the hospital that could potentially benefit from a shift of system structure to electronic medical records.

### **Current Efforts in Meaningful Use**

In year 2009, Health Information Technology for Economic and Clinical Health Act was passed, allocating \$44,000 for each clinician and between \$2-10 million for each hospital that qualified as a meaningful user of EMRs (Jha AK, 2010). The Department of Health and Human Services (HHS) defined meaningful use to be the usage of EMR to quality by rewarding and incentivizing providers to quickly adopt the EMR system (Harle, Huerta, Ford, Diana, & Menachemi, 2012). This was an important step towards health care efficiency because it challenged to change the payment system and incentives based on the use of EMR to bring about results in quality care. Although the federal effort behind efficiency has been clear, the process to become acclimated to the federal standards has been slow. According to the study by Harle et al, hospitals that reported the computerized provider order entry as the biggest challenge to meaningful use criteria were 18% less likely to receive the meaningful use payment compared to hospitals that reported other criteria as their primary challenges; also in the study by Jha, adoption rates for EMR remained low during this implementation period. This shows that there needs to be constant improvements on strategies to support hospitals become fully compliant with meaningful use all the while continuously bringing in stakeholders to maintain

and improve on the meaningful use elements. The shift from paperwork to IT systems is becoming more relevant in both the public and private sectors, and as this policy matures, more hospitals and providers must understand the importance of this change in relation to healthcare quality and cost.

### **Boston Medical Center: Resident Continuity Clinic Experience**


The hospital that will be highlighted in this study is Boston Medical Center (BMC), a not-for-profit safety net hospital located in the South End district of the city of Boston. BMC is a renowned academic medical center that strives for excellence without any type of exception. BMC trains its students, residents, and physicians in advanced research while taking care of patients in many specialties, in particular emergency care, trauma, and primary care.

Internal Medicine residents at BMC are part of the 3+1 Program where they spend one week seeing their regular patients in the primary care clinic and the remaining three weeks on a rotation at a different location. During this three week rotation, residents are responsible for completing patient's paperwork that includes social security and disability forms. The expectation is to complete these forms in 14 days. The forms are currently only available in hard copy (paper), and residents must return to the primary care clinic during their 3 week rotation to complete these forms. Unfortunately, the current system has not been able to achieve this, and therefore forms are frequently delayed. Delayed forms are a

cause of patient and provider dissatisfaction and leave the hospital liable for any legal concerns associated with the forms.

## **OBJECTIVES**

The objective of this project was to explore possible solutions to decrease the turn-around time for residents to complete and return important paperwork to patients and agencies. Patients' paperwork includes disability and social security forms (see Figure 5) that need to be completed and signed by the patient's primary care physician (PCP) within 14 days; in this case the patient's PCP's are the Internal Medicine Residents. These forms can only be completed by an MD, the patient's PCP.


Suite 6 \_\_\_\_\_

Patient Name: \_\_\_\_\_ DOB: \_\_\_\_\_  
 Patient MRN: \_\_\_\_\_ PCP: \_\_\_\_\_  
 Date form dropped off \_\_\_\_\_ Date of last exam \_\_\_\_\_  
 Type of Form (circle): Utility EAEDC Work/School/Phys Exam Other \_\_\_\_\_

Check-list for person accepting form:

- Staff member's name: Jessie
- Patient has filled out their name, address, and personal information on the form.
- The name of the patient's provider is on the form.
- Pt has been informed that the form will be ready after 14 days.
- There has been a visit to the clinic within the past 6 months.
  - If EAEDC form: visit to clinic within last 30 days.
  - If not, patient is handed the form back; appointment is made
- Ask what the patient preference is for what to be done with the form when it is completed?
  - Mail to address: \_\_\_\_\_
  - Fax to \_\_\_\_\_
  - Call the patient to have him or her pick it up  
Phone number: \_\_\_\_\_

Check list for provider

- Signature needed on page \_\_\_\_\_
- Provider, look at page \_\_\_\_\_
- See list of medications attached
- See last clinical note/s
- Further instructions from provider

---



---

Instructions for Provider: Please do not remove yellow sheet from any form in your box. Please make copy for any paperwork you will hand to pt on the day of visit, to keep for records. Thank you.

---



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**Figure 5: Disability Form.** An image/example of a form that a patient has to fill out, and would then need to get a signature of the provider. Form taken from BMC.org.

In the Internal Medicine Residents' 3+1 continuity clinic program, residents spend three weeks completing a rotation at a BMC-affiliated clinic usually located away from the main BMC campus, and one week in their primary care clinic at BMC. The three week rotation is usually either at a VA clinic or another BMC-affiliated clinic off campus. Patients have no way of contacting their PCP while residents are away at their three week rotation. During this time, it is difficult to get the forms completed and signed by the patient's PCP and returned to the patient or the agency within 14 days and as a result accumulate in mailboxes (Figure 6). Residents physically return to their primary care clinic at BMC 21 days later (after their 3 week rotation), which causes delay in addressing these forms.

Delays in returning patient forms caused patient dissatisfaction, provider dissatisfaction and left the hospital potentially liable to any legal issues associated with these forms. Delayed form completion prevent patients from accessing resources such as disability and social security income and time off from work and/or school in a timely manner. Residents have expressed frustration with the antiquated paperwork system currently being used at BMC. It prevents the residents from providing the best care possible for their patients.



**Figure 6: Shapiro Clinic Office Mail Box.** Images of the administrative assistant office to which these disability forms belong to, along with dozens of other paperwork for each provider



## **MATERIALS AND METHODS**

### **Process Mapping**

We conducted a thorough assessment of the current system being used to notify residents of pending paperwork in their mailboxes. We worked with first year and second year residents who were familiar with the Administrative Assistant (AA) on Shapiro 6A, B and C units who conducted multiple interviews and the gemba walk with the AA on the floor, to understand the current system. The AA educated us on the numerous steps involved while handling patients' paperwork. Based on the interviews and the residents' observations, we created a process flow map to depict the series of steps involved in the current system used to notify residents of pending paperwork.

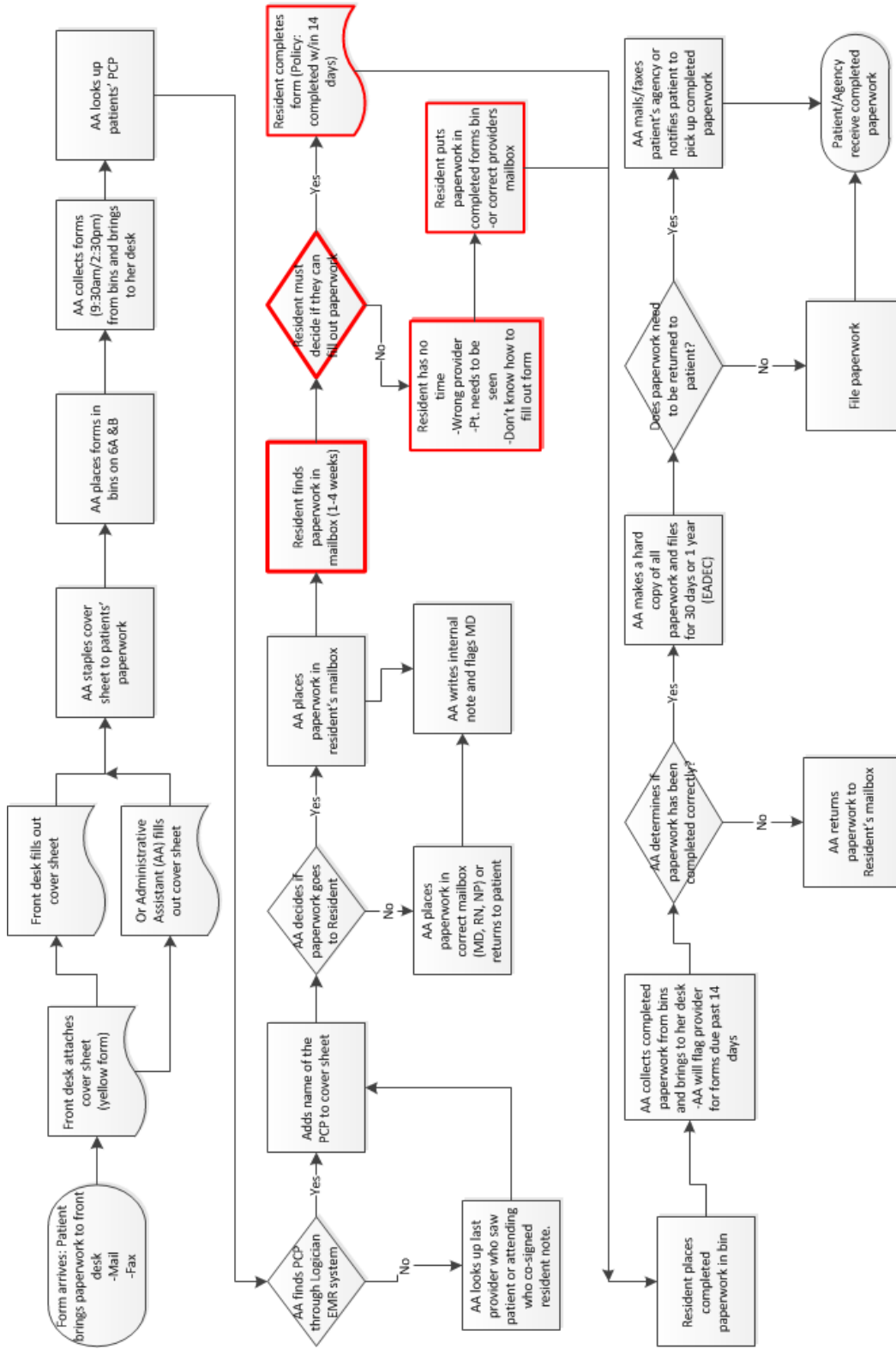
The AA explained the use of a 'yellow cover sheet' which is attached to any kind of patient paperwork that comes into the office to be completed by a physician. This paperwork includes patient's disability and/or social security forms. The AA in the Shapiro Clinic attaches the yellow form to the patient's paperwork; she looks up the patient's PCP and fills in the yellow cover sheet with these details. After identifying the patient's PCP in Logician, she flags the physician through Logician to notify them of the pending paperwork and fills in the yellow cover sheet attached to the paperwork and puts them in the resident's mailboxes located on Shapiro 6 A, B and C (Figure 6). This is assuming that the AA is able to identify the patient's PCP. If not, the AA must schedule the patient for an appointment with a physician.

We found that majority of the delay in the system was caused by this particular part of our process flow map. The highlighted areas are explained in further detail below in Figure 7.

*Residents being notified of the form/ finding it in their mailbox:* This step in the current system depends on when and whether the resident finds the appropriate paperwork in their mailbox. Additionally, the 3 week rotation indicates that residents only physically see the form when they come in for their primary care clinic week unless they check their mailbox during their time away from the BMC primary care clinic.

*'Can Residents fill out paperwork?':* After accessing the form, residents must decide whether they can fill out the form correctly. Reasons for not completing forms include the resident may need to see the patient, they may not be the patient's provider and sometimes they might not know how to fill out the form. Assuming the resident is able to fill out the form correctly, they must put the form in the completed forms mailbox for the AA to complete processing.

*Resident completes form (policy: completed within 14 days):* Policy states that forms should be completed within 14 days of receipt by the clinic. This step assumes that residents are aware of the policy and make an effort to complete it within the appropriate time frame.

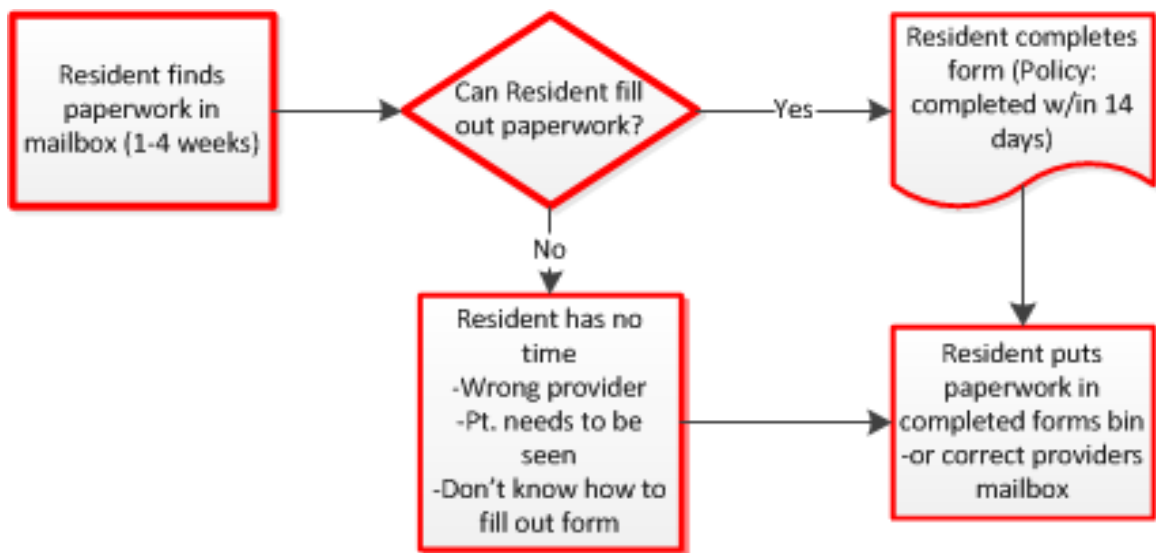


**Figure 7: Overall Process Map.** The first step in the method to the study; with the help of the AA, this process map was created to visualize the paperwork's progress as it gets submitted by the patient; red highlighted boxes represent the bottleneck, or the cause of delay, of this entire system

*Resident puts paperwork in completed forms bin or correct providers mailbox:*

This step assumes the residents put completed forms in the completed forms mailbox and or if they find paperwork that does not belong to them, they put it in the correct provider's mailbox.

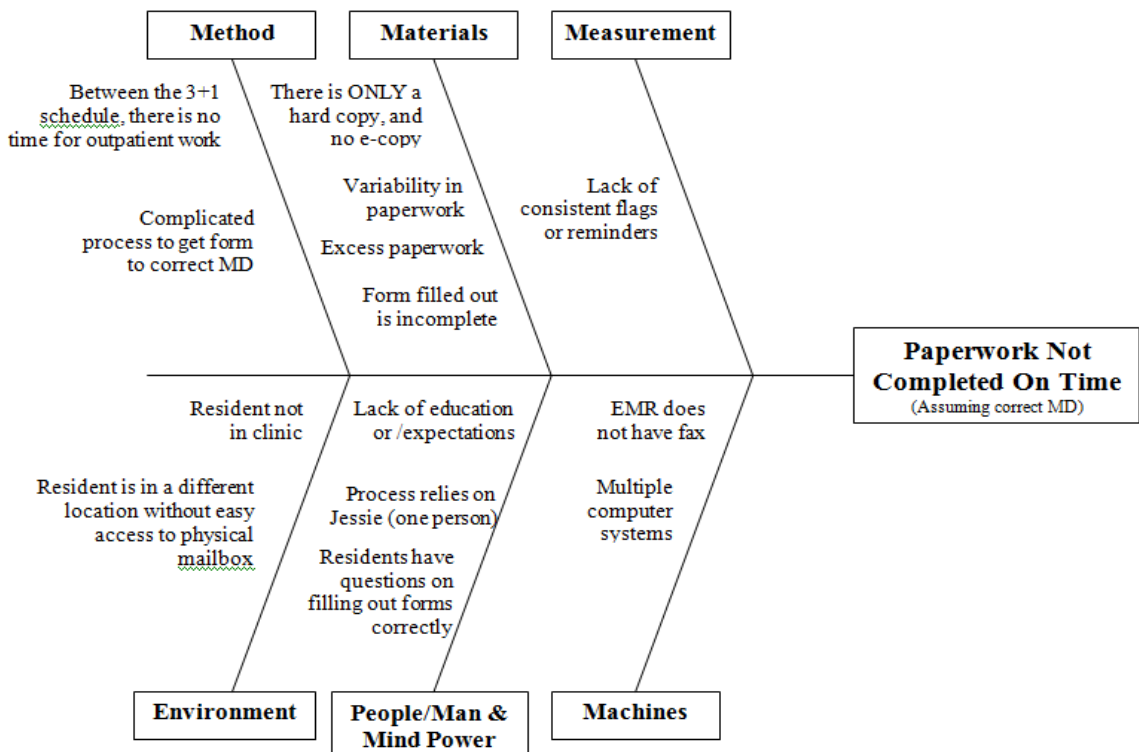
A summary of the bottleneck found in the processing map leading to the delay in form processing is shown in Figure 8.



**Figure 8: Bottleneck.** The cause of delay in the current paperwork system in the Primary Care Clinic.

## Root Cause Analysis

We conducted a root cause analysis using a fishbone diagram to categorize the factors that contributed to our problem of delayed paperwork, and is shown on the figure below. This step was necessary to build out possible experiment details and see what results and solutions can be attributed to the process.



**Figure 9: Fish Bone Diagram.** The main problem of paperwork not being completed on time has rooted problems; each branch is a possible category that contributes to the bottleneck that was presented in the process map

The fish bone diagram brought up factors that needed further analysis. Four of the six categories presented the most challenges but also presented the most feasible challenges to tackle. The major factors contributing to this delayed paperwork were:

1. Materials: There is only a hard copy, and no e-copy. As discussed above, residents are physically not present at BMC and are unable to access their mailboxes located in the Shapiro clinic. Patient forms are only available in hard copy and this contributes to delay in residents accessing the forms.

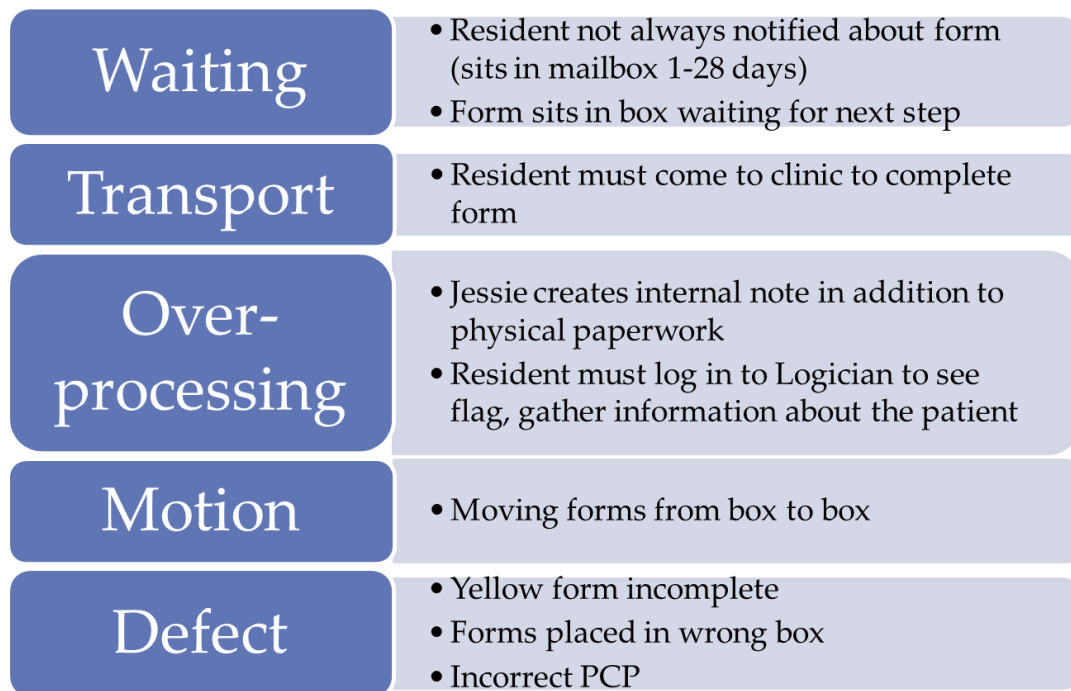
2. Environment: Resident not in clinic. Residents must physically return to BMC to check their mailboxes for any paperwork during their clinic rotation at a satellite clinic. This is often difficult and time consuming for residents to do while on their 3 week rotation.

3. People/Man & Mind Power: Lack of education/expectation. Through our conversations with the Residents we learned that they lacked education on completing the forms as well as the expectation to complete all forms within 14 days. At present, they were only addressing forms on Monday mornings, the first day of their clinic during their primary care clinic week.

4. People/Man & Mind Power: Residents have questions related to the correct completion of the forms. Residents, especially first year had no resources to turn to address their issues.

## Wastes in the System

Another question that had to be answered was the waste that created by the system. Every bottleneck experiences delay, and from that comes wasted products, time, and resources. After completing the root cause analysis, we further identified wastes in the current system. We highlighted the most important areas that contributed significantly to the delay in completing and returning patient's paperwork. These results are shown in the Muda diagram (Figure 10).



**Figure 10: Muda Diagram.** Muda, a Japanese term, means waste or useless; this was a concept picked up by the Toyota Production System to identify waste in the system and make it more efficient, and of the seven types of wastes that include categories of waiting, transport, over-processing, motion, defect, inventory and overproduction, five of them are represented in this diagram to identify waste in this paperwork system

*Waiting:* Residents were not always notified about form (in mailbox 1-28 days later): We discovered a communication gap in the current system the AA uses to inform residents of pending paperwork. In addition to preparing the yellow sheet, the AA sometimes flags the resident in Logician. However, we found that residents do not return to BMC during their 3 week rotation to check their mailboxes and have difficult accessing Logician off-site, so they do not see the flags in Logician.

*Transport:* Residents must come to clinic to complete the form: Even if the resident was able to access Logician and check their flags for pending paperwork, they would have to physically come back to BMC to sign off on forms. This is extremely inconvenient for the residents while off site on their rotations.

*Over-Processing:* AA creates an internal note in addition to physical paperwork: At present in the current system, the AA must look up the patient's PCP, prepare the 'yellow cover sheet', attach it to the patient's form and put it in the appropriate PCP's mailbox. Additionally, the AA must flag the resident in Logician. This is not the most efficient use of the AA's time and is a redundant effort.

*Motion:* Moving forms from box to box: The AA prepares the yellow cover sheet and the forms and places them in the appropriate resident's mailbox. After the resident completes the form, he or she is supposed to move that form to the completed forms box. However, if a resident finds a wrong form in their mailbox, they don't always have time to look up the right PCP and move it to the



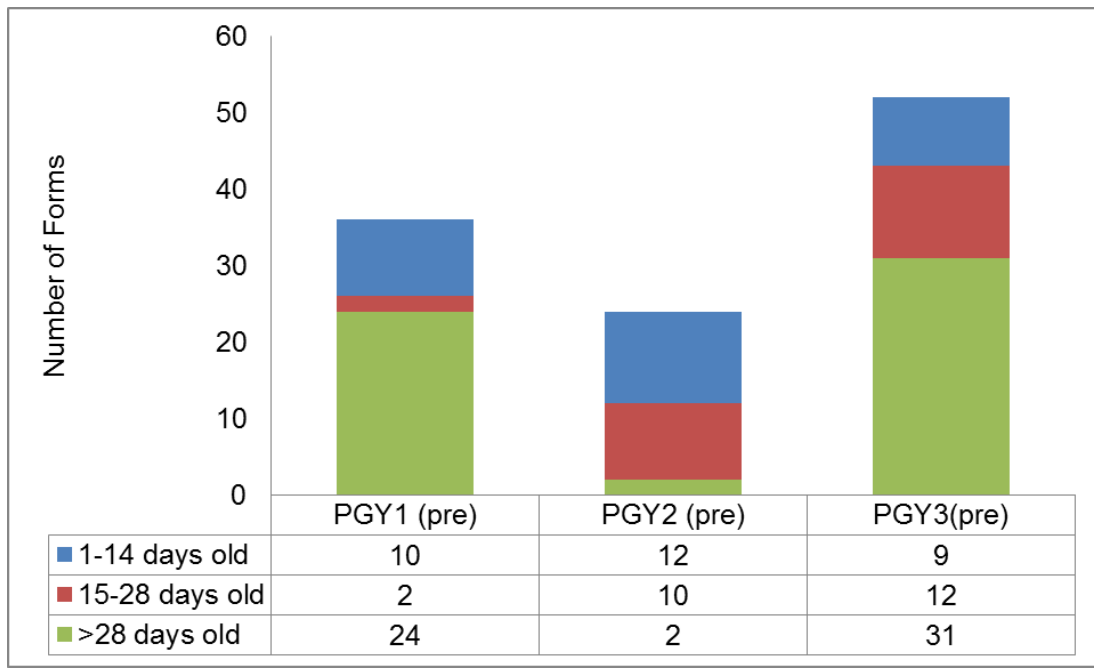
appropriate resident's mailbox. There is no system in place to help resident's complete forms or address any questions they may have about filling out the forms.

### **Audit**

We audited the residents' mailboxes in Shapiro 6A, B and C to assess the magnitude of the problem of delayed forms. We conducted the audit on February 18<sup>th</sup> and recorded the number of forms left in each resident's mailbox. We differentiated between first year, second year and third year residents.

## RESULTS

Through the audit, we found that there were a total of 112 yellow forms in the resident’s mailboxes. The breakdown by residency year: 36 incomplete forms in the first year residents’ (PGY1) mailboxes, 24 in the second year residents’ (PGY2) mailbox and 52 forms in the third year residents’ (PGY3) mailbox (Figure 11). In the bar graphs, the blue column represent forms that were 1-14 days old that were not addressed by the resident; the red column represent forms that were 15-28 days old from being addressed; the green column represent forms that were more than 28 days old and unaddressed by a resident.

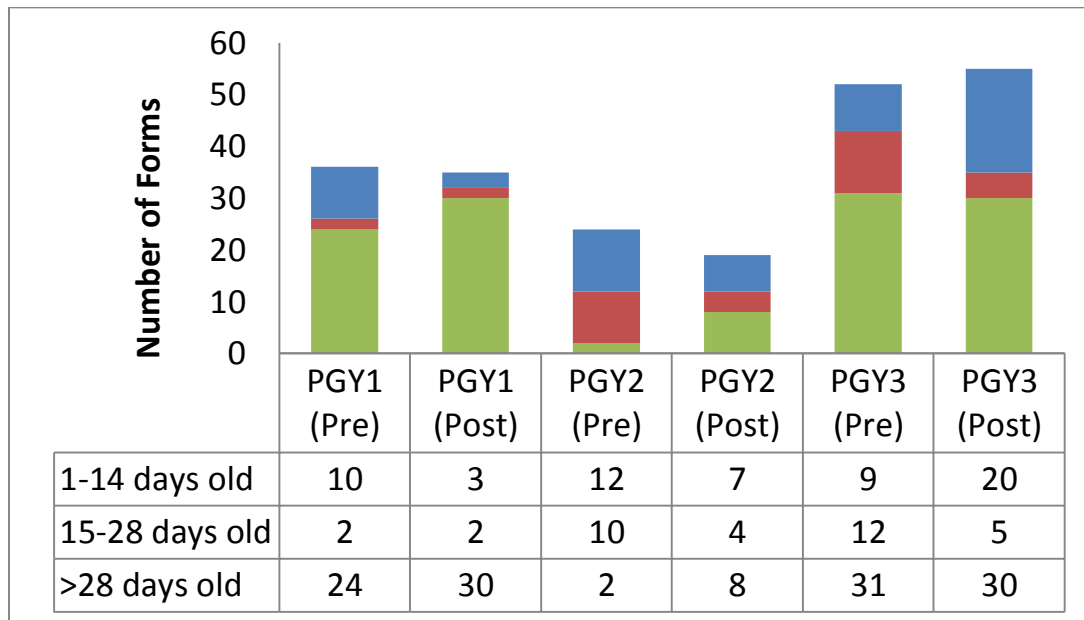


**Figure 11: Initial Audit.** Shown is a summary of the paperwork in residents’ mailboxes; green represents forms that were more than 28 days old, and is by sheer total the most of any length of paperwork found in residents’ mailboxes

**Reminder Email**

During the project, we learned of the weekly ambulatory emails that go out to all residents during their clinic week. We added a reminder to the email from the Chief of Ambulatory care for residents to check their mailboxes and address any patient paperwork within 14 days. This email went out to all the Internal Medicine residents by pod during their clinic week.

We audited the forms three weeks later to assess whether the reminder had prompted the residents to address the forms in their mailboxes (Figure 12).



**Figure 12: The Email Effect on Second Audit.** This graph shows a comparison of the previous audit and the audit after the reminder email was sent; the total amount of paper forms in the mailboxes stayed relatively similar pre and post-email

**Findings from Audit and Reminder Email:**

We found that the reminder in the weekly Ambulatory care email to the residents made no significant difference in the number of forms the residents completed. In comparing Figures 11 and 12 it is clear that the forms continued to not be addressed even with the reminder email. This result suggests that it wasn't for the lack of reminding the residents that forms weren't being completed.

## **DISCUSSION**

The aim of this project was to investigate the issues within the current process, employ operations management tools to conduct a root cause analysis, and identify the factors responsible for delayed paperwork in the Shapiro Clinic at BMC. By identifying and understanding the various areas of error, we aimed to make suggestions that would expedite the return of paperwork to patients in the Shapiro clinic.

The current study evaluating the process by which internal medicine residents at BMC complete required patient forms demonstrate a need to improve the system. Residents complete their 3 week rotation at an off-site where they do not have direct access to their mailboxes located at the primary clinic site at BMC. Residents do not come back to the hospital to check their mailboxes during their 3 week rotation. When residents return for their primary care clinic week they often find a back log of forms to be completed.

A second finding was that residents are unable to access Logician from the VA and other BMC satellite clinics; they lack software compatibility along with other technical problems; as a result residents are unable to see the forms required flags from the AA and thus are unaware of the need to complete patients' forms. One clear recommendation is the need for all residents to have a secure token to access Logician off-site to allow residents to check for flags from the AA. When residents return from their off-site rotation for their primary care

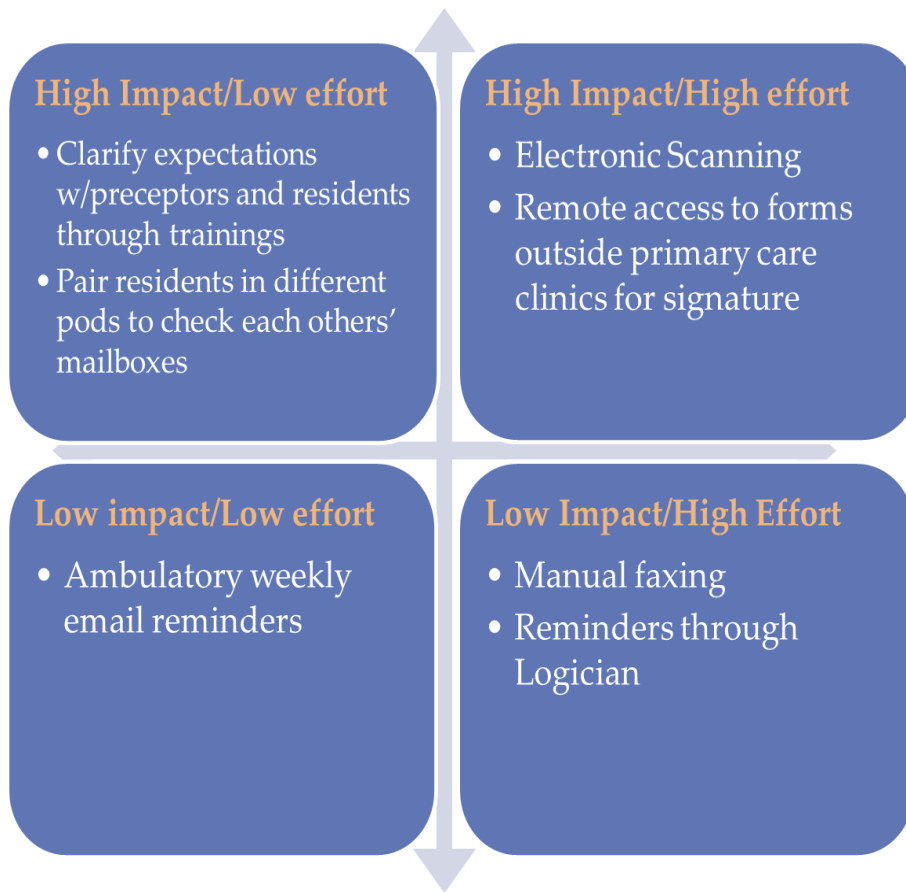
clinic week, many forms are already past their due date. This remote access to Logician should help improve this problem.

We also found that although third year residents had been working in the clinic longer than the first and second year residents, they had accumulated more forms, indicating that the duration of residency had no real effect on a more rapid completion these forms within the appropriate time frame.

Other issues identified include wrong forms placed in resident's mailboxes and the inability to complete forms because they have to physically assess the patient before completing the questions on the forms. Lastly, it was noted that some residents have questions related to completion of the forms and do not know who to ask.

Improving the timeliness in which urgent paperwork is returned to patients is a reflection of the hospital's commitment to providing the best care which is in alignment with BMC's endeavor to provide exceptional care without exception.

Based on the analysis of the project we organized our recommendations on the Impact/Effort Grid and explain them in detail below.



**Figure 13: Impact-Effort Grid.** Shown are possible solutions after examining the process map, root cause diagram, Muda diagram, and the data of current paperwork system in the clinic. The solutions are grouped based on the amount of effort and impact on hospital operations

**Clarifying expectations with preceptors and residents through training**

**sessions:**

Our high impact-low effort recommendation is to conduct an annual training session for all residents and clarify expectations about completing and returning patients forms. Training sessions will be held by Clinic Preceptors and

Administrative staff. Residents will learn about the different kind of forms, the impact of the forms on both patients and the hospitals and how their timeliness in completing the forms contributes to both patient and provider satisfaction. Additionally, it would be extremely beneficial to educate residents on the effect incomplete forms have on their patients. We would hope that after clarifying expectations and raising awareness of patient outcomes, residents and clinic preceptors would strive to provide the best possible care for their patients including completing patient's forms within the appropriate time frame and further BMC's mission to provide exceptional care without exception.

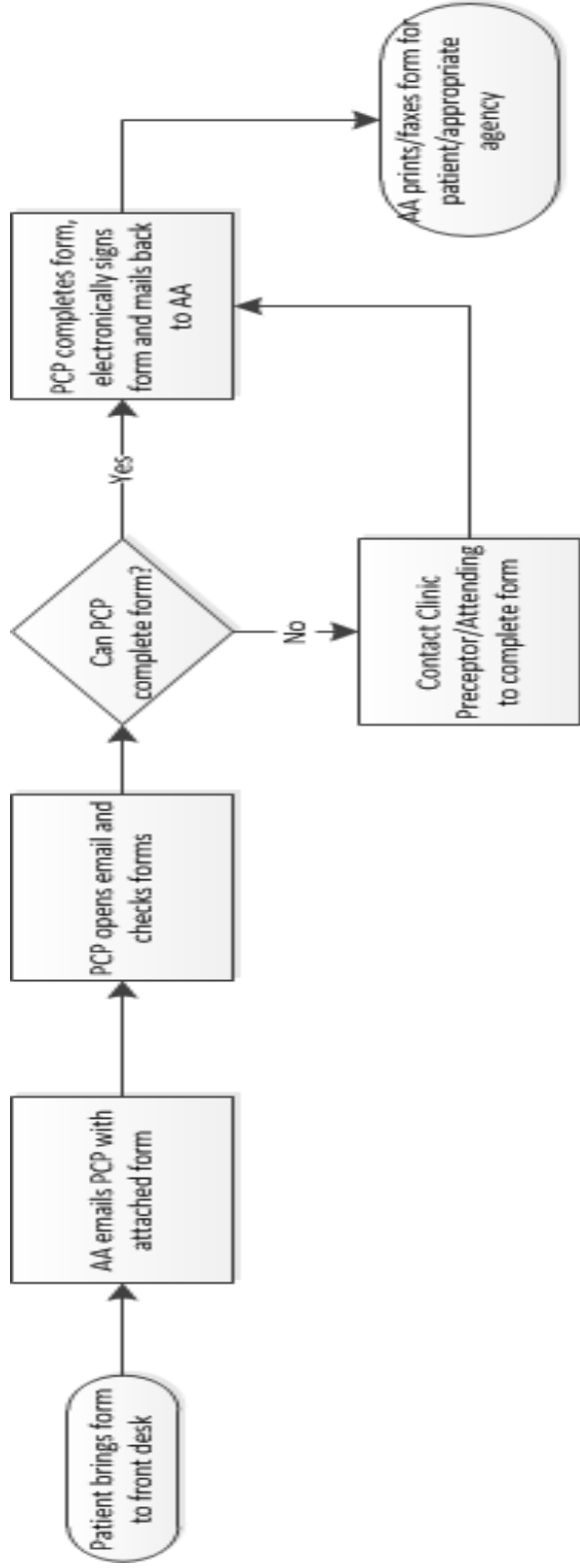
### **Match Residents from Different Pods**

Another high impact-low effort recommendation is to match residents from different pods in order to check each other's mailboxes during their primary care clinic week. Residents are scheduled for clinic week by their pod. Residents would be instructed to look through their partner's mailbox and address any urgent forms and/or remind their partner either through email or text message to address their patient's forms. This 'buddy system' would build accountability for completing forms in addition to serving as a continuous reminder for residents to complete patient's forms.



### **Electronic Scanning/ Remote Access to Forms**

Our high impact-high effort recommendation is to make the various forms electronically available to residents. Once the AA identifies the patient's PCP, she can attach the appropriate form to an email and ask the resident to complete, sign and return the form at their earliest convenience. This would considerably reduce the total turnaround time for returning forms to patients. Additionally, residents would be able to access the forms through email while they are away for their 3 week rotation. All residents have access to their email either by phone or computers at the clinic. The implementation of a HIT system that supports this recommendation would considerably reduce the number of steps currently necessary in the system. Additionally, it would eliminate redundancy in the system. If implemented, the AA could avoid preparing the 'yellow cover sheets' and flagging residents through Logician. Since residents have difficulty accessing Logician from off-site clinics, this recommendation would eliminate the need for residents to log on to Logician and expansion of that network. Although making the forms available online would require high effort, we believe the benefits would have a high impact and positively affect the system. Figure 14 summarizes these recommendations.



**Figure 14: New Process Map.** The proposed new process map according to the high impact, high effort recommendation, which is to make forms electronically available and accessible to residents and physicians; the amount of steps taken has been reduced significantly because possible bottleneck has been erased, but this would require a high-effort in terms of time, resources, and energy

### **Weekly Ambulatory Email Reminders**

We were able to implement our low impact-low effort recommendation of including a reminder for resident's to check their mailboxes and appropriately address patients. The reminder was included at the bottom of the Ambulatory care email sent out during residents' primary care clinic week. This strategy had a negligible impact prompting resident's to address forms.

### **Faxing/Reminders through Logician**

Our recommendation to have the AA fax over the forms in addition to flagging residents through Logician would require high effort from both the AA and the resident to complete and fax over the complete forms. Additionally, flagging residents through Logician will have no impact if residents are unable to access Logician during their rotation at an off-site clinic.

We strongly believe that education and training sessions for all residents and attending physicians will improve the rate at which patient's forms are returned. Making the forms electronically available for Internal Medicine Resident's in the 3+1 program will facilitate the timeliness of handling patient's forms and empower residents to adhere to the timeline. We are confident that these recommendations will result in increased patient and provider satisfaction and further BMC's mission of providing exceptional care without exception.

## **Conclusion**

This study clearly supports the need for new methods and modes of communication with residents, efficiency in form organization, and a strict adherence to the due dates listed on the forms. The benefits of these recommendations include residents' timely response to patients' needs/ paperwork, and better administrative and system management.

Our results suggest the need to make the shift from paperwork to EMR system as it will likely be the most cost-effective, and the most quality-saving method for clinics and hospitals. Our recommendations to improve the current paperwork system are a short term solution with the current resources but are unsustainable and unfeasible in the long run, as outlined by the reminder email study.

An intermediate approach would be making more of the forms electronic so they can be sent via email by the AA. This would again improve communication between the AA and residents but would require significant additional work by the AA. Again this is a short term improvement but not a long term solution.

A complete overhaul and transition will be useful for BMC and other hospitals that are planning to increase patient care quality and satisfaction. A manipulation of current system (i.e. Logician) can be useful, but would take a tremendous effort to make sure all forms are able to be electronically accessible

via the program, which might not be as feasible as changing the entire records system. More study on the comparison of the two distinct systems in the same or similar environment would be helpful to support the objective of this study.

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## CURRICULUM VITAE

