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Hospital Turnaround Practice in the United States: Value and Role of Consultants
Amrita Shenoy, Raymond Khoury, Ashish Chandra
ARE ELECTRONIC MEDICAL RECORDS SYSTEMS HELPING TO INCREASE PRODUCTIVITY?

Danielle Marcette Auer, Southeast Missouri State University
Heather McMillan, Southeast Missouri State University
Kenneth Heischmidt, Southeast Missouri State University

ABSTRACT

As Electronic Medical Records (EMR) Systems increase in popularity among medical facilities, so will the questions surrounding their ability to have an effect on productivity. With any business, increased productivity generally means greater revenues, and medical facilities are no different. If a medical facility is looking to implement an EMR system, they should be aware, not only of what the system can offer, but the different ways that it can affect productivity. In this study, data was collected from local medical facilities to see what kind of effect implementing an EMR system has on their productivity. Productivity was based on four variables: filing time, labor hours spent entering charges, accuracy of entering charges, and revenues. Monthly data was collected on each variable and each facility was asked to obtain six months of data before the system was implemented and six months of data after the system was implemented. Although no significant differences were found between the months before the system was implemented and the months following the implementation, this doesn’t mean that these systems have a negative effect on productivity.

INTRODUCTION

In the past, patient medical records were in paper form, meaning that medical facilities, depending on their size, could have hundreds and even thousands of individual patient charts. These paper charts mean stacks of paperwork and endless hours of filing time for staff members, not to mention the problem of misplaced charts and the need for additional storage space. Although paper charts are still the norm for many facilities, they are facing a technological upgrade in the form of the electronic medical record (EMR).

Electronic medical records have quickly become a growing commodity in many medical facilities. Over the past couple of years, they have become increasingly popular and in the future are likely to replace paper charts altogether. According to the Institute of Medicine, an EMR can be defined as “a type of clinical information system, which is dedicated to collecting, storing, manipulating, and making available clinical information important to the delivery of patient care. The central focus of such systems is clinical data and not financial or billing information. Such systems may be limited in their scope to a single area of clinical information (e.g., dedicated to laboratory data), or they may be comprehensive and cover virtually every facet of clinical information pertinent to patient care (e.g., computer-based patient record systems)” (1997).

An EMR system creates an electronic chart for each of the facilities’ patients. This requires scanning existing documents into the new electronic chart. Every time a patient is seen in the office, the provider must create a new office visit document in that patient’s electronic chart. Other reports, such as imaging reports or operative notes, if applicable, can also be entered. As with the paper charts, different facilities keep different reports, and maintain different document types in their patients’ charts. Electronic charts offer a variety of advantages over paper charts, including “the ability to access a chart from any location; the opportunity for multiple viewers to read or contribute to a chart simultaneously; legibility; and the ease of incorporation of data into the note, without transcription error” (Siegler & Adelman, 2009).

EMR systems vary depending on the company the medical facility chooses to purchase the system from. Like with most other systems available, the systems can be tweaked to fit the special needs of the particular medical facility. An EMR system can be set to electronically send bills for office visits and other services to patient’s insurance companies. Prescriptions and orders for different studies can also be sent electronically to a designated pharmacy or facility, depending on the patient’s preference (Centricity, 2007).
Almost a year ago, the doctor’s office where I work, a Neurosurgeons’ office in Cape Girardeau, MO, implemented an EMR system. I am currently the EMR Team Lead at the facility and am anxious to see where this system will take us. With less than a year’s experience, the entire clinic has seen some drastic changes, and although I have already learned a great amount of information involving EMR, I know that there is plenty more to learn about the topic and how it affects day to day operations, not only within our facility, but also other local medical facilities that have implemented an EMR system.

Implementing an EMR system can prove to be very beneficial to a medical facility; however there are also some obstacles that arise when switching to an electronic system. The greatest advantage seems to be “the perception that these systems promote increased efficiency and cost savings within the first few years of implementation, as well as better patient care and patient education” (Andrews & Smith, 2003, p. 44). Probably the biggest downfall with these systems, and one of the main reasons why many facilities are not eager to implement them anytime soon, are the costs associated with not only purchasing a system, but also maintaining it.

One of the biggest discussions among many medical facilities today, is whether or not to implement an EMR system. There have been talks and debates weighing the advantages and disadvantages of someday making EMR systems mandatory in every medical facility. Some facilities are unable to afford the systems, while others are content with the paper charts and don’t see a need for change.

For the most part, studies related to EMR systems, including Challenges Associated with Physicians’ Usage of Electronic Medical Records (Ilie, et al, 2009) and Anticipated Use of EMR Functions and Physician Characteristics (Meinert & Peterson, 2009), are mainly composed of questionnaires and surveys documenting physician and patient reactions and attitudes toward these systems. Since this is a fairly new topic, any in-depth research involving EMR systems is still rare, and potential implications are still unknown. EMR systems affect almost every aspect of medical facilities’ day to day operations, and it is not something that can be measured overnight.

THEORETICAL PERSPECTIVES

The underlying theories used in this study will be the Theory of Planned Behavior (Ajzen, 1991), diffusion theory (Rogers, 1995), and the Classic Growth Theory (Smith, 1904). The Theory of Planned Behavior and diffusion theory, typically applied in IS research, help to explain human behavior and how it reacts to the adoption and usage of new innovations, such as EMR, including moving from paper charts and bills to electronic charts and bills (Ilie, et al, 2009, p. 40). The Classic Growth Theory, primarily applied to economic growth, is used to explain the correlation between company growth (increase in the number of patients), and increased productivity, or vice-versa.

PURPOSE

The purpose of this study is to compare the effects that EMR systems and clinic size have on local (Cape Girardeau, MO) medical facilities’ productivity. Productivity within the clinics will be based on filing time, the number of labor hours spent entering charges, the accuracy of entering charges, and different costs associated with implementing an EMR system. Each aspect has its own effect on the medical facilities’ productivity. The aspects used to measure productivity in this study are focused toward, but are not limited to, business/billing staff members of a medical facility.

RESEARCH QUESTIONS AND HYPOTHESES

Using the knowledge gained from working with an EMR system, the new information gained from previous studies, as well as insight from local medical facilities’ interactions with their own EMR systems, this study will look to answer the following question: What are the effects of implementing an electronic medical records system on medical facility productivity?

Each of the aspects (filing time, the number of labor hours spent entering charges, the accuracy of entering charges, and different costs associated with implementing an EMR system) will increase, decrease, or have no effect on the medical facilities’ productivity. I have identified a hypothesis for each independent variable:
Hypothesis 1: Implementing an Electronic Medical Records system decreases filing time, thus increasing medical facilities' productivity.
Hypothesis 2: Implementing an Electronic Medical Records system decreases the number of labor hours spent entering charges, thus increasing a medical facilities' productivity.
Hypothesis 3: Implementing an Electronic Medical Records system increases the accuracy of entering charges, thus increasing a medical facilities' productivity.
Hypothesis 4: Implementing an Electronic Medical Records System increases a medical facilities’ productivity by justifying and offsetting the associated costs.

DEFINITIONS

- Clean claim – “a claim for payment for a health care service which has no defect or impropriety. A defect or impropriety shall include lack of required sustaining documentation or a particular circumstance requiring special treatment which prevents timely payment from being made on the claim” (Act 68 – “Prompt Payment of Clean Claims”).
- Electronic Medical Record (EMR) – “a type of clinical information system, which is dedicated to collecting, storing, manipulating, and making available clinical information important to the delivery of patient care. The central focus of such systems is clinical data and not financial or billing information. Such systems may be limited in their scope to a single area of clinical information (e.g., dedicated to laboratory data), or they may be comprehensive and cover virtually every facet of clinical information pertinent to patient care (e.g., computer-based patient record systems)” (Institute of Medicine, 1997).
- Filing time – the amount of hours and FTE spend on filing charts, paperwork and x-rays
- Full time equivalent (FTE) – “Ratio of total number of paid hours during a period (part time, full time, contracted) by the number of working hours in that period Mondays through Fridays” (businessdictionary.com).

IMPORTANCE OF RESEARCH

“Because of the many potential benefits associated with EMR technology, a number of experts believe the market for EMR systems will grow rapidly over the next decade” (Meinert & Peterson, 2009, p. 2). In order to keep up with the ever-changing health care industry, implementing an EMR system seems to be the next logical step for most facilities. Not implementing such as system could prove fatal to facilities further down the line.

When contemplating an EMR system it is important to do as much research as possible. There are different systems with different amenities and ensuring that you find the one that best fits your facility is essential. Once implemented, it will be important to monitor and modify the system, to ensure that is achieving what it is supposed to, and one way to do that would be to compare the level of productivity of the facility before and after the system was implemented.

Measuring productivity is an essential part to ensuring that a company is creating its desired outputs. In a medical facility productivity can be measured using multiple methods, including, but not limited to, filing time, the number of labor hours spent entering charges, the accuracy of charges entered, and costs. Each aspect can be measured and used to determine if the facility is being productive.

When implementing an EMR system, or any new technology for that matter, the main goal is to increase the productivity of the facility as a whole. A new product or system that doesn’t bring a change in productivity, or even worse, a decrease in productivity, would be considered a waste of money, which is why it is important to measure different aspects to ensure that the system is doing what it is designed to do.

Within any line of work, it is important to stay up to date with other companies in your industry, as well as ensure that you maintain an advantage over your competitors, and the health care industry is no different. It is imperative that medical facilities looking to implement EMR systems are aware of exactly how the system will affect their company, not just on a daily basis, but also in the long run. Not all companies, especially smaller ones, are able to afford such a large loss if the system does not increase their productivity.
CURRENT STATUS

EMR systems are quickly growing in popularity among medical facilities. In an occupational field that thrives on technological advances, it is not surprising that medical facilities would look for ways to ensure their ability to incorporate such systems.

“As more practices and institutions switch to electronic records, a paper-based system will become increasingly cumbersome. Other practices, medical centers, and medical care facilities will want to receive documents, letters, reports, and other information from your office in an electronic format so that the data can enter their system without needing to be retyped or scanned. They will also want to send you information electronically” (Andrews & Smith, 2003, p. 44).

Satellite offices are another technological advancement that medical facilities are branching out to and another reason EMR systems are gaining popularity. When a practice has several satellite offices, things can run more efficiently if they are done electronically. There won’t be a need to carry charts back and forth from the different offices, because all charts will be accessible from each location (Nash, p. 26).

Although EMR systems are not mandatory at this time, it is definitely a possibility that they may be in the future. President Obama’s American Recovery and Reinvestment Act contains money for health information technology, including the push for EMR systems in every medical facility (Recovery.gov). It “aims to achieve national improvements in the quality and value of health care through financial incentives for providers to make ‘meaningful use’ of electronic health record technology” (Torda, et al, 2010).  Insurance companies, like Medicare and Medicaid, also plan to offer incentives for physicians using the systems, in order to allow for more efficient electronic claim filing. As more companies implement EMR systems, it is not unlikely that those choosing not to implement the systems may even be fined.

RELATIONSHIP BETWEEN LITERATURE AND PROBLEM STATEMENT

Whether or not an EMR system has an impact on productivity is something that all facilities should consider before implementing a system, as well as monitor throughout the life of the system. It is important to know whether the system will be worth the installation and maintenance costs. At first, it may seem that measuring the impact on productivity might be difficult, and in some ways it might, but focusing on a few aspects of productivity could prove to be very beneficial.

When it comes to saving time, such as filing time and labor hours, “the consensus is that EMRs can save considerable time, at least once the initial implementation and learning period have passed” (Andrews & Smith, 2003, p. 50).  Of course, one can only expect there to be issues in the beginning that may actually cause a decrease in productivity, but as people become more familiar with the system that should change. After some time has passed, “EMRs will eliminate wasted time spent pulling charts, refilling charts, looking for misplaced charts, and paging through charts” (Andrews & Smith, 2003, p. 50).

As for justifying the costs of the system, if you look at is as more of an investment, rather than an expense, then you expect to get something in return from the system within the coming years (Andrews & Smith, 2003, p. 55).  It’s important to realize that even though you may not see immediate results, the system will show its value over time. In a time when competition is a fundamental part of business, waiting until after everyone else implements a system, will prove to be too late.

Of course, not everyone will agree that EMR systems are the next big thing. There are downfalls to EMR systems and most facilities see no reason for change. “If you have a well-organized paper chart, it’s easy to flip through it pretty quickly and somewhat discretely while you’re talking to patient, but if you try to flip through the computer-based chart, it definitely takes a lot longer, and it’s not nearly as discreet” (Nash, p. 28).  This feeling is shared by many physicians, all who believe that paper charts have proven to work and nothing else will be as efficient.
RELATIONSHIP BETWEEN VARIABLES AND THEIR IMPORTANCE

Filling time, labor hours spent entering charges, accuracy of entering charges, and cost are important variables in calculating productivity. Each variable by itself would be able to give you an idea about your facility’s level of productivity, but together, they are able to give you a more accurate analysis. Depending on the variable, an increase in productivity will either create a positive or negative correlation between the variable and productivity.

When implementing an EMR system the hope is that filing time will decrease to almost nothing. With an EMR system there should be very few labor hours spent filing charts, paperwork, or films. The lack of paperwork is one of the biggest incentives for medical facilities to implement an EMR system. A decrease in filing time would signify an increase in productivity.

A decrease in the number of labor hours spent entering charges would also indicate an increase in productivity. In a medical facility’s business office there are individuals whose job duties consist of entering all charges for each patient seen each day, which is a necessary task to ensure that the facility is paid for services rendered. However, with an EMR system, most charges can be entered electronically and sent directly to the appropriate insurance carrier, thus making the task of entering charges a redundant one.

On the other hand, an increase in the accuracy of entering charges would imply an increase in productivity. Entering charges, as stated before, is a necessary task, and it is also an important one. Clean claims consist of no errors and are usually paid without any problems. Inaccurate claims, or ones with errors, are usually sent back to the facility to be corrected, thus delaying the payment to the facility. An EMR system would hopefully increase the accuracy of charges entered, because the doctor would be entering the charge(s) during the visit, thus limiting the chance of it being misinterpreted incorrectly by the employee in billing.

The costs of implementing and maintaining an EMR system can prove to be rather expensive, especially for smaller facilities. Initially, the costs of the system will likely have a negative effect on productivity, due to the increase in expenditures. Over time, however, the costs should be easily justifiable with the overall increase in the facility’s productivity. “The cost-savings can be significant because for the first time the documentation can fully support the coding, there can be an auto-auditing capability, and there are no more lost charges. These advantages can immediately offset the cost of most systems” (Charters & Rosenthal, p. 68).

The relationship between the variables can be explained using the Theory of Planned Behavior and diffusion theory. The two theories explain how human behavior reacts to the adoption and usage of new innovations, including EMR systems. Thus, decreasing labor hours spent filing and entering charges, as well as increasing accuracy of charges, and justifying the costs are going to be meaningless if the employees are not willing to accept the changes associated with the new EMR system. The Class Growth Theory is used to explain the correlation between company growth and productivity, meaning an increase in company growth (number of patients being seen) should have a positive effect on the company’s productivity.

RESEARCH DESIGN

A quantitative research method is the most appropriate method for the study between medical facilities’ productivity and implementing EMR systems. Collecting the data will help to effectively test the hypotheses that implementing an EMR system increases productivity within the facilities. The data will be secondary data from local medical facilities that have implemented an EMR system.

Sample

Data was collected from four local medical facilities, all of which have implemented an EMR system. Monthly data was collected for 6 months before the system was implemented and 6 months after the system was implemented, for a total of 12 months of data for each facility. Although data was collected from four facilities, only data from three of the facilities was able to be used in the study. The one facility’s data that was discarded was unrealistic, with monthly totals being identical; the accuracy of the data was questioned and determined not suitable for the study. Table 1 outlines the demographics of each of the four practices, and includes the practice’s specialty, the averages for each of the variables, as well as the costs to implement the system and monthly maintenance costs.
### Table 1: Practice Demographics

<table>
<thead>
<tr>
<th>Specialty</th>
<th>Practice 1</th>
<th>Practice 2</th>
<th>Practice 3</th>
<th>Practice 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Family Practice</td>
<td>Neurosurgery</td>
<td>Surgical Clinic</td>
<td>Gastroenterology</td>
</tr>
<tr>
<td>Avg No. of Patients</td>
<td>2226.67 / 1964.00</td>
<td>1793.67 / 1907.33</td>
<td>2000.00 / 1975.00</td>
<td>133.50 / 155.83</td>
</tr>
<tr>
<td>Seen Before/After</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implementation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avg Labor Hours –</td>
<td>160.00 / 23.33</td>
<td>306.29 / 593.38</td>
<td>480.00 / 240.00</td>
<td>37.50 / 32.33</td>
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<tr>
<td>Paperwork Before/After</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implementation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avg Labor Hours –</td>
<td>160.00 / 127.50</td>
<td>54.17 / 85.92</td>
<td>240.00 / 240.00</td>
<td>148.33 / 160.00</td>
</tr>
<tr>
<td>Charges Before/After</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implementation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avg Charge Accuracy</td>
<td>90.00% / 90.83%</td>
<td>94.17% / 93.17%</td>
<td>99.00% / 99.00%</td>
<td>97.50% / 98.00%</td>
</tr>
<tr>
<td>Before/After Implementation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avg Monthly Revenue</td>
<td>$26,5674.67 / $25,215.33</td>
<td>$80,5070.92 / $83,4913.37</td>
<td>$321,666.00 / $301,666.00</td>
<td>$26,7018.50 / $25,5713.00</td>
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<tr>
<td>Before/After Implementation</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>One-time Cost of</td>
<td>$109,961.00</td>
<td>$125,000.00</td>
<td>$45,000.00</td>
<td>$250,000.00</td>
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<tr>
<td>Implementation</td>
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<td></td>
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<td></td>
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<tr>
<td>Recurring System Costs per Month</td>
<td>$1,125.78</td>
<td>$1,700.00</td>
<td>$1,100.00</td>
<td>$5,000.00</td>
</tr>
</tbody>
</table>

### Data Collection Instruments

After establishing which medical facilities the data would be collected from, the business office manager of the facilities were contacted through e-mail. The purpose of the study was described to them, so that those participating completely understood the data that was needed and what it would be used for. Since the data is secondary, an HSC approval was not required, however, a consent and confidentiality form was sent to each facility because specific billing information and other performance data was needed [Appendix A]. In order to efficiently collect all of the data, an Excel spreadsheet was created and emailed to each facility [Appendix B]. Each facility received the same consent and confidentiality form and spreadsheet. The facilities used in the data collection process, are well known facilities within the community, so their credibility should increase the reliability of the data.

### Operationalization of Variables

Data was collected for each variable: the number of labor hours spent filing charts and paperwork, the number of labor hours spent entering charges, and the accuracy of entering charges, both before and after the system was implemented (Table 1). This should have been readily available information for most medical facilities. Collecting the different costs associated with implementing an EMR system, proved to be a little more difficult to obtain, but not impossible.

Filing time and the number of labor hours spent entering charges were measured using the total number of hours full time equivalent (FTE) employees spend filing charts and paperwork and entering charges into the system, before and after implementing an EMR system. The accuracy of entering charges was measured by the percentage of clean claims the facility submits each day, both before and after implementing a system. A clean claim can be defined as any claim for a service rendered in the facility that was not rejected by an insurance company due to billing error. The different costs associated with implementing an EMR system were initially going to be measured by calculating the initial cost and the cost to keep the system maintained, compared to the facilities’ revenues both
before and after implementing the system. Ultimately, this variable was analyzed using the monthly revenues for each facility. The average number of patients seen in a day was also taken into account.

**Analysis of data**

Once the data was collected, it was entered into SPSS. Using independent samples t-tests, SPSS allowed all of the data to be analyzed on the same level. Since there were multiple variables, it was beneficial to see how the different variables compared before and after the implementation. Also in SPSS, paired sample t-tests were used to help further analyze the data within each facility.

**Results**

Each hypothesis stated that productivity would increase after the EMR system had been implemented; however, there was no significant difference for any of the variables before or after an EMR system was implemented (see Table 2). According to the stated hypotheses, monthly revenues, accuracy of entering charges and average number of patients seen were to increase, in order to show an increase in productivity. Monthly revenues and accuracy of entering charges increased, but not significantly. As for the number of patients seen, the number actually slightly decreased after implementing a system. The slight decrease could be due to the months that were used in the data collection process. In medical facilities, different months are consistently more productive than others, thus influencing the amount of patients and ultimately the amount of revenues the facility generates. To show an increase in productivity, it was stated that the number of labor hours spent filing charts and paperwork and the number of labor hours spent entering charges would decrease. Each of these, actually increased after implementing the system, but as stated earlier, the increase was not a significant one.

| Table 2: Independent Sample T-Test for all Facilities - Before and After Implementation |
|--------------------------------------|---------------------------------|-----------------|-----------------|-----------------|
|                                      | Mean                            | N/df            | t               |
| No. of Patients Seen                 | 1384.61                         | 1342.39         | 18/34           | .140            |
| Avg Labor Hours – Paperwork          | 167.93                          | 216.35          | 18/34           | -.654           |
| Avg Labor Hours – Charges            | 120.83                          | 124.47          | 18/34           | .802            |
| Avg Charge Accuracy                  | 93.89%                          | 94.00%          | 18/34           | -.089           |
| Avg Monthly Revenue                  | $445,921.36                     | $447,583.90     | 18/34           | -.018           |
|                                      | *p ≤ .05 **p ≤ .01 ***p ≤ .001  |

Data for each facility was also examined individually (Tables 3, 4 & 5). These results allowed for further investigation into whether or not each facility was able to show partial support for each hypothesis.

| Table 3: Paired Sample T-Test for Practice 1 - Before and After Implementation |
|--------------------------------------|---------------------------------|-----------------|-----------------|-----------------|
|                                      | Mean                            | N/df            | t               |
| No. of Patients Seen                 | 2226.67                         | 1964.00         | 6/5             | 2.03            |
| Avg Labor Hours – Paperwork          | 160.00                          | 23.33           | 6/5             | 10.45***        |
| Avg Labor Hours – Charges            | 160.00                          | 127.50          | 6/5             | 3.90**          |
| Avg Charge Accuracy                  | 90.00%                          | 90.83%          | 6/5             | -.42            |
| Avg Monthly Revenue                  | $265,674.67                     | $252,125.33     | 6/5             | .90             |
|                                      | *p ≤ .05 **p ≤ .01 ***p ≤ .001  |

Of the three facilities whose data was used in this study, practice 1 was the only facility that had expected results. Both the average number of labor hours spent filing charts and paperwork and the average number of labor hours spent entering charges decreased significantly after the system was implemented. The average number of labor hours spent filing charts and paperwork decreased from 160 hours per month to 23.33 hours per month, and the average number of labor hours spent entering charges fell to 127.50 hours per month, from 160 hours per month (Table 3).
Table 4: Paired Sample T-Test for Practice 2 - Before and After Implementation

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>N/df</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Patients Seen</td>
<td>Before: 1793.67, After: 1907.33</td>
<td>6/5</td>
<td>-1.51</td>
</tr>
<tr>
<td>Avg Labor Hours – Paperwork</td>
<td>306.29, 593.38</td>
<td>6/5</td>
<td>-3.53*</td>
</tr>
<tr>
<td>Avg Labor Hours – Charges</td>
<td>54.17, 85.92</td>
<td>6/5</td>
<td>-7.26***</td>
</tr>
<tr>
<td>Avg Charge Accuracy</td>
<td>94.17%, 93.17%</td>
<td>6/5</td>
<td>.89</td>
</tr>
<tr>
<td>Avg Monthly Revenue</td>
<td>$805,070.92, $834,913.37</td>
<td>6/5</td>
<td>-.39</td>
</tr>
</tbody>
</table>

*p ≤ .05 **p ≤ .01 ***p ≤ .001

Practice 2 had some unexpected results, however, it was the only facility where revenue increased, although not significantly. The average number of hours spent filing charts and paperwork and the average number of hours spent entering charges both increased significantly after the system was implemented. Before the system was implemented, practice 2 spent an average of 306.29 hours per month filing charts and paperwork and that increased to an average of 593.38 hours per month after the system (Table 4). As for the number of hours spent entering charges, it increased from an average of 54.17 hours per month before the system was implemented to 85.92 hours after the system (Table 4).

Table 5: Paired Sample T-Test for Practice 4 - Before and After Implementation

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>N/df</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Patients Seen</td>
<td>Before: 133.50, After: 155.83</td>
<td>6/5</td>
<td>-.938</td>
</tr>
<tr>
<td>Avg Labor Hours – Paperwork</td>
<td>37.50, 32.33</td>
<td>6/5</td>
<td>.632</td>
</tr>
<tr>
<td>Avg Labor Hours – Charges</td>
<td>148.33, 160.00</td>
<td>6/5</td>
<td>-1.00</td>
</tr>
<tr>
<td>Avg Charge Accuracy</td>
<td>97.50%, 98.00%</td>
<td>6/5</td>
<td>-2.24</td>
</tr>
<tr>
<td>Avg Monthly Revenue</td>
<td>$267,018.50, $255,713.00</td>
<td>6/5</td>
<td>.48</td>
</tr>
</tbody>
</table>

*p ≤ .05 **p ≤ .01 ***p ≤ .001

Practice 4’s data showed no significant results. The number of patient seen increased, the average number of labor hours spent filing charts and paperwork decreased, and the accuracy of entering charges increased (Table 5), which were the expected results, but they were not significant enough changes from before the system was implemented to after the system was implemented to consider them as supporting the each hypothesis.

Discussions

Limited monthly data, limited local facilities with EMR systems and inaccurate data are all contributing factors as to why the study, overall, did not have any significant results. The variables used are common among all medical facilities and had the potential to be accurate measuring tools for gauging productivity, however, with only four local facilities found for collecting data, of which only three were accurate, and a limited number of months, both before and after implementation, it isn’t surprising that overall significant results weren’t found. Other contributing factors to insignificant results may include the type of practice and differences in the EMR systems. Looking at the practices individually, practice 4 was the only facility that didn’t have any significant results, and it was also considerably smaller than the other facilities. Practice 2, although the number of labor hours spent filing charts and paperwork and the number of labor hours spent entering charges increased significantly, was the only practice where revenue increased. Not only is the size of the practice likely to have an impact, the type of specialty could influence whether or not significant results were obtained from the study.

The greatest reason for the lack of significant data can likely be contributed to issues concerning the implementation of the system. As with any new technology, there is an unavoidable learning curve and transition period that must be taken into account when calculating labor hours and accuracy. When transitioning from paper charts to an EMR system, “some tasks, such as document scanning, required clerical users to do overtime and all users experienced an adaption period that demanded particular efforts” (Gagnon, et al, 2010). Not every employee
learns at the same pace and it is inevitable that unwanted technical issues are going to arise, especially in the beginning, causing problems for the clinic as a whole.

Implementing an EMR system is not an easy task. A lot of hard work and dedication goes into the process. Once the decision has been made to implement an EMR system, the work begins. Planning begins months, maybe even a year or so, before the system is actually implemented and includes, but is not limited to, designing the system to fit the facilities’ needs, scanning in old paper charts, if applicable, and continuously altering day to day workflows. Providers’ schedules may decrease a few weeks before and after the system is implemented to allow for changes, thus, not only causing a decrease in the number of patients being seen, but the amount of revenue that the facility earns. Even after the first couple of months, as employees and patients, alike, adjust to the system, there are still changes being made and workflows being altered to allow for the greatest productivity levels, and six months may not have been long enough to accurately see the expected results.

Even though the overall results of this study did not show any significant increases in productivity, it is certainly not a reason to never implement an EMR system or to think that the system you have now is a waste of money. EMR systems can offer great advantages to medical facilities and are likely the future of documenting patient visits and records. According to CMAJ (2010), last year, Obama’s administration passed legislation making a financial investment of nearly $27 billion in incentives to encourage physicians to “abandon their paperwork and join the information age” in order to ensure that all Americans benefit from EMR systems by 2014. As they continue to increase in popularity, not having an EMR system could be a great disadvantage. EMR systems, like most technology, are created with a purpose of making life easier, but since they are fairly new for a lot of facilities, there are still many obstacles and issues that arise that must be evaluated and overcome before the system can run at its full potential.

PROPOSED IMPLICATIONS AND LIMITATIONS OF STUDY

The ultimate goal for this study was to allow facilities to analyze their current EMR systems to ensure that the system is working productively, and to also give other facilities, who have not implemented an EMR system, the opportunity to review the data to see if implementing the system will be worth their time and money, especially within their billing department. Each facility is run differently, so being able to look at each variable, will give the individual facilities their own perspective on the data. However, since the data collected was unable to show any significant differences from before and after, the hopes is that this study could be a starting point for future studies. These future studies could hopefully have the time and resources to find a greater amount of facilities and would be able to collect more than six months of data before and after implementation. At least a year’s worth of data, both before and after, would probably prove to be the most beneficial.

Since it was secondary data that was being used for the study, there were limitations. Facilities may define the variables differently, thus not giving accurate comparable data. Also, when collecting secondary data it is always possible that errors could exist because the data is being copied from the original. These limitations were decreased by creating a dictionary so that everyone can see exactly what each variable consists of and using the spreadsheet to ensure that the data didn’t have to be copied more than once, after the initial recording.

One of the biggest limitations was not only trying to find local facilities that had implemented an EMR system, but finding ones that had had the system longer than six months. When trying to find facilities, calls were made to almost every medical facility in the area. The most common response was that the facility planned on implementing a system within the next few years, if not within the next year. Some facilities didn’t even seem to know what an EMR system was and others clearly said that they felt that their facility would never switch to EMR. As the popularity of EMR systems continue to grow, it is inevitable that more facilities will be available for future studies. Also, the differences in the EMR systems are likely to have an effect on the outcome of the study. The systems are created differently and are molded to fit the particular facility, and may not be comparable to another one.

CONCLUSION

There comes a point when the familiar, paper charts, are not going to be the most efficient. Deciding to switch to an EMR system is a big step, but as they become increasingly popular, not implementing an EMR system
could prove to be detrimental to facilities. It’s important to realize that there are advantages and disadvantages to these systems, but the disadvantages can be minimized with some detailed research, effectively trained employees, and a system that best fits the need of the facility.

Measuring the productivity of the facility is necessary when dealing with such an expensive system. Filling time, labor hours spent entering charges, accuracy of entering charges, and cost are all measurable aspects of productivity. Once productivity levels have been established, the system can be modified to help increase these levels even more. After all, productivity helps bring money to the facility.

REFERENCES


Danielle Marcette Auer  
Southeast Missouri State University

Heather McMillian  
Southeast Missouri State University

Kenneth Heischmidt*  
Southeast Missouri State University  
kheischmidt@semo.edu  
kheischmidt@semo.edu

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Ken Heischmidt