

USING ELETRONIC DATA INTERFACE TRANSACTIONS TO REDUCE COSTS  
BETWEEN PAYERS AND PROVIDERS

Richard R. Dowell Jr.

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well as his practical approach to learning. It is fitting that I close my doctoral studies under his guidance and mentorship.

## ABSTRACT

### USING ELETRONIC DATA INTERFACE TRANSACTIONS TO REDUCE COSTS BETWEEN PAYERS AND PROVIDERS

by Richard Dowell

There is no shortage of alarming statistics regarding the rising cost of healthcare in the United States. Solutions and opinions abound including recommendations for cost management that range from a single payer overhaul of the entire US care system to an open marketplace free of regulation and administrative interference. Regardless of the currently charged political climate, the reality of increases in the cost of healthcare is being directly borne by consumers or patients. Gains in median income for families in the United States increased twenty three percent between 1999 and 2009; however “this gain was largely offset by increased spending to pay for healthcare” (Auerbach, Kellerman, 2011, p. abstract). Out of pocket spending increased forty-three percent while the expense of monthly health insurance premiums more than doubled from \$490 to \$1,115 (Auerbach & Kellerman, 2011, p. abstract). To combat this increased slice of the consumer’s income, the overall cost of care must be reduced. Cost reduction however is more than a policy change; it is also a change in workflow for those processes that are deemed inefficient or wasteful. Functions that have no clinical responsibility can often make up the best opportunities for cost savings and short term impact.

The primary objective of this research paper is to extend theoretical knowledge regarding healthcare policy into the context of applied and practiced change. Specifically, this dissertation focuses on the adoption and impact of technology aimed at

improving efficiencies in the claim adjudication and reconciliation processes and provides a basic assessment of the impact, or cost, as a result of claim management policy and regulation. A 2010 physician study conducted by NaviNet found that “when respondents were asked what external factors were influencing their offices’ decisions about changes to technology, 53 percent said CMS mandates” (Baxter, 2010, para. 6). Using the Centers for Medicare and Medicaid Services (CMS) modifications to the Health Insurance Portability and Accountability Act (HIPAA) electronic transaction standards for Electronic Data Interface (EDI), an evaluation will be made as to the initial impact of the adoption of the 276 claim status request and the 277 response transactions. The result, that there was little or no measurable impact for in claim status claim volume up to six months after deployment of the transactions indicates that there is more work to do, including a better understanding of what is required for technology adoption in an industry with diverse needs and stakeholders. The primary contribution of this work is the understanding that for claim rework, standards alone, even those with industry support, are insufficient to have the kind of grand scale impact required to slow the billion dollar growth of healthcare expenses.

The submission of claims and the subsequent follow-up make up a costly dance between healthcare providers and payers that move beyond the value of the service provided and instead begin an administrative maze that challenges the expectations of standardization and communication. EDI transactions, while efficient, are not collaborative, and are generally limited by canned responses that answer a single question. Government regulations, especially in healthcare, do not generally address administrative costs efficiently and struggle to connect their directive to the intended

output. Some studies suggest that the “demands created by Medicare and Medicaid outstripped the restricted supply of physicians and hospitals” (Holly, 2013, para. 15); however the costs associated with administrative requirements, not demand for care, has not been deeply studied. Cost and complexity, technology adoption and regulation effectiveness each play a role in healthcare cost reduction on a national or even global scale.

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## KEYS TO SYMBOLS, DEFINITIONS, AND ABBREVIATIONS

- EMR: Electronic Medical Records
- EDI: Electronic Data Interchange
- ACA: Affordable Care Act
- HER: Electronic Health Record
- HBMA: Hospital Billing Management Association
- HIPAA: Health Insurance Portability and Accountability Act
- AHA: American Hospital Association
- AMA: American Medical Association
- HMO: Healthcare Management Organization
- PPO: Preferred Provider Organization
- PCP: Primary Care Physician
- MGMA: Medical Group Management Association
- CMS: Centers for Medicare and Medicaid Services
- HHS: Health and Human Services
- 276: The EDI request transaction that an interested party sends to receive claim status
- 277: The EDI response transaction that an interested party receives in response to the 276
- 270: The EDI request transaction that an interested party sends to receive patient eligibility information

- 271: The EDI response transaction that a interested party receives in response to the 270
- 4010: Version of HIPAA transaction standards introduced in 2002
- 5010: Version of HIPAA transaction standards introduced in 2012
- ICD-9: The International Classification of Diseases, Ninth Revision
- ICD-10: The International Classification of Diseases, Tenth Revision
- CORE: Committee on Operating Rules for Information Exchange
- CAQH: Council for Affordable Quality Healthcare
- NAHQ: National Association for Healthcare Quality
- NPI: National Provider Identification number
- TIN: Tax identification number
- ASC X12: The Accredited Standards Committee set of message types like invoice purchase order, healthcare claim etc.
- ANSI: American National Standards Institute
- EAI: Enterprise Application Integration

# CHAPTER I

## INTRODUCTION

### Background

The complexity of healthcare in the United States has been a topic of discussion almost since health insurance was introduced to the American public during the great depression 150 years ago. Up until the 1930s, “most patients paid for almost all health care services out of their own pockets” with little corporate interference (Mahar, 2006, p. 23). In 1932 the American Hospital Association (AHA) approved hospital insurance as “the only practical solution” to the depression induced drop in billings (Mahar, 2006, p. 28). The health insurance industry, originally a method for spreading costs evenly to enable more patients to afford health care has grown into a behemoth of initiatives and programs aimed at improving care and driving costs down. Yet despite the best intentions, interaction between those that provide care (providers) and those that cut their checks (payers) has grown beyond a single financial transaction into a web of administration that adds to the costs and complexity of the healthcare system.

Healthcare has grown rapidly from local or family practices, siloes of university specialists, and stand-alone regional hospitals to a dynamic industry with the lines of ownership, access and cost blurring with physician owned facilities and health plans, non-profit integrated health systems and proprietary technology. This new environment requires leaders to think together and integrate multiple stakeholders into their strategic plans. Success in this industry requires “that healthcare leaders and their teams are

embracing new concepts such as ‘design thinking’ and ‘co-innovation’ as these are instrumental in developing more tailored and holistic solutions” (Weems, 2016, para. 3).

The mechanics of health insurance are similar to most insurance processes. Essentially, everyone pays into an account and from that account benefits are paid against claims. The initial payments, in this case by prospective patients, are called premiums. Just like automobile insurance or fire insurance, there has to be a large population of people paying premiums that need little or no benefit for the system to work. Health drives the success of an insurance program because if most of the people participating in the plan are mostly healthy most of the time, their premiums will help pay for the expenses of the small number who are sick or injured. Benefits are designed by the healthcare plan and sold directly to employers and individuals or through brokers. Some plans feature comprehensive benefits. They will pay out for office visits, surgeries, and medication. Other plans only pay for catastrophic injuries or emergency coverage. Premiums are collected and pooled by the insurers and paid when a patient, or a healthcare provider on behalf of the patient, submits a request for reimbursement for that service in the form of a bill or claim.

Today, healthcare claims may take a variety of forms within similar workflows. The claim could be submitted electronically or on paper. If submitted electronically, a care provider that is part of a large facility or medical group may submit that electronic bill directly to the payer, assuming that the payer has the appropriate technology. Otherwise the claim is printed, or dropped to paper, and sent through the mail. Once that bill is received, the charges are matched up against the contract between the two organizations to determine whether or not the service meets the requirements for

reimbursement, and the expected value or amount of that reimbursement. If the requirements are not met, in one form or another, the claim may be denied by the payer. If that occurs, the provider will then research the bill and determine where the error occurred. If they cannot determine the error on their own, they will consult a host of services. Sometimes paid consultants manage the denial inventory, researching and submitting on behalf of the provider. At larger institutions, teams are usually assigned to manage this task.

At times medical records may need to be submitted to illustrate the appropriateness of the procedure, or medical necessity of the service. At other times, a change is made in the way the bill is constructed, and the claim is resubmitted. If the claim is still not paid, even after the additional information, the provider may be within their rights to appeal the decision to a payer's medical record or even the state depending on the regulations and plans. Finally, if the provider's collections and appeals efforts yield no payment, they may employ a third party paying hundreds of dollars or a percentage of the value of the claim for a chance to collect. Millions of times a year, providers call in to the payers in order to determine the reason for the denial and the next steps to recover the correct payment. This process can become expensive and burdensome to both parties.

An early attempt at eliminating complexity and lowering costs was through plan design. Health Management Organizations (HMO) were developed in the late 1970s and early 1980s to manage care in a way that would eliminate services that were not needed or too costly by installing a physician as the gatekeeper to service, rewarding that physician financially for the resulting performance. The physicians serve as a

“central triage point for the referral and approval of services” (Cleverley, W. & Cleverley K., 2011, p. 160), in a tight or controlled network of specialists and hospitals that will manage to the same financial management strategy. Americans, however, did not like that approach as the rules of the HMO plans can be limiting in terms of covered procedures and may end up requiring patients to bear the full financial burden of receiving service outside of the prescribed network of participating providers. Patients are concerned too about “cost-cutting mandates that shorten hospital stays and doctor visits and make it difficult for patients to see specialists” (Gawande, 1997, para. 3). Insurers largely abandoned these plans because of their unpopularity and moved to plans that offered patients more choices and broader physician networks. These plans compensate providers on a fee for service basis. Rather than try to manage the health of a group of patients through the HMO structure, Preferred Provider Organizations (PPO) developed. Contracting rates with a payer was still a method of managing cost; however the fee for service model allowed providers to manage revenue as well as care on a volume basis.

Despite the concern for patients and their needs in coverage and affordability, very few patients actually make a pure market and feature purchasing decision when it comes to their health coverage. Following the Great Depression, health insurance plans began to be offered primarily through employers as a benefit to their employment. In this scenario, the employer selects the plans that will be offered to their employees by working with brokers who are handsomely rewarded for understanding the nuances of the sales cycle, plan design and financial limitations of the employer. Once the employer determines the plan or plans they will offer to their employees, frequently

chipping in for some or even all of the premiums, an employee or patient, will obtain coverage.

Despite even the best of intentions and innovative plan design, costs continue to grow. Kaiser Health News identifies seven factors that increase the cost of healthcare including longer life expectancies, poor health, technology, hidden costs; lack of information and greater access to care that drives demand as well as costs up across the population. Financial considerations may dominate decisions relative to care, even the structure of our reimbursement system, fee-for-service billing “encourages overtreatment, including repetitive tests” (Appleby, 2012, para. 4). And while the overall cost of care has grown, the administrative costs have grown right there with them. The Medical Group Medical Association (MGMA) found that for a practice with ten physicians, “more than \$247,500 per year was spent on unnecessarily complex or redundant administrative tasks” and a single physician may pay as much as \$68,000 in administrative expenses just working with payers and insurance companies (MGMA, 2004, para. 4). While technology on the care side of this equation has had a positive impact on service, there is little documentation showing the value of technology as a cost-cutting tool specific to healthcare.

There have been considerable attempts by payers to control medical expense through attempting to stem utilization with capitation designed plans (plans that pool risk sharing with gate keeper physicians), prior authorization requirements (plans that require prior approval or authorization by the insurer’s medical review team before a procedure can be considered covered, and payment withholds meant to drive physician behavior). Understandably, healthcare professionals do not appreciate this oversight

and are not always fully game to engage in the cost cutting schemes. When considering large scale programs and requirements and considering this environment, “payors have started to look at approaches that better align the interests of the patient and the payors, and pay-for-quality incentives schemes have emerged as an important lever. However, for these schemes to be successfully implemented, systems must be in place to measure quality and providers need better systems to improve quality of care” (Poon, Jha, Christino, Honour, Fernandopulle, Middleton, & Kaushal, 2006, p. 1)

In 1996 the Health Insurance Portability and Accountability Act (HIPAA) was put into place for the “protection of individually identifiable health information” (Health Information Privacy, 2006), creating the need for providers and insurers to standardize their data management processes. “HIPAA is considered to be the most significant body of health-care legislation to be enacted since Medicare” (Medescribe, 2012, para. 1). Before HIPAA “more than 400 different formats were used for electronic health care claims” now we just have one (Cutler, Wikler, & Basch, 2014, p. 1875). Since the implementation of HIPAA, the need to standardize has been met with the ability to manage data electronically, both in large quantities and with relatively low levels of sophistication such as through a web browser.

Payers have reacted to the administrative complexity with their own solutions. On December 1, 2015, Blue Cross Blue Shield of North Carolina announced that they will not be requesting medical records, which often require printing, scanning and mailing as certified through the postal service, in order to reduce the burden of both parties (Blue Cross Blue Shield of North Carolina, 2015, para. 1). This saves all parties the cost of rework, but can present a hit to medical cost utilization, a scenario in which

providers bill for services in excess of necessity, driving the cost of care up and subsequently the cost of health insurance premiums. To derive the cost of utilization payers, with information from providers, review “a variety of procedures and services [that] are of interest and some measures of “cost” is assigned to each service so that resource intensity can be summed over all provided services” (Diehr., Yanez., Ash, Hornbrook, & Lin, 1999, p. 126). This cost is part of the equation payers and providers consider when contracting together, providers attempting to maximize their dollar per utilization while payers minimize, or manage, the care provider to reduce the cost of that care. These transactions and calculations result in tremendous amounts of data being exchanged between the two entities.

The rules for managing health data continued to be revised and updated through the 1990's and into the 2000's. The rules published in January 2009 replaced the versions of the standards with version 5010 (CMS.gov, 2015, para. 1). The new version improves on the 4010 transactions by “latest set of standards aim to upgrade the regulation of all electronic transmissions of healthcare transactions including eligibility, claim status, referrals, claims and remittances” (Pham, 2011, para. 1). In a response to managing data demands, Electronic Data Interface standards have been developed. It is important to note that while HIPAA does identify the requirement for EDI data, “a provider and payer could agree to transfer less than the maximum data set, no payer could require more data than the designated maximum” (Moynihan, 1993, p. 49). HIPAA mandated that the healthcare industry use standard transaction formats for electronic claim and related transactions. The Department of Health and Human Services states that the benefit of the EDI transactions is “significantly decrease the

administrative burden” (Berwick & Sebelius, 2011, p. 40459). Electronic data interchange “is majorly used for exchange for automated transfer of data as per specific format between healthcare providers and payers for better claims management and is also used for better supply chain management between the healthcare providers and equipment suppliers” (Wood, 2014, para. 5). The use of these transactions present an opportunity to reduce administrative costs, and nowhere is this more prevalent than in the interaction between payers and providers and the need to share large amounts of detailed information on healthcare claims and payments.

EDI transactions are not limited to healthcare. These transactions are an inexpensive way to move large amounts of standard data from one organization to another. Cost nearly double between electronic and paper claims with the “average cost of processing a clean electronic claim was 85 cents, nearly half the \$1.58 cost of processing a clean paper claim” (Claims Transit, 2016, para. 6). When healthcare transactions are viewed with other high volume transactions, the dramatic difference in cost can be startling. Processing a claim can cost \$16 manually and even \$8 electronically where as other electronic transactions are much lower. Placing a purchase order with a Wall Street broker will cost as little as ten cents and checking your bank statement online may cost less than a nickel. Inexpensive transactions are a goal across all payment and transaction industries. In consumer businesses “companies in industries receiving electronic payments from consumers faced the problem of home banking payments and subsequently automated closing” (Moynihan, 1997, p. 79); however, they managed to keep costs well under a dime. There are cost advantages to using a standard data format like EDI. The question, however, is does

the creation of a standard, and the associated regulation, result in the realization of those costs savings.

### Transaction Processing

To better understand how these transactions might impact a provider's office, it is important to have a little bit of background on the interaction between payers and providers. Healthcare providers and payers interact in a variety of ways, but the focus of their payment interaction is primarily around claims payment as illustrated in the process map found in Figure 1.

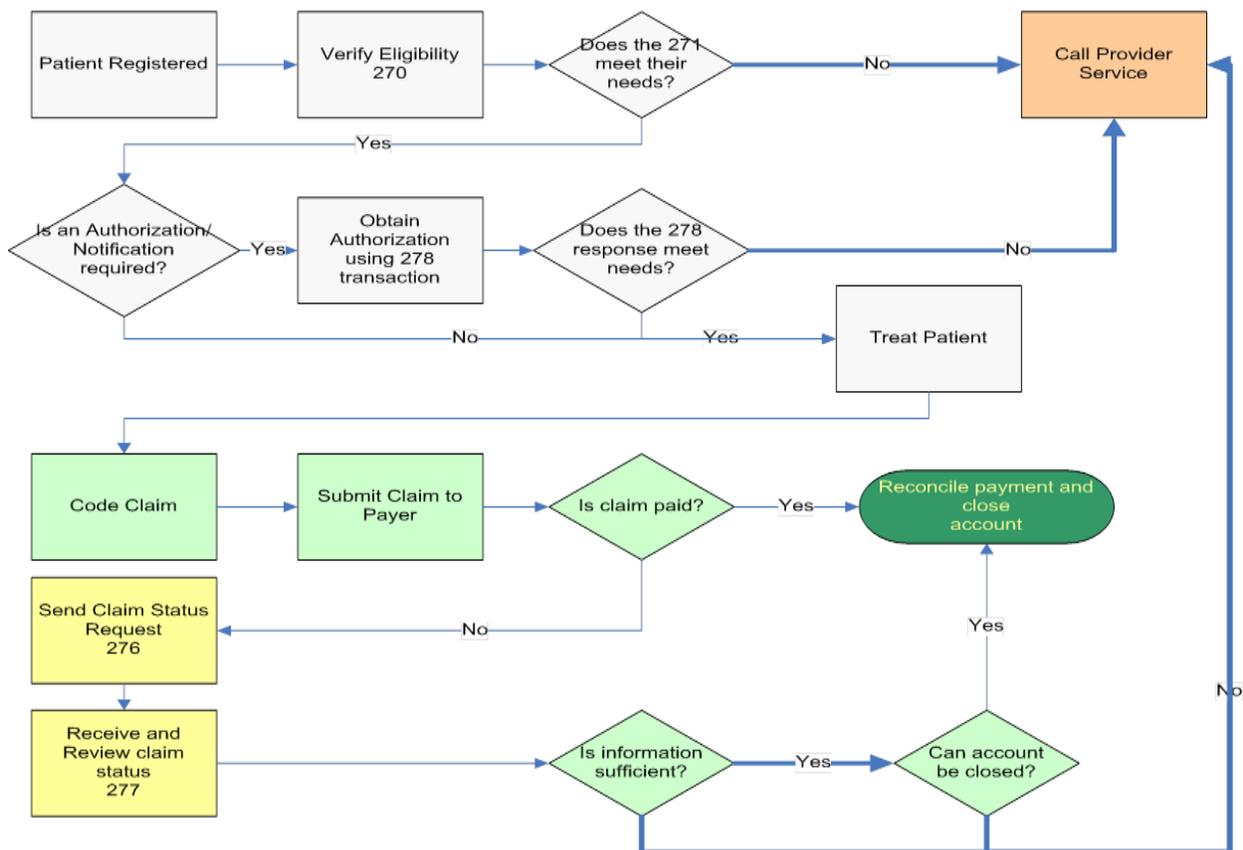


Figure 1. Claim Processing Map

Once a patient arrives at the hospital or physician's office, the provider checks the patient's eligibility, determining which insurance coverage is appropriate and what the charges will be. Information like deductibles and co-pays are identified, the billing address is confirmed and the patient proceeds with the visit or treatment. Eligibility is the key to fast and easy reimbursement for providers. If the patient is eligible (i.e. has insurance coverage for the service being performed), the provider can submit a claim and be reimbursed quickly and easily. When verifying eligibility "productivity is limited to the number of telephone calls staff members and respond to each day" (Moynihan, 1995, para. 5).

Once the visit or treatment is complete, the provider determines the correct codes for the procedure, the expected payment, and patient responsibility in dollars. The coders match the procedures that were performed with the appropriate identifying codes. Most organizations had become proficient with the codes coming from the ICD-9 disease codes and CPT codes. The ICD-9 codes represent the International Classification of Diseases, Ninth Revision. ICD-9 code "is the United States' modification of the International Classification of Diseases, Ninth Revision, developed by the World Health Organization" (Hazlewood, 2003, para. 1). For Physician billing, CPT codes, or Current Procedural Terminology is the "most widely accepted medical nomenclature used to report medical procedures and services under public and private health insurance program" in the United States and is a proprietary system of codes owned and administered by the American Medical Association (AMA, 2015, para. 5). In the hospital setting, coders frequently use DRGs or Diagnosis Related Group, to bill comprehensive services that the facility may provide. Providers employ coders, or

vendors that employ coders, to match the procedure from the care giver with the appropriate codes for billing.

Medical coding is a unique task often arranged by specialty. The coder must take courses and usually be certified by an organization like the American Health Information Management Association, which holds accreditation for specialists and physician based codes. Certified coders must maintain an understanding of the trends in the healthcare industry in order to ensure accurate and timely billing. The translation of physician notes to bills is crucial for the success of the claim. For instance a surgery bill that indicates surgery was performed on the right hand but medical records show it was performed on the left hand will be denied and the physician and his or her staff may lose that revenue. Accordingly, procedures that do not match the age or gender, such as a hysterectomy on a 9 year old boy will prompt questions that may result in delays to payment and risk the payment entirely. Fast, accurate and thorough coding is crucial for quality medical billing.

Having completed the coding, providers bill the insurance company for the balance by sending a claim. That claim is frequently sent to a clearinghouse that might check for simple coding errors or provide some sort of data standardization before it is sent to the insurance company for payment. After receiving the claims, the insurance company will match the codes billed with the contracted payment amounts and adjudicate the claim, determining whether the claim will be paid, denied, or held for a specific type of review. If paid, the provider receives a check or bank transfer for balance. Once that payment is received, the transaction is posted to the provider's ledger as revenue.

The Pittsburgh Post-Gazette reports that for the University of Pittsburgh Medical Center, the major care provider in the region, “Medicare most frequently denies claims at 4.92 percent” (Twedt, 2014, para. 5) meaning that nearly ninety five percent of all claims are processed correctly and usually within 14 days the provider receives payment. The remaining five percent of claims however can be costly in lost or delayed revenue for a provider. Claims that are denied or held for review can cost a provider weeks and months of lost revenue. Accounts receivables, billing or patient account services teams are deployed by providers to determine if there are delays in receiving payment, what those delays are, and what needs to be done to receive payment. This activity is called checking claim status and requires the skill of someone that understands basic medical billing and payment transaction information from an industry perspective as well as has some familiarity with the facility or physician contract for the relevant payer. This person’s job is generally to call the insurance company’s 800 number and talk to a representative who can describe the issue and recommend resolution. These phone calls alone can be costly to both parties, as much as \$11 to \$18 for a 30-minute call (World Wide Call Centers Inc., 2017, para. 5).

The EDI transaction numbers 276 and 277 are designated by the 5010 regulation for claim status and enable providers to receive the status of a high volume of claims by executing the transaction. Data fields that are connected, like billing codes, patient information, and contract amounts, begin to tell the story of an encounter yet often times fail to answer the next question, which may often be the location of missing information or a relationship to a different event. The increasing complexity of the claim and billing

processes limits the impact that a static content tool like an EDI transaction can have on administrative costs.

The provider electronically transmits a 276 transactions or request to the payer requesting status on claims that are identified by line items in the transaction format. The payer responds using the 277 response transaction providing status for each claim identified in the 276. Despite the potentially large volumes of data, these transactions can be executed almost immediately; however they usually happen overnight as there is a tremendous amount of work happening behind the scenes with large billing and claims processing systems throughout the business day. Providers that utilize these transactions usually receive these files and dump them into workflow or practice management applications may be part of enterprise wide systems that tie clinical and financial data together.

### Technology Adoption

At the core of this discussion is the issue of technology adoption and what “adoption” in that context means. There is significant support for the idea that there is waste in the current healthcare system in the U.S. and that payers, providers, and customers must “align reimbursement practices with goals for quality and value” (Blackmore, Mecklenburg, & Kaplan, 2011, para. 4) so that the incentives match the desired outcomes. Yet the challenge remains to leverage what we know about the process, specifically the reimbursement process, so that work that can be automated is automated and work that requires manual or intellectual interaction is designed appropriately. To that end, technology for technology’s sake is essentially adding

complexity, not removing it. Part of the literature review for this study includes analysis of the factors that influence technology adoption and how that adoption can impact administrative processes in provider operations.

Technology adoption in the context of the EDI transactions analyzed in this study includes tasks that must take place, just for adoption to begin. There is coordination required between payers and providers for the transmission of information. The software must be coded for alignment on key fields, timing and maintenance. The change management considerations must be managed across corporate entities and at times include clinicians that do not have systems experience and payer lead teams that have never been inside the operations of a provider's billing or collections function. An organization that has executed these events, or tasks, can begin the discussion of adoption and the success or failure of their efforts.

Coordination between payers and providers are key to the adoption of the EDI transactions identified in the 5010 regulation. A provider must develop the data structure within their own systems that will produce an acceptable request.

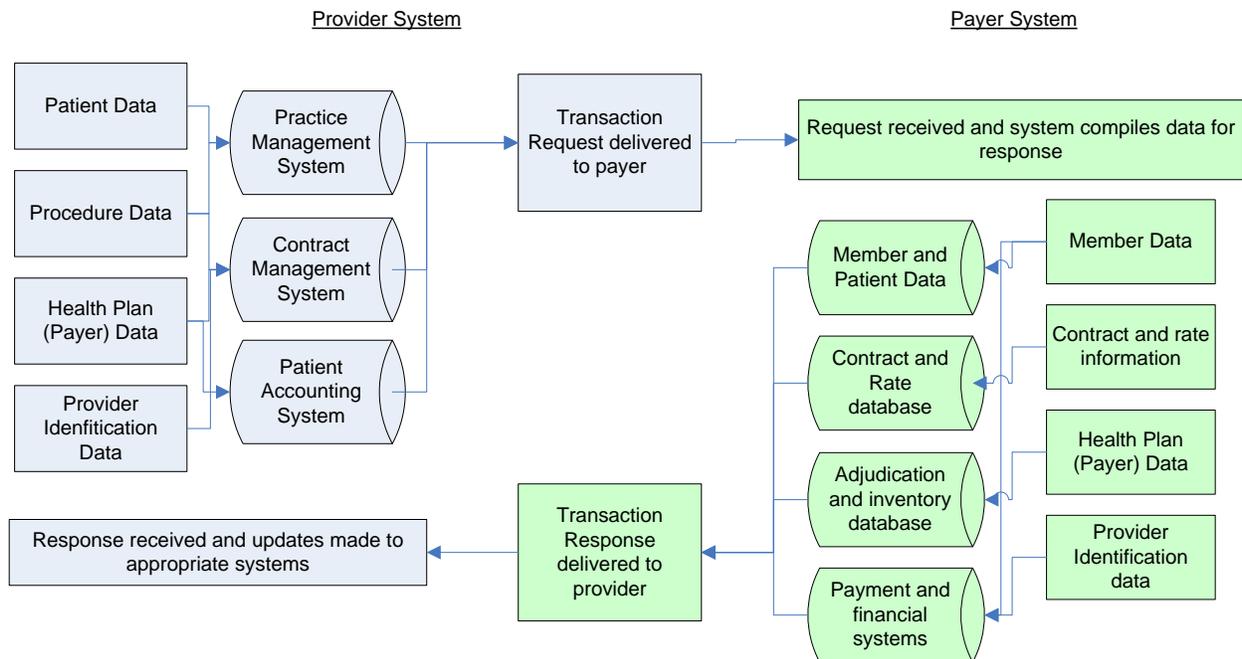


Figure 2. Transaction Data Structure

As outlined in Figure 2, a payer develops the data structure between their systems that will identify the key data elements of the response. HIPAA implementation guides counsels “require transmitters and receivers to make certain determinations/elections” (AmeriHealth 834 Companion Guide, 2006, p. 2) such as which elements are most important to their business and where situational elements apply. The provider must identify each of these data elements and determine the source of that data element within their systems. There are vendors that can pull each of these data sources together into one warehouse, however the need remains. Each data element reflects a piece of information required to find, and determine status of the claim. Patient data may include the patient’s social security number, first and last name, and date of birth. Procedure data is not a required data element, but that

information serves as an identifier for charge amounts and costs as well as dates of service.

Provider information is also included in the request. A provider may have as many as three identifying numbers with a single payer. The Provider ID number identifies the entity requesting status and the Federal Tax ID, or TIN, and allows the payer to match the provider to the correct contract in their system. Widely used, but not necessarily required is the National Provider Identification number, or NPI. When implemented effectively, that number alone can grease the skids of information in the payer's system, pulling all of the relevant identifying data together to formulate the response.

Once the provider compiles the appropriate data lines for each of the claims they are requesting status for, they send the request in bulk form to either a clearinghouse, or vendor that generates the actual 276 requests in the compliant format. Providers that generate sufficient claim volume, and payers that have the corresponding technical capability, they may decide to submit the request directly to the payer, skipping the middle man. Whether submitting tens or tens of thousands of claims per request, the process remains relatively the same.

Once received, the payer executes a similar process of checking claim information for patient, adjudication, and payment data elements. Of particular interest are the remarks added by a claims adjuster or the processing system. The 276 and 277 transactions are nearly identical with the exception of status information (Blue Cross, 2011, p. 7). The STC loop in the response share the claim status information, payment amount and the claim paid or denied date.

The process just described is simply the execution of the transaction. Adoption of the technology means more than sending and receiving, but also using the technology. The requests and responses flow in limited text-only style files. The average person, even one familiar with the process, would be hard pressed to make much use of the file itself. Instead, to turn the data into information, the files are often uploaded into graphical user interface, or GUI, applications that align more than just the response. A sample of the interface from WebMD is shown in Figure 3 (Health Partners, 2007, p. 10) which is much easier to read for an accounts receivable specialist and is more searchable than the standard ANSI format in Figure 4.

| Claim Status Notification                            |  | HealthPartners Plans PA                       |                                    |
|--|--|---|------------------------------------|
| Request: Insured = Jane Doe                          |  | Member ID = 111111111                         | DOB = 01/01/01 Provider ID = 00018 |
| WebMD Trace Number :111111111                        |  |   |                                    |
| <b>Patient : Member Name</b>                         |  | <b>Provider : TEMPLE UNIVERSITY HOSPITAL</b>  |                                    |
| Member ID : 111111111                                |  | Service Provider # : 00018                    |                                    |
| DOB : 01/01/01                                       |  |   |                                    |
| Gender : Female                                      |  | <b>Submitter : TEMPLE UNIVERSITY HOSPITAL</b> |                                    |
|  |  | Electronic Transmitter ID : 00018             |                                    |
| <b>Claim# :</b>                                      |  |   |                                    |
| Status :   |  |   |                                    |
| Status Information Effective Date :                  |  |   |                                    |
| Total Claim Charge Amount : \$ 0.00                  |  |   |                                    |
| Claim Payment Amount : \$ 0.00                       |  |   |                                    |
| Claim Statement Period Start : 01/01/2004-03/30/2004 |  |   |                                    |

Figure 3. Sample Interface from WebMD

**STC\*F1>1\*20030130\*\*127.06\*108.00\*20030128\*NON**

Figure 4. Sample 277 Standard ANSI Response STC Loop

ST\*276\*0046!  
 BHT\*0010\*13\*\*20030109!  
 HL\*1\*\*20\*1!  
 NM1\*PR\*2\* PAYER NAME \*\*\*\*21\*9012345918341!  
 PER\*IC\*PROVIDER CONTACT INFO\*TE\*6145551212!  
 HL\*2\*1\*21\*1!  
 NM1\*41\*2\*\*\*\*\*46\*111222333!  
 HL\*3\*2\*19\*1!  
 NM1\*1P\*2\*PROVIDER NAME\*\*\*\*\*FI\*FEDERAL TAX ID!  
 NM1\*1P\*2\*PROVIDER NAME\*\*\*\*\*XX\*NPI NUMBER!  
 NM1\*1P\*2\*PROVIDER NAME\*\*\*\*\*SV\*PROVIDER NUMBER!  
 HL\*4\*3\*22\*1!  
 NM1\*IL\*1\*DOE\*JOHN\*\*\*\*MI\*MEMBER ID!  
 TRN\*1\*500!  
 HL\*5\*4\*23!  
 DMG\*D8\*DATE OF BIRTH\*F!  
 NM1\*QC\*1\*DOE\*JANE!  
 TRN\*1\*500!  
 AMT\*T3\*68.69!  
 DTP\*232\*RD8\*20021016-20021016!  
 SE\*19\*0046!

Figure 5. Sample 276 Standard ANSI Request

Adoption of the transactions also means that the information will be useful to the provider when the response is received. Over 700 claim status codes are approved for standard use through the Washington Publishing Company (WPC). For instance, the standards reviewed in June 2015 resolved that a response containing ‘code 6’ indicates “Balance due from the subscriber” (Washington Publishing Company, 2015, para. 2). The WPC is a private company that “serves as the code set registry for the following health care code sets” (CMS.gov, 2015, p. 2). The provider that can effectively utilize those status responses is one that can say that they have adopted the technology.

## Statement of the Problem

As the responsibility for the cost of care shifts from public and private payers to patients, either through health plan design or lack of support and insurance coverage, the structure of the current payment structure comes under scrutiny. The current process hides much of the competitive pricing, which in turn hides process and payment inefficiencies. As patients and consumers become more active in the marketplace, shopping for care where cost becomes a factor and prices will adjust. Today the unknowns in care pricing create “an opportunity for transparency to reduce spending” (Sinaiko & Rosenthal, 2011, para. 1). These pressures to reduce spending in turn put all administrative processes under the microscope.

Cost challenges, or driving cost out of business operations, have long been a staple of business management and health care is increasingly joining the list of industries that must balance the value of increasing administrative capabilities and technology with the value of these processes and systems to the consumer or patient. When administrative costs outpace the value of services, the business model, if not the whole system, is out of balance. Care providers, payers and technology vendors have become part of a “dysfunctional system, and each rigorously defense short-term interest as the system falls short and prices continue to rise” (Blackmore, et al., 2011, para. 4).

Pricing transparency, market efficiencies and the potential risks of dramatic cost shifting are large and complex concepts that can be debated and addressed as theory supporting future policy development and have their place in this discussion. However, the tactical opportunity to reduce costs in a way that significantly impacts administrative processes is one that requires a focus on the scope of the handoffs and transactions

within the targeted system. The problem with the current environment is that there are host of tools and methods touted as solutions to problems that may or may not exist, and the investment in these tools is draining attention and capital from opportunities for advancement in care and research.

### Purpose of the Study

CMS has published that the 5010 implementation will save between \$2.2b and \$6.1b in provider benefits over 8 years (Weems, & Leavitt, 2008, p. 49768). This study aims to determine if the EDI 276 claim status request and 277 responses, as defined in the 5010 regulation, are reducing administrative cost by eliminating the need for providers to place phone calls to obtain the status of claims. This study used call data from 2011 and 2012 from a large national insurance company to measure call volumes across providers that had been contracted and elected implement the 276 and 277 transactions for their processes with that payer. Details of the request and response content are proprietary; however, the organizations involved in this study did verify their compliance with the regulation. The study will use limited provider descriptions to determine if there are any unique characteristics by provider type or region that might provide some insight into performance differences. The results of this study will provide a guide post to policy makers, payer and providers looking to invest in technology as a means of cost reduction for administrative processes and present an opportunity to better understand the impact, intended or otherwise, of the 5010 EDI regulation.

## CHAPTER II

### REVIEW OF LITERATURE

The researcher used multiple criteria including healthcare costs, EDI, technology adoption, administrative costs in healthcare and ICD-10 and 5010 standards to search Google scholar, Off-Campus Library Services for Central Michigan University, Pub Med and HealthTextElite. Literature was selected if the literature included original research, evaluations, case studies and examples, and meta-analysis. The researcher reviewed promotional material for technology solutions both healthcare and non-healthcare related. The review of this literature follows.

#### Healthcare Technology Adoption

Technology adoption is a slippery term and it goes hand in hand with change. Successful change management is crucial for the development and acceptance of any new technology. Change “is not just a matter of process and technology. It’s also about the people who participate in those processes and use that technology” (O’Malley, 2017, para. 1). Not only does the technology appear different, processes are different. Even the simplest change requires a shift in routine. As basic as email is to our lives today, a simple google search will yield hundreds if not thousands of articles addressing the impact that change may have on your day, or even life. “Managing change is tough, but part of the problem is that there is little agreement on what factors most influence transformation initiatives” (Sirkin, Keenan, & Jackson, 2005, para. 2). Transformation to new technologies requires planning, communication, and training. Soft issues like culture and leadership usually make the list, but a more tangible approach may prove to

be a focus on hard factors like the time required to complete the change, the number of people or effort required for success, the financial results and leadership commitment are better determinants of successful change. The Sirkin article uses the acronym DICE to describe this approach and has had success implementing it with Boston consulting (Sirkin, Keenan, & Jackson, 2005).

While change management is generally accepted as a growing discipline and people tend to think of themselves as accepting of change, the “concept of change can prove to be evasive and paradoxical due to its inherent relativity” (Ben-Eli, 2013, p. 1). Adoption can mean anything from registering for a website to integrating technology into your daily life. In the past fifteen years you might say cell phones have been ‘adopted’ by most people, yet before that time many people had them. They used them to make phone calls. Today, many people use cell phones, or smart phones, to check work email, download spreadsheets or video conference with someone across the world. Not to mention all the sharing of files and information. It is safe to say that many people are adopting mobile technology.

Adoption as it is defined in this paper is to be fully aware and utilizing a process or technology to its fullest potential. Merely training or introducing something will not make it adopted. Using email, but falling back to sending memos through interoffice mail systems is not adopting. A home where members of the family have cell phones, but still pay for a land line is utilizing but not adopting. Adoption requires an almost thoughtless usage and acquisition.

Consumer technology adoption has similarities and differences. It is tough to align the needs of a physician billing practice to the needs of a consumer. Bank of

America's consumer challenge is mobile banking. Their approach includes "outfitting teller stations with quick response (QR) codes that can be scanned by mobile devices" (Adams, 2012, p. 189). Making it easier for customers to use their tools is important as it is for any organization wanting to get efficiencies out of technology investments.

Usability blogger Jeff Sauro identifies three areas that usability designers must address for adoption: early focus on users and tasks, iterative design (leveraging multiple phases), and empirical measurement that guides results (Sauro, 2013) where business and consumer adoption differs: the party footing the bill, customizations, user participation, costs of change, training and usability.

Probably the best place to start the assessment of business vs consumer adoption is the party paying the bill. Consumers that use technology are making their own, personal investment. Business users are just that, users, and their compensation is rarely tied to usability. Winning over a business user is tougher than just mandating usage. Customizations and training really have to do with user feedback and an organizations commitment to adoption. A company that invests in developing a tool based on the appropriate level of design and training will see better results. User participation is dramatically different between the two. Consumers are usually compensated in some way for participating in user testing or design work. Business users must leave their productive roles, and in the case of billing teams those roles are measured by production, and participate on a separate team, leaving their job functions. Usability is highly considered with consumers, logic holds that they are paying for the change so, of course, their input is key. Business users tend to lose to the mighty dollar and detailed unique designs are often expensive.

Lastly, the switching costs can be high. As mentioned before, users have to change and risk productivity gaps during adoption. Changes may require different or new skills and perhaps different outcomes. Designing an interface for EDI adoption, not just improving responses, is an important factor in driving the adoption of this technology. The promise of productivity is attractive, however “it’s hard to know if the grass is greener until you get to the other side” (Sauro, 2014, para. 12). There are those that will challenge even the perception of usage or change benefits. A study in health records found that “perceptions of usefulness and of ease of use were the key determinants for nonusers ...to adopt the system” (Archer & Cocosila, 2011, p. 3).

The risk that users perceive as they enter the stage of technology change is no different than the challenges of technology type (moving from one platform to another) or gender as studied by Im, Yongboem and Hyo-Joo as they studied the user acceptances of technology. Their results, supported by the National Science Foundation found that “perceived risk, technology type and gender were significance moderating variables” however “the effects of user experience were marginal after the variance of errors was removed” (Im, Yongboem, & Hyo-Joo, 2008, p. 8). These results at least support the idea that as investments are made in claim status tools, consideration for general usability across teams is appropriate.

Technology adoption generally requires user participation, but that rarely happens in a vacuum. The literature on technological innovation and adoption points to “two main classes of variables that are important in determining adoption of an innovation: individual characteristics and organizational characteristics” (Thong, 1995).

By focusing on one factor or the other, managers can risk missing important elements of adoption.

The definition of adoption is a little tougher at work, or in the office. Much of the literature surrounding healthcare technology adoption focuses on large scale EMRs; however, by treating physician offices as small businesses, we might change our expectations about what can be delivered by technology. For a small business, embarking on IT adoption for the first time is non-trivial as there is a lot of uncertainty and risk involved. The introduction of IT is likely to cause changes in work procedures and increase computer anxiety among the employees” (Thong & Yap, 1995). As computing cloud initiatives and products rolled out in the late 2000’s through the present, technology leaders were “predicting that the cloud adoption will be faster and deeper among the Small and Medium Enterprises (SME). The reasons for this seem obvious on the surface: SMEs are less tied down by historical investments in infrastructure” (Permmaraju, 2010, para. 2). To add to this perception, a study of providers that regularly see patients regarding Electronic Health Record (EHR) adoption found that “Given the lack of a widely accepted definition for what constitutes a “personal health record” actual adoption by consumers is difficult” (Fortin & Drazen, 2012, p. 4). The study also found that “the majority of hospitals and physician practices are still paper-based” (Fortin & Drazen, 2012, p. 8).

Sticking with the EHR theme, a popular one for healthcare technology adoption, we can find certain characteristics that should carry across organizations. Whether large or small “the majority of physicians who adopted the EHR capabilities required to obtain federal financial incentives used the capabilities routinely, with few differences

across physician groups” (Hsiao, Ashish, Jha, King, Patel, Furukawa, & Mostashari, 2013, p. 172). In Canada, where many costs of adoption are borne by the government, a similar study was conducted showing that “Perception of ease of use was found to be the strongest motivator for EHR users” (Archer & Cocosila, 2011, p. 3). Michael McBride agrees, stating that “despite all the rhetoric about the future of healthcare and the government's role in its delivery, another force will accelerate the adoption of healthcare information technology: consumer demand” (McBride, 2013, para. 3). Perhaps restated: “To maximize the chances of success of new EHR implementations, it is necessary to focus on mitigating doubts about the rationale for such systems, to stress how EHRs are relevant for physician jobs, and to demonstrate that they are easier to use than nonusers might expect” (Archer & Cocosila, 2011).

Adding to the topic of EHR discussion, we can also include change management in the discussion of adoption, since, at its core, using a new system or application is ultimately a change in business process. Cain and Mittman (2002) have identified 10 critical dynamics of innovation diffusion within the context of healthcare technology adoption. They are:

- Relative advantage
- Trialability
- Observability
- Communication channels
- Groups with similar characteristics
- Pace of innovation
- Norms, roles and social networks

- Opinion leaders
- Compatibility
- Infrastructure

(Cain & Mittman, 2002, p. 27). The authors also report a basic outline of the stages and decision process to adopt innovation, all leading back to the basics of communication and stakeholder management.

Adoption of technology requires two specific parts of an organization to meet and work effectively: technology and operations. Specifically relating for electronic transactions in healthcare Intermountain Healthcare in Utah meets weekly with payers to begin “identifying errors quickly and resolving them” which saves everyone money and furthers the case for adoption (Moynihan, 1995, p. 66). To take that thought a step further “implementation does not follow automatically” (Hausman & Stock, 2003, p. 681) when tracking the technology adoption process.

“Quite simply, people hate change” (Leonard, 2004, p. 76) is the conclusion of one author who reviewed research and stories regarding challenges with technology adoption in healthcare. Not unique to this industry, Fortune Magazine reports multiple sources that “IT projects typically take longer than planned and cost more, with only 16% of projects hitting their targets” (Cheese, 2013, para. 3). So the challenges just keep coming. In many organizations, “two out of three transformation initiatives fail” (Sirkin & Kennan, 2005).

Healthcare is no different, in fact it may be more of a challenge because “health care professionals are obligated both to acquire and to maintain the expertise needed to undertake their professional tasks, and all are obligated to undertake only those tasks

that are within their competence” (Al-Abri, 2007, p. 9), meaning each additional task required in change management is a potential expansion of that the term ‘competence’ and therefore another reason to delay or deflect the change.

Organizational differences play a part in adoption success. As part of a series of articles supported by lobbyists supporting the 2007 Wired for Health Care Quality Act, Haydn Bush identified that “benefits of early technology investments can be sizeable”. And that a 2011 report “analyzed 291 hospitals in its highest portfolio class found that the 24 providers deemed stage 6 or stage 7 meaningful use-ready by the Healthcare Information and Management Systems Society standards reported 46 percent higher revenue on average than the group as a whole” (Bush, 2012, p. 1). In order to achieve adoption on the scale that will start to drive down costs, or support increased revenue, health systems must sometimes reach beyond their organizational walls to other teams. Virginia Mason Medical Center launched a successful profitability campaign in 2002. They engaged such tools as Lean process improvement methodology and new technology. Their success, however “required a level of transparency and communication that would not have been needed in a strictly internal initiative. However, the benefits of direct contact with the consumers of our services are now considered to be an integral part” (Blackstone, 2011). This type of collaboration externally fosters technology adoption. The team at VMMC also determined that the appropriate leadership “is also a key element of setting direction, ensuring alignment, and motivating all participants through the change management process” (Blackstone 2011). The assessment of VMMC’s change management process, one that yielded so

much change in their organization, due in part as a result of the successful and appropriate adoption of technology through a well led change management process.

*“Data analysis shows that small businesses with certain CEO characteristics (innovativeness and level of IS knowledge), innovation characteristics (relative advantage, compatibility, and complexity of IS), and organizational characteristics (business size and level of employees' IS knowledge) are more likely to adopt IS. While CEO and innovation characteristics are important determinants of the decision to adopt, they do not affect the extent of IS adoption. The extent of IS adoption is mainly determined by organizational characteristic” (Thong, 1999).*

Parente and Prescott look at technology adoption more broadly across income levels and countries. They use Japanese development to start the conversation and propose “that the technology adoption decision by firms and the barriers to such adoption are often placed in the paths of entrepreneurs” (Parente, 1994, p. 299). The historical economic approach to this assessment produces a model that barriers to moving from one technology to another are significant in knowledge and government spheres. The result is that income disparities in countries with per capita incomes below the worldwide averages are the result of large systemic barriers, not necessarily barriers to usability.

At the macro level it is easy to conceive that this model is accurate, however breaking down the adoption of a specific set of technologies, say medical billing software and tools, within an individual nation, in our case the United States, may illustrate their findings a little deeper. We know that because EDI's targeted users, billing teams that call for claim information have calling as an alternative, the barrier to

adoption is primarily usability and speed. Organizational barriers are limited to change management, and it is not hard to assume that if EDI delivered in the promise of better information more quickly, there would be no business barrier to adoption.

Government adoption barriers barely exist in this scenario as well. The HIPAA 5010 guidelines do not present a technical challenge, and in fact may be so broad that they don't present a content challenge either. The barrier appears to be on the payer side and the ability or willingness to invest in the type of content that is both useful and repeatable as part of an automated response. A response that simply states "claim denied for additional information" does not tell the person investigating the claim too much information. Whereas a response that says, for the same claim, that reads "claim denied, need information on additional insurance coverage" can prompt the provider's representative to call the patient to quickly verify coverage and respond appropriately. Government and income barriers are not the factors delaying adoption in terms of the claim status EDI transactions.

In their prediction of success of application adoption Alpar and Reeves (1990) determine that adoption requires that business implementation without "adequate resources to information systems and basic transaction-oriented systems" (p. 3) adoption of even basic functions is unlikely. There are significant advantages to inserting the claim status transaction early in the review process, prior to the billing team even reviewing the claim. Building priority in the workflow allows callers or those pursuing payment to work only on those claims with a higher probability of relevant progress. If a collector knows that status was updated yesterday, they may save the phone call on the claim today and instead decide to check back in a week. By

systemically categorizing and reviewing the EDI response, and building the associated business rules, a billing office can prevent costly phone calls and review that need not take place.

There are status codes that do not require engagement with the payer, at least at first. For instance the category code A3 tells the provider that the claim was received and status code 0 tells them that electronic status cannot be provided. This may be for a variety of reasons such as the claim is new and has not been adjudicated; perhaps the claim is complex and requires manual intervention. In any event, the billing team could table action this claim for seven days (which might be the response they get on the phone anyway) before picking up the phone and sitting on hold.

Another example, the category code of F3-Finalize/Revised tells the provider that there has been action and the corresponding status code (for example a 101) may tell them that the payment is on the way. For a claim that pays \$30, making a ten dollar phone call to verify that it has been paid can whittle away at the value of follow up over time. Integrating systems as mentioned in the Alpar article can generate useful efficiencies in adoption of the 277 response.

Table 1. BCBSNC Claim Status Guide (Blue Cross Blue Shield of North Carolina, 2011, p. 7)

| Category Codes (507)<br>STC01 (for F2-STC10 and 11 are possible)  | Status Codes (508)<br>STC01-2 (for F2-STC10 and 11 are possible) |
|---|--|
| A1-Acknowledgement/Receipt<br>The claim or encounter has been received. This does not mean that the claim has been accepted for adjudication. | 0-Cannot provide further status electronically.                  |
| A3-Acknowledgement/Not Found<br>The claim/encounter has been rejected and has not been entered into the adjudication system.                  | 0-Cannot provide further status electronically.                  |

Table 1. BCBSNC Claim Status Guide (Blue Cross Blue Shield of North Carolina, 2011, p. 7) (continued)

| Category Codes (507)<br>STC01 (for F2-STC10 and 11 are possible)   | Status Codes (508)<br>STC01-2 (for F2-STC10 and 11 are possible)  |
|--|---|
| A4-Acknowledgement/Not Found<br>The claim/encounter cannot be found in the adjudication system.  | 35-Claim/Encounter cannot be found.   |
| P1-Pending/In Process<br>The claim or encounter is in the adjudication system.   | Can be any of the 508 codes as published by the Washington Publishing Company:<br><a href="http://www.wpc=edi.com">http://www.wpc=edi.com</a> |
| P2-Pending/Payer Review<br>The claim/encounter is suspended and is pending review (e.g. Medical review, repricing third party administrator processing)<br>No action should be taken by the provider upon receiving a P2 response. | Can be any of the 508 codes as published by the Washington Publishing Company:<br><a href="http://www.wpc=edi.com">http://www.wpc=edi.com</a> |
| P3-Pending/Provider Requested Information<br>Medical records are needed or have been requested for the claim.<br>The provider will need to provide additional information.   | Can be any of the 508 codes as published by the Washington Publishing Company:<br><a href="http://www.wpc=edi.com">http://www.wpc=edi.com</a> |

Technology adoption initiatives, at least successful ones, are the result of successful change management, regardless of scope or industry. Through this portion of the literature review, it was not always easy to discern which articles were healthcare related and which were not. This observation alone is an indicator that the adoption of standards and related technology are human, not industry, challenges.

Government policies, like those mentioned by Parente and Prescott, are encouraged by other authors like the National Institute of Health's Hackbarth and Milgate. They contend that "Medicare policies could have an important impact on physician's decision to use clinical information technology" (Hackbarth & Milgate, 2005, p. 1148). While Medicare rates are not necessarily the highest, their claims generally pay quickly and the guidelines are well known and published. The Medicare Payment

Advisory Commission (MedPAC) recommends budget-neutral incentives to ease the adoption of technology. While these proposals usually focus on technology that is closer to care (such as medical records) such incentives could speed the transition from phone calls to online or EDI tools. The challenge in using this approach for administrative processes is that the risk to the provider is cash flow, not just investment. EDI transactions that do not produce results delay payment, sometimes more than 30 days. Delays mean cash flow risk which makes the accounts receivables grow and age and decreases the likelihood of timely payments. Physician compensation in terms of technology adoption depends on the level of care and the clinical result. As long as the provider is incented to reduce costs by transaction, and the reimbursement is paid per service, or fee-for-service, the provider is incented to adopt or change. Capitated plans, plans where a physician is paid to manage the care of a population not by service, may have a less desirable outcome for the patient or medical staff. Analysis has shown that “A shift from fee-for-service to capitation is likely to display undesirable incentives” for clinical investment and adoption (Selder, 2005, p. 928). Perhaps an appropriate incentive would be, if electronic claim status is used, timely filing or response limits would be eliminated, this would still present the risk of delay, but eliminate the risk of non-payment due to timely responses.

Kevin J. Leonard introduces the characteristics that make up the “10 critical dynamics of innovation diffusion” (Leonard, 2004, p. 78):

1. Relative Advantage
2. Trialability
3. Observability

4. Communication channels
5. Homophilous groups (groups with similar characteristics)
6. Pace of innovation/reinvention
7. Norms roles and social networks
8. Opinion leaders
9. Compatibility
10. Infrastructure

Leonard uses a series of stories to illustrate the success factors associated with change management and the adoption of new technology in healthcare. The five stories Leonard uses take us through reflect the adoption lifecycle and illustrate the importance of following through on technology adoption efforts. To some extent, the list consolidates the ten critical dynamics that Cain and Mittman provide into practical examples.

The first story Leonard presents is that of change management and the resistance of physicians to adopt imaging technology. Their resistance is based on process change. Doctors did not check their emails, therefore did not know that their images had arrived. They complained about the “tardiness of results” (Leonard, 2004, p. 76) that more often than not were currently available in their emails. The imaging team resorted to sending CD-ROMs via interoffice mail to the physicians, who learned to look for the special envelopes.

This solution, while a workaround, illustrates the challenge of changing someone’s workflow. The logical assumption of this story would be to better alert the physician, or reward them in some way, to check their emails. The imaging team,

however, chose to avoid the tough change, physician behavior, and instead chose a path of less resistance e.g. the shiny thing: a new envelop. “Quite simply, people hate change” (Leonard, 2004, p. 78) is as truthful of a statement as you can find. There is more to change than an explanation of the solution or identifying the problem. Instead of relying on the doctor, they chose the inanimate object that could not say no, the envelope.

The second example from Leonard was an example of cutting corners on training. He uses an often heard tale of post hole digging to point out the importance of training. In our aggressive business environment we are pushed to do more with less. When it comes to training, the ill effects of that decision can mean a lack of performance relative to the newly implemented technology. Training is more than capability, effective training is about communication. Because of this “no instruction clarification or detail should be considered too small to communicate” (Leonard, 2004, p. 80).

Stakeholder buy in, frequently assumed by many, is Leonard’s third example and for it he uses a healthcare information system. Leaders who had gone along with the business case were suddenly at a loss to identify the value of such an undertaking. Without the strong case for change internalized for this key group of stakeholders, support for the implementation became weak. Once armed with the facts, albeit after nearly derailing the project they “had no trouble in identifying, next steps, priorities and a plan” (Leonard, 2004, p. 80) to deliver the technology.

Story four shares what frequently the most sought is after and overlooked component of change: knowing what has happened vs what you want to achieve. Reporting is rarely easy or cheap, yet even the most experienced change agents can

overlook the importance of getting a comprehensive measurement system in place. The story uses hockey coach's trepidation in using computer printouts to show that old habits die hard. Seeing that the information was not getting into the right hands, developers created more user-friendly outputs that put the decision-making tools in the right hands. Leonard's takeaway was that "momentum must keep going through the adoption cycle" (Leonard, 2004, p. 80) and that may mean tweaks to the output in order to sustain the initial excitement.

The last story used by Leonard was an issue any project manager or business owner fears, bad luck. After months or even years of work, getting a product out the door and in the hands of users always has that one breathless moment. For web developers it may be the page loading, for a mechanic it is the sound of an engine turning over, and for a physician it's the data illustrating a patient is on the road to recovery. Often times what happens with early setbacks or challenges in adoption can fuel innovation and acceptance. In the story used for this article, Leonard address the outbreak of Severe Acute Respiratory Syndrome (SARS) and the need for more patient information with the onset of this disease. Because of the restrictions and quarantines related to the outbreak, physicians were forced to trust remote data, which they had largely dismissed prior to this because of concerns around quality.

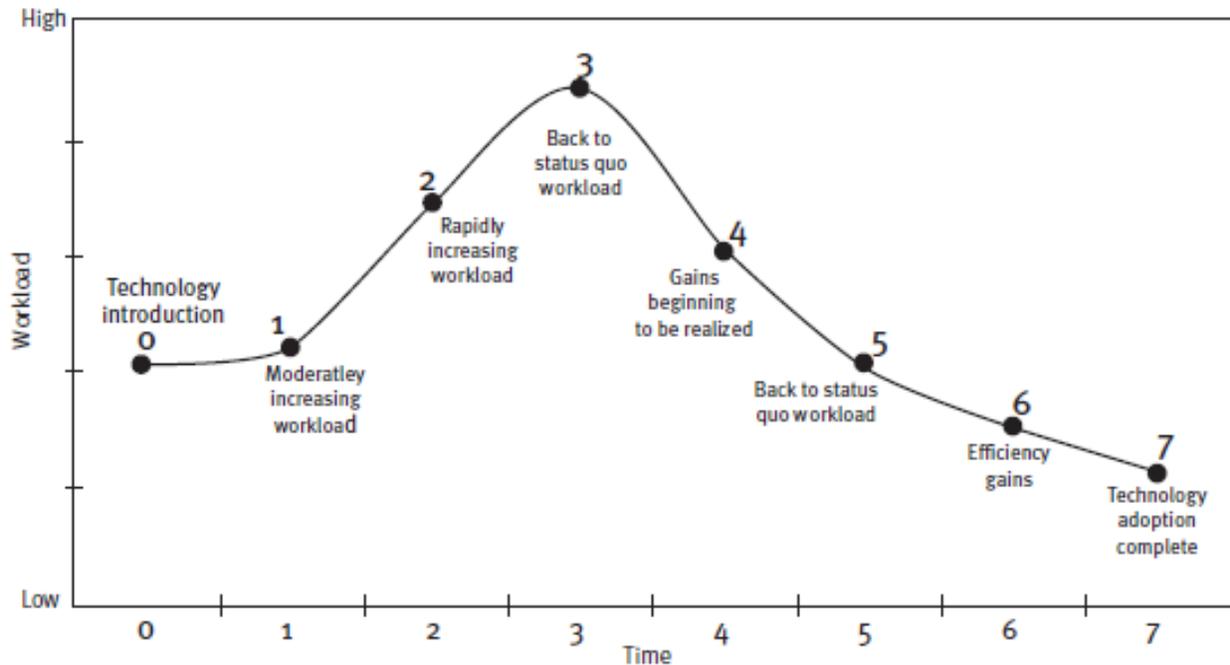


Figure 6. Technology Adoption Curve

The technology adoption curve used and explained by Leonard provides a map for those looking to implement technology. Understanding which part of the curve you are on helps to set expectations across the organization. Many times, step 2, Rapidly Increasing Workload, is where we start to get frustrated and concerned because we are not yet realizing our gains but have increase the workload. Providers looking to utilize payer data must realize that they are engaged in a change process and learning new data sources requires attention to this curve just as any other technology would. The challenge for any organization is to make it all the way to the top, step 3, where the workload impact is negligible, and direct observation of the new technology and process can be assessed. Decisions made prior to this point are essentially using the front portion of the curve as “evidence that the system cannot work” (Leonard, 2004, p. 79).

It appears that Leonard's experience is that adoption efforts generally lack the follow through and buy in necessary to sustain the early excitement about change. The five success factors that he illustrates: change management, training, stakeholder buy in, reporting and dealing with the breaks, contain a succinct framework for establishing an adoption strategy. Technology teams engaged in the EDI platform would be wise to adhere to these findings in order to realize the initial benefits of change throughout the product lifecycle. In addition, garnering the right support from leaders can help break the cycle of "building not-so-effective systems" (Leonard, 2004, p. abstract) for which healthcare has become known.

#### Rework and Cost Reduction

The assumption in most of the literature reviewed is that while there are efficiencies to be gained from a clinical perspective; much of the low hanging fruit, or easily addressed opportunities remain outside the scope of clinical directive, with the possible exception of electronic medical records. Like in any business expenses eat away at profits, and of course, healthcare is no stranger to these challenges. The Center for American progress identifies that "Administrative costs for private insurance plans rose by 117 percent from 2001 to 2010" (Wikler, Basch, & Cutler, 2012, p. 1). The story continues with almost any literature search on the topic of healthcare rework and cost reduction, with estimates in the billions: "Seven hundred billion dollars" (Arnst, 2009, p. 27), "18 percent of healthcare waste (Fox, 2009, para. 11); 11 billion in annual savings for providers if they adopt electronic transactions "outlined in the ACA" (Cutler, Wikler, & Basch, 2012, p. 1876). The recommendations of most publications, whether

privately or publicly funded, are to move towards administrative standards and technology within the practice operation.

Administrative costs are seen as waste and “extremely costly” (Cutler, Wikler, & Basch, 2012, p. 20); however, in her ten recommendations for cutting healthcare costs, Catherine Arnst does not recommend any solutions that involve back end processes (Arnst, 2009, p. 27). This illustrates a theme in the literature. Most recommendations remain at a high level: “simplifying healthcare administrative plans” (Wikler, Bash, & Cutler, 2012, p. 1875) or statements identifying the adoption of new technology within has care has been promoted in a way to reduce costs and increase efficiencies. In a corporate setting “information technology has been linked to productivity growth in a wide variety of sectors, and health information technology (HIT) is a leading example of an innovation with the potential to transform industry-wide productivity” (Agha, 2013, p. 20).

The MGMA surveys medical practices and publishes the results of cost estimates based on administrative work. The 2004 survey found that a physician practices spends 267 hours per year verifying insurance coverage and a total of 787 hours per physician on simple administrative tasks like checking patient eligibility, completing paperwork for credentialing. They estimate that the average 10 physician practice will spend \$247,594 to accommodate this work (MGMA, 2004, Sheet 3).

In his book, *How to Get What We Pay For*, Joe Flower identifies many of the inefficiencies that drive rework. He identifies that “healthcare in the United States is much too complex for any simple paint-by-numbers” (Flower, 2015, p. xvii) approach to costs. Throughout his book, Flower addresses many of the issues that faces patients

and providers. He identifies that patients “are terrible at correctly estimating” their medical risk (Flower, 2015, p. 8) which in turns drives utilization and costs challenges all around.

Flower also shares the economics around pricing in healthcare. He determines that as costs in care rise “it becomes a luxury good, freely accessible only to those who can afford it” (Flower, 2015, p. 9). The concept shared is that complexity breeds cost, not an unusual take today.

One of the drivers of cost is the lack of transparency on prices. Cooper, Craig, Gaynor and Van Reenen reviewed results from multiple health plans across four years. Their research found four characteristics of pricing anomalies in hospital or facility pricing. First, that “healthcare spending on the privately insured varied by a factor of three” across participating hospitals (Cooper, Craign, Gayrnor & Van Reenen, 2015, p. 1). That kind of spending discrepancy raises a red flag regarding the utilization of care. Moreover it brings to question the guidelines agreed upon between the provider and the payer. Hospitals use guidelines to “help identify and reduce variances from best practice, and to document appropriate evidence-based levels of care to improve care quality and efficiency” (FierceHealthcare, 2010, para. 3). These guidelines can come from a variety of sources; however there are two primary, standard hospital guidelines: Milliman and InterQual.

The Milliman guidelines are the product of what was once an actuarial consulting practice in the late 1940s. After a series of acquisitions and years of growth, the company began a foray into healthcare as “insurance companies had become increasingly dependent upon actuarial outsourcing firms, which, as a result, were

growing at double-digit rates (Milliman USA History, 2004, para. 8). The guidelines, or best practices, for care were established for healthcare and managed care companies began to institute them as part of their contractual and reimbursement strategies claim. Physicians fought the standardization of care claiming that “the guidelines had no basis in sound medical practice” (Milliman USA History, 2004, para. 15). The guidelines remain in high use and debate even today.

InterQual has a different history although rooted in the same need to identify standards for care that increase quality and predictability. Clearly even a simple review of modern healthcare today illustrates that the “healthcare puzzle sometimes seems too complicated for anyone to solve; passionate people with good ideas have been able to effect substantive and relatively rapid change” (Mitus, 2008, p. 229). Nurse Joanne Lamprey is just such a historical figure. She, and other nurses, noticed in that “Medicare began issuing retrospective payment denials with greater frequency as inappropriate services were increasingly identified, leaving patients responsible for the bills” (Mitus, 2008, p. 230). After relatively tepid results in pushing clinical standards, she partnered with Charles Jacobs and launched a clinically driven model that gained wide acceptance and usage in the 1980s.

Commercial payers must determine the clinical guideline that they will follow when determining benefits. Hospitals, and their physicians, understand these guidelines, however want to maintain independence as care givers and follow the path that their clinical results lead them. This disconnect, between accepted best practices and clinical realities, can result in denials, appeals, phone calls and ultimately lost revenue for the facility. Here is an example. The Milliman guideline for a hospital stay

for a normal birth with no complications is one day. For babies that require additional care they may be assigned to the NICU, or Neonatal Intensive Care Unit. The days in the hospital allowed by the Milliman guidelines will differ based on factors like the baby's birth weight, conditions of the mother, or other areas of concern (Kaiser Permanente, 2013, p. 6). For this illustration, let's assume the baby remains in the hospital for three days. The claim that is submitted, if not coded with the additional information, will fail against the one day guideline. The payer will ask the provider for additional medical information to justify the additional level of care. Once the medical records are supplied and reviewed, and the reviewer determines that the medical necessity of the care matches the billed service, the claim is paid. The challenge starts when that denial does not have the information the provider needs to share. Without a specific explanation, the payer and the provider might take weeks swapping the incorrect information back and forth. This drives up the administrative costs and does nothing to add to the value of care. Misalignment on the amount to be paid and the level of care identified in the Cooper study may cause additional issues. Does one hospital have a higher utilization of NICU services than another and if so why? Are there a higher level of at risk births or unhealthy babies at one facility? These are questions that prompt additional research and administrative cost.

Hospitals and their physicians may argue which standard, if any, is relevant for payment, however clinicians and administrators generally agree that "What matters is that hospitals use an evidence-based screening tool that's accepted by the medical staff" (Zebrowitz, 2010, p. 1) in order to document and support requests for additional information from payers. An organization with strong processes that runs into changes

in care mid-flight, can usually make the case that “it is reasonable to assume that the provider could not have been expected to have known that the services were excluded from coverage at the time they were delivered” (Zebrowitz, 2010, p. 1). Hospitals that emphasize documentation and the rigor of medicine will fare well when presenting their case for reimbursement. University of Texas Science Center counsels their staff to “be attentive to written documentation, and recognize that good documentation not only improves care, but also improves the ability of MSRDP/UTP to collect for services” (Billing and Documentation Guidelines, 2011, p. 20). In order to align with the payers for the best possible reimbursement.

The second factor identified in the Cooper study was a high variation in the prices per patient. For commercial, or private, plans these prices varied within the plans themselves with some plans paying better or worse than others. For Medicare prices remain the same, however “the quantity of care provided across HRRs is the primary driver of Medicare spending variation” (Cooper, Cragin, Gaynor, & Van Reenen, 2015, p. 1). Again, utilization differences between hospitals appeared to be the cause of variation between hospitals regardless of insurance plan type.

When looking at specific services the Cooper study found seven examples of procedures with high levels of variation. For instance, they showed that “hospital prices for lower-limb MRIs vary by a factor of twelve across the nation and, on average, two-fold within HRRs” (Cooper, Cragin, Gaynor, & Van Reenen, 2015, p. 1). Consider that in this case an MRI on your leg might cost you \$100 in Kansas City, and \$1200 in Detroit. These shifts in pricing can be accounted for by many factors including the profile of the physician or facility, the internal costs associated with the procedure, the

health plan's allowable payment and the hospital or physician's contract with payers. Assuming that these prices were billed and paid as agreed between the provider and payer, in other words, per contract, there is no reason to think that a high payment would result in administrative work and may not even be noticed as long as the fee schedule of the facility matches the allowable loaded in the payer system.

Finally, the Cooper study confirmed what might be an obvious pricing outcome. Facilities that had market power were able to price aggressively (Cooper, Craign, Gaynor, & Van Reenen, 2015, p. 1). Market power can be defined a number of ways. A geographic advantage may mean that a facility is the only game in town, or region. If a patient needs care, they will need to use the regional facility unless they want to travel. Another type of power is network power. As payers work with employers, large employers may ask for a limited network in exchange for cost advantages. In this scenario there may be many facilities in the region, however the major employer for the region only has one of them in network. In order to maximize their benefits, patients would tend to go where they get the most coverage. Lastly, specialty power, providing a service or access to a specialty that is not readily available at other facilities can be a tremendous advantage, especially for providers specializing in surgery or oncology care which can be very expensive. The research provided by Cooper, Craign, Gaynor and Van Reenen illustrates how seemingly unrelated market and clinical conditions can impact rework and put particular pressure on communication between the payer and provider billing team.

Cutler, Wikler, and Basch produced the most useful and thorough discussion around administrative simplification in the new ACA world. They call out a few specific

actions relating specifically to this research. Number one, the need to increase the detail provided through electronic transactions including claims status and making that a mandate rather than just a recommendation. The second was integrating the “clinical and administrative information within electronic medical records” (American progress, WBC, 2012) which would eliminate request for information, a frequent reason for claim status calls.

Between 1999 and 2009 health insurance premiums rose 131% with estimates that “premiums will go up another 166% in the decade ahead” (Tuttle, 2009, para. 1). This significant change was rightfully causing concern for consumers of healthcare as “unsurprisingly, employers will be passing along the most recent rises in premiums to their employees” (Tuttle, 2009, para. 4). The consumer is in a tough spot and certainly behind the learning curve. The National Bureau of Economic Research found that despite the financial incentive they found “no evidence of consumers learning to price shop after two years in high-deductible coverage” and “consumers reduce quantities across the spectrum of healthcare services, including potentially valuable care” (Brot-Goldberg, Chandra, Handel, & Kolstad, 2015, para. 1). Grace-Marie Turner in the Wall Street Journal concluded that the current system “does not provide meaningful incentives for innovation, cost efficiency or higher-quality, consumer friendly healthcare” (Quincy & Turner, 2016, para. 16).

The anticipated increase has prompted a series of literary works aimed at addressing problems within the U.S. healthcare system including costs. Most of these works are in the form of a 200+ page book that identifies issues across the care spectrum from billing and technology challenges to utilization and coverage and plan

design opportunities. These books are sometimes written by physicians, but also by industry veterans to whose expertise appears to align more with systems and process thinking. The researcher has selected books to add to this review based on their prominence in rating with Amazon and the diversity of their authorship. This sampling of literature includes physician as well as industry observer and expert backgrounds, first and second editions and publishers from academia as well as commercial ventures. The first book in this review was *How to get what we pay for* by Joe Flower. The book was an easy read and well organized. The book covers the current healthcare system and focuses on the breakdowns that impact both cost and quality. The author frequently refers to the quest for an improved system as a revolution with statements like “consumers do not trust the healthcare system and do not feel they have any real consumer power” (Flower, 2015, p. 136). The author uses the concept of Next Healthcare as a somewhat utopian state that exists at some time in the future where physician incentives are aligned with health as opposed to fee for service quantification and patients only utilize what they actually need based on excellent data. The organization of the concepts leads the reader on the path to this utopia with clear explanations of current challenges like drug price distortion and poorly designed reimbursement models. Each of these concepts receives its own chapter complete with text book like questions that the reader can consider throughout the section.

Flower addresses cost from a few different angles. The case against excessive costs includes statements like “when healthcare costs too much, it becomes a luxury good, freely accessible to only those who can afford it (Flower, 2015, p. 9). However the book was lighter on scare tactics and heavier on solutions, if only high level, than

this statement may indicate. One of the important concepts that this book identifies was the need for cost containment and the difference between a traditional cost accounting method versus as a care accounting model that takes outcomes into consideration. The best example was of the use of DRG's. While the original intent may have been simplicity, Flower identifies that the DRG covers just the hospital cost and not the cost of specialists, tests, or materials, all of which are billed separately. As a result, "the DRG did not give anything the ability to guess how much the total cost of anything would be (Flower, 2015, p. 24). Because the DRG only covers a portion of the cost of care, Flower explains, the cost per unit (DRG or hospital cost) may be controlled, but the cost of care (all inclusive) was not measured, unless if you are diligent and knowledgeable as a patient and care about that number (which you should). This cost distortion leads to inefficiencies which increases system costs all over.

In addition to addressing some of the history around poor cost controls, the author reviews some behavioral contributors, even coming up with "Joe Flower's Three Laws of Behavioral Economics". The laws outline the challenges in our incentive system and are worth noting as part of this assessment because of their potentially universal application to technology adoption or even capital investment. The first law "People do what you pay them to do" essentially drives as the fee for service reimbursement system that compensates physicians on quantity not quality. The second law: "People to exactly what you pay them to do" was again an emphasis on the physician's interest in moving patients through their office quickly. Third and final law: "The populations of individuals trying to decide whether to have a third drink consists

exclusively of people who have already had two drinks” (Flower, 2015, p. 24) needs a bit more explanation.

Joe Flower’s third law of behavioral economics challenges the established healthcare leadership, in a broad sense, to think differently. In other words we are asking a lot for those who have developed the current system to design and develop a new one. The healthcare system, in order to approach New Health Care, needs different thinking. That thinking includes health plan design which was covered in the second half of the book. For all the posturing and folksy approach to analyzing our current system, Flower’s solution resides with a near perfect execution of the Patient Centered Medical Home (PCMH) and a version of an Accountable Care Organization (ACO).

The book does an effective job of discerning the staff physician’s challenges from the independent physician and offers limited solutions for both agreeing that even while “agreeing to lower fee-for-service prices, the providers cannot truly promise lower actual costs” (Flower, 2015, p. 133) because of the interdependencies of care. The current system “payers and providers playing the Default Model are delivering an unreliable, unguaranteed, financially and medically dangerous product to their real customers - the large purchasers and consumers of healthcare” (Flower, 2015, p. 133). This was where the concept of a healthcare revolution comes back into play. Flower recommends high level actions like coordinating with other providers to leverage buying and negotiating power to restructure contracts based on a loose concept of better care performance.

Flower concludes with a strong value statement that supports all of the previous points and concepts and encourages the reader to take action. He says that “The

largest cost-saving opportunity in our entire nation is not in cutting the military budget, or foreign aid, or food stamps. It is in preventing, managing, and treating chronic disease” (Flower, 2015, p. 149). While appropriate for the title of the book and the theme of the writing, there is little data to support what the terms manage chronic disease means and specifically where that savings comes from. Therein lays the challenge that the researcher found with each book in this category, a compelling accounting of costs and how they would be eliminated.

Adoption remains something of a holy grail in healthcare technology. In their article presented at the 2014 47<sup>th</sup> Hawaii International Conference on System Sciences, Khoubati, Themistocleous and Irani make the argument that the integration of systems was the key to adoption through Enterprise Application Integration (EAI). They claim that “EAI has emerged to provide significant benefits to organizations” (Khoubati, Themistocleous, & Irani, 2014, p. 149a). Certainly any and every system integration effort, when executed effectively, is going to boost the user adoption required. However the work flow that users have, and the information they are looking for, are they primary drivers of adoption in the claim rework scenario. Their article acknowledges that “Healthcare organisations continue to struggle with integration challenges” (Khoubati, Themistocleous, & Irani, 2014, p. 149a) which was a consistent theme throughout all, if not most of the literature.

There are other opportunities for cost savings within a healthcare organization and many times provider may choose other options to invest their time and resources. This was not to say that reducing rework to save costs was not a viable solution. Huron consultants identify ten opportunities to reduce costs (Herman, 2013):

- HR benefits
- Purchased services
- Staffing to demand
- Front end revenue cycle
- 340B drug program
- Linen supply cost
- Physician offices
- Clinical operations efficiency
- Reprocessing of single use devices
- Blood management

Of all the proposed solutions, only one potentially uses rework level technology, the front end revenue cycle. The 5010 regulation offers a solution to verify eligibility through an EDI transaction. The 270 request and 271 response completes an eligibility check between participating and technologically prepared payers and providers. Other front end recommendations include “point-of-service collections, insurance verification, financial counseling and healthcare access” (Herman, 2013). A look back at figure 1, the claims processing workflow illustrates the importance of getting information accurate and timely in order to expect accurate and timely payments and a consistent revenue stream.

### Healthcare and the 5010 Regulation

When authors and researchers dig into the cost savings opportunities of administrative expense reduction, we start to find alignment on the value of standards

that include detailed descriptions of the solution. Routinely healthcare transactions are compared to banking transactions. “Standardization is a central factor in reducing administrative costs” (Cutler, Wikler, & Basch, 2012, p. 2). Other authors are taking that standardization one step further, and identifying the need to improve responses: “information provided in the electronic eligibility transaction varies among payers. Often providers get a simple “yes” or “no” response but what they really need is actionable information at the point of service” (Center for Health Transformation, 2009). Industry white papers make the case for adoption of the 5010 transactions, however primarily as a way to comply with the regulation and avoid cash flow interruptions during implementation. Part of this, invariably, will require the help of a specialist or consultant. But in addition it will require engagement in testing with each of their trading partners.

Researchers have found that “the expansion of health IT in the health care system is worthwhile” and that as “President Obama and Congress envisioned that the HITECH Act would provide benefits in the form of lower costs” the verdict may be out on the end result, but the initial findings are encouraging (Buntin, Burke, Hoaglin, & Blumenthal, 2011, p. 465)

The most useful literature with respect to this research and the 5010 requirements is the Federal Register published in 2011 by the Department of Health and Human Services (HHS). This register outlines the requirements, not just the theory, for meeting the regulation. Also present are small descriptions of the potential gaps in the existing policy. The regulations state that “the flexibility in the standards permit each health plan to use the transactions in very different ways, which remains an obstacle to

achieve greater healthcare industry administrative simplification” (Berwick & Sebelius. 2011, p. 40459).

The literature also explains the development of the standards and the relationship to the potentially punitive measures of non-compliance, indicating the health plans must file certification statements and proof of end-to-end testing to the CORE (Committee on Operating Rules for information Exchange). While CORE is the certification body today, “HHS is not requiring compliance with any operating rule requirements” (CAQH, 2016, para. 5), which puts the industry in an interesting position. The regulations are published and compliance with the production of the uniform standards is required. However adoption or use of the technology is allowing the payers and providers to determine what is practical as well as achievable. CORE is managed through the CAQH and “CAQH CORE was selected by HHS as the authoring entity for the first set of Federally mandated operating rules for the eligibility and claim status transactions” (CAQH, 2016, para. 7), These are aimed at providing a more robust, secure, and consistent eligibility, benefit inquiry, and claim status transactions. CAQH describes itself as a “not-for-profit collaborative alliance of the health plans and networks” in the United states” (Blue Cross Blue Shield, 2016, para. 1). Within the CORE’s guiding principles, you find that participation in CORE does not commit and organization to adoption the resulting CORE Operating Rules non-binding.

## EDI in Healthcare

EDI technology has passed its maturity and, to some extent, has lost some of the shine we assign to interactive internet or mobile technologies. However, over the past

twenty years, opinions and research have developed to promote the use of the relatively inexpensive and easy-to-use transaction platform, especially in healthcare. Much of the interest in EDI for healthcare is fostered through the cost saving opportunity of cheap transactions. In 1993, the industry group WEDI (Workgroup on Electronic Data Interchange) published that “a six year implementation project could save \$42 billion by 2000” across the healthcare industry (Schaich, 1993, p. 20). This proclamation supported the launch of EDI as a cost saving tool calls for specific transactions to be automated that “include enrollment, claims submissions, and payment along with other healthcare operations” (Schaich, 1993, p. 20).

As an understanding of the potential for efficiencies to be gained through using EDI transactions, interest developed to gain additional information about the types of transactions and regulations. James J. Moynihan authored a number of articles regarding claim payment processes including the development of EDI standards. Statements like “when the history of healthcare reform is written, 1993 will be remembered as a milestone in the way healthcare providers and payers process medical claims” (Moynihan, 1993, para. 1) illustrate his focus on the impact that standards and technology would have on health insurance transactions. Yet even this early in the development of EDI standards Moynihan determines that “The most critical issue facing EDI was not one of technology; it was one of leadership. The technology exists to slash administrative costs and eliminate the inefficiencies of information recorded on paper, but standards are needed to exchange information electronically” (Moynihan, 1993, para. 6). This understanding sets the table for future discussion regarding implementation.

The Journal Healthcare Financial Management dedicates a significant amount of space to Moynihan who takes the lead in discussing the detailed opportunities that EDI in healthcare present. Much of his writing is spent setting the table to make the case for EDI adoption as a cost saving tool. Acknowledging that “if accurate insurance coverage information is given to providers before medical treatment is rendered, chances are good that providers will be paid for services rendered” (Moynihan, 1995, para. 1). However, in the scenarios in which that does not happen provider “staff members can only ‘triage’ potential credit risk” (Moynihan, 1995, para. 2) putting themselves at risk financially.

Continuing the presentation of ideas and research on the benefits of healthcare EDI in healthcare, authors state that other transactions, even outside of claims processes, have value. In shipping or logistics, “hospitals can realize the benefits of automated receiving” (Moynihan, 1999, para. 2). Business processes and results are considered proprietary and measuring them in a vacuum can be misleading. Study limitations include the idea that “a single context-hospital supply chains-and extended results to similar context appears inappropriate” (Hausman & Stock, 2003, p. 683).

A series of brief case studies and articles demonstrate the increasing cost efficiency and opportunities of EDI adoption. Invoicing or the replacement of paper invoices, “eliminates massive amounts of work” (Moynihan, 1997, p. 1) with results like eliminating data entry off of paper forms. Scale, as always with these routine transactions, was important. A smaller practice or health system may see benefits if they are part of a hub and spoke system that enables them to take advantage of the investments of other firms.

These systems “have adopted EDI because a major trading partner, known as a ‘hub’, required that they exchange documents electronically” (Moynihan, 1995, p. 1). These hubs start the critical mass ball rolling by achieving greater participation than they alone can impact. The larger the system, the greater the reward. Systems “a relatively small investment to support EDI transactions with one or two key distributors can eliminate enormous amounts of paper” (Moynihan, 1997, p. 90). While one would not argue that scalability in transaction processing was certainly advantageous and that as an industry increases support for standards, those standards become more prevalent. What was missing, however, was a determination as to whether the cost of implementing a new purchasing and invoice system has a significant return on investment relative to the jobs displaced.

There are additional considerations regarding the impact of EDI transactions in business over the late 1990’s. The decision to centralize transaction functions can have EDI “as a catalyst for financial managers to make such decisions” (Moynihan, 1995, p. 1). In “To Centralize or Decentralize” Moynihan describes EDI again as an agent of process change potentially “revising current cash management practice and overall bank relations” (Moynihan, 1995, p. 1). Reporting is another function that has potential impact. Again, the theme of the material “the use of EDI standards to transmit eligibility data could be a major improvement in the way payers and providers do business” (Moynihan, 1997, p. 2) was supported with logic and process explanation, yet misses tangible results that can be evaluated. Security concerns regarding either the HIPAA regulations or simple personal concerns can be addressed with secure transactions. HHS regulations were proposed in 1998, after consideration that existing processes

within healthcare are “inadequate for the maintenance of patient confidentiality” (Moynihan, 1999, p. 57).

Again, leading the charge in the concept of using EDI administratively in healthcare, Moynihan continues with articles that specifically address cost providing some explanation for using automated systems to execute simple error free transactions. Pushing EDI invoice for utility savings was really a play on analysis, stating “such activities as comparing bills against different rate schedules and tracking bills from different facilities are labor-intensive” (Moynihan, 1998, p. 78). While this may be true, but towards the end of the article, it was clear that real savings in utility costs will come externally from if “deregulation of the energy industry should act as a catalyst to focusing on cutting utility costs” (Moynihan, 1998, p. 78).

This was the theme and routine of articles published on EDI which are somewhat promotional, certainly informative and thought provoking, yet lacking some empirical evidence of result. In one article touting the eligibility transaction, examples of adopters are identified as needing “an immediate, real-time response during the registration process” (Moynihan, 1997, para. 7). However, in terms of security or confidentiality the author does identify that when “messages are authenticated through message authentication codes (MAC) sent with electronic data interchange (EDI)” risks can be managed effectively (Moynihan, 1996, p. 1). In order to manage the security and quality of the transactions, edits, or quality control tests, are applied to the files. The receivables or “patient accounting department is probably most aware of the importance of edits because quality outgoing claims substantially can reduce days in accounts receivable” (Moynihan, 1995, p. 94). Those accounting functions rely on accuracy and

consistency. Receiving information by itself was not enough, the “requirement for EDI savvy software was the automated processing of information uploaded in an interface” (Moynihan, 1998, para. 5) that can be analyzed and managed.

These points of the literature are very helpful. We can certainly support the need for standards and simplicity; however, it was important to understand how the data will be used and where the value resides within the process. However, when the technology of the early to mid-1990s met the HIPAA regulations, the opportunity to take advantage of EDI as an effective information technology started to become a reality. In his article “The administrative cost of healthcare: 1997 and beyond” James Moynihan states the case for not only adopting standards which came to be with the signing of HIPAA, but also where the future of the burden of administrative cost would be managed. By identifying that “providers should choose an information system that supports EDI claim transactions and provides interfaces for X12 standard transactions” his call to arms of sorts was for a systemic, not product, approach. In 1995 Moynihan identified the turning point from proprietary to industry standards determining that the result would “shorten implementation timelines” and “eliminate time spent file testing” (Moynihan, 1995, p. 94). He concedes that “penalties may motivate some changes” but also the goal to “restore healthy margins” from a business perspective needs to be part of the strategy. Regardless, Moynihan sees EDI’s impact in cost reduction. His belief that EDI adoption improves “both external and internal information exchanges makes the claims process more efficient and less expensive” (Moynihan, 1993, p. 48). Industry articles support this need for automation and standardization as well, stating broadly that “automating functions can minimize traditionally labor-driven expense” (Sederstrom,

2013, para. 21), yet the dollars associated with those savings do not necessarily appear in the materials. Business processes and results are considered proprietary and measuring them in a vacuum can be misleading. Study limitations include the idea that “a single context-hospital supply chains-and extended results to similar context appears inappropriate” (Hausman & Stock, 2003, p. 684).

The primary source of rework addressed in this dissertation is the lack of communication between payers and providers regarding claim status. The literature shows that the attempts to close the gap in this communication may be focused on the right areas, however in many ways lack the teeth required to drive changes industrywide.

## CHAPTER III

### METHODOLOGY

#### Conceptual Model

The researcher used a conceptual framework based on the interaction between payer and provider to determine the status of a claim. Phone calls from the provider to the payer indicate a need for clarification and information. There are a number of reasons that a provider might call a payer, however the researcher selected calls defined by the payer phone team as claim status because that most closely aligns with the purpose of the 276 requests and 277 response and rework. Calls were received by the payer and coded by the telephone representative as to the reason for calling. Call volumes were measured through the payer call systems, recording the TIN, call type and specifics about the call and information about the provider. The data is population data; all claim status calls for these TINs are counted in the data set.

#### Criteria for Selection

The data used for this analysis was comprised of a purposive sample of providers that were contracted with the large payer providing call and claim data, both hospitals and medical groups that had met the following criteria.

Providers that were included in the sample made phone calls requesting claim status over a period of 12 months. These criteria yielded 5117 providers. In order to ensure sufficient volumes, providers that had submitted less than 50 claims per month during the 12 month evaluation period were eliminated from the evaluation reducing the population to 1917 providers. In order to ensure that providers were aware of the

opportunity to use EDI, the criteria of self-identification was added. Providers that did not identify themselves to the payer's network management team as planning to implement the EDI transaction for claim status were eliminated. This dropped the population to 321.

In order to avoid duplication of effort, or providers that were part of the same health system, and therefore not acting independently from another provider in the measurement, the population was dropped to 105 providers.

#### Description of Sample Size

The researcher chose a 95% confidence level with a margin of error of +/- 10% which would require a 94 provider sample based on the initial population of 5117 candidates. The 105 providers used in the study meet the requirement for these sampling parameters. Data for all of the 105 providers was pulled from the same reporting system.

#### Description of the Sample

As part of administrative simplification initiatives within the payer community, the payer used in our study conducted a number of information sessions and open discussions with their contracted providers regarding administrative cost reduction. One of the methods proposed was through the adoption of EDI transactions.

Implementation and of these transactions was voluntary. Providers were able to implement all, or a portion, of the recommended administrative cost cutting solutions. From the providers evaluated in this study (n=105) only 47 of them followed through on the final implementation and sustained use of the EDI 276 and 277 transaction for more

than 6 months. The remaining 58 identified themselves as using the transactions, yet were not able to meet the timeline in this study and did not complete a full six months of use before abandoning the use of the transaction or determined not to implement the transaction at all.

For those providers that did implement the transactions successfully, data was captured on call and claim volume for the six months prior to their implementation and the six months following the implementation. To reduce some of the bias in the trend data, the ratio of calls per 1000 claims was used to evaluate the data between the pre and post time periods. For those that did not implement in the study timeframe, the month that they had originally targeted for implementation was used. Not all implementations happened on the same day or even in the same month, so the calendaring of the implementation was not consistent amongst providers; however, November, December, and January did not have any implementations. The date range for pulling data begins as early as January 2011 and end as late as December 2013.

### Research Questions

This study seeks to answer these three main research questions:

1. What effect does the implementation of the claim status EDI transaction have on call volumes between the payer and provider?
2. Does the provider organization type impact the success of using EDI to reduce calls associated with claim status?
3. Is there an association between the state that the provider is located and the success in reducing calls by implementing the claims status transactions?

## Hypotheses

### *Hypothesis One-Call Volumes*

*H<sub>01</sub>: C<sub>before</sub>-C<sub>after</sub> ≠ 0. There is not a statistically significant difference in the call volumes for providers after the implementation of the 276/277 EDI transaction.*

*H<sub>a1</sub> C<sub>before</sub>-C<sub>after</sub> = 0. There is a statistically significant difference in the call volumes for providers after the implementation of the 276/277 EDI transaction.*

### *Hypothesis Two-Provider Types*

*H<sub>02</sub>: (H<sub>before</sub>-H<sub>after</sub>)-(P<sub>before</sub>-P<sub>after</sub>) ≠ 0. There is not a statistically significant difference in the call volumes for providers after the implementation of the 276/277 EDI transaction based on whether they are hospitals or physician groups.*

*H<sub>a2</sub>: (H<sub>before</sub>-H<sub>after</sub>)-(P<sub>before</sub>-P<sub>after</sub>) = 0. There is a statistically significant difference in the call volumes for providers after the implementation of the 276/277 EDI transaction based on whether they are hospitals or physician groups.*

### *Hypothesis Three-States*

*H<sub>03</sub>: S<sub>before</sub>-S<sub>after</sub> ≠ 0. There is not a statistically significant difference in the call volumes for providers after the implementation of the 276/277 EDI transaction based on their state.*

*H<sub>a3</sub>: S<sub>before</sub>-S<sub>after</sub> = 0. There is a statistically significant difference in the call volumes for providers after the implementation of the 276/277 EDI transaction based on their state.*

## Design and Procedure

The research was a longitudinal study with quasi-experimental call data from a single national health insurer for providers where it could be determined that they had implemented the claims status transaction and call data was available both before and after the implementation for at least six months prior and six months after. The decision to define the research as quasi-experimental is due to the fact that as researchers we “often cannot know when or to whom to expose the experimental treatment” (Cooper & Schindler, 2008, p. 262), which in this case is the facilities and medical groups that elected to implement the EDI transactions as a method for gaining information regarding the status of a claim.

The study used stratified purposeful sampling to select providers from different states with different practice types. The study extracted call and claim volumes from the payer reporting system for years between 2011 and 2012. The study categorized calls as claim status calls using the payer definition found in the call process through their reporting systems (Figure 7). The payer representative receiving the call records the purpose prior to moving on to their next task and following the end of the phone call.

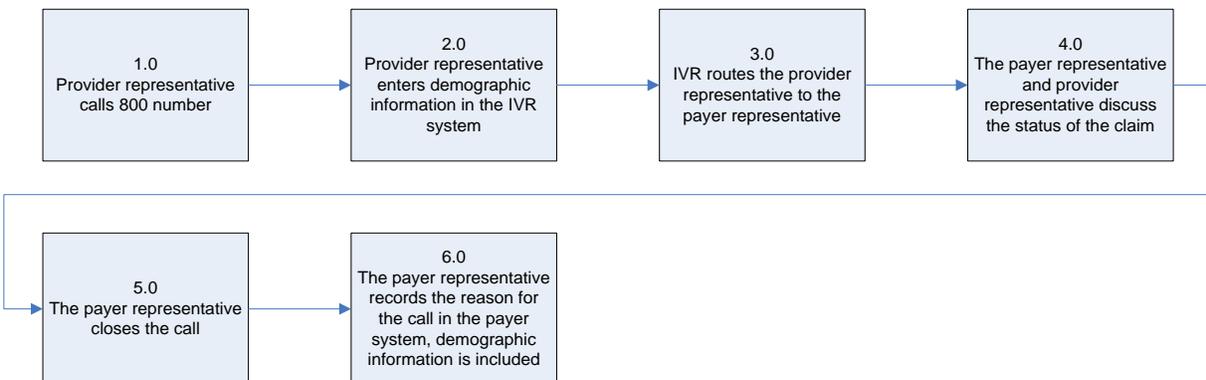


Figure 7. Provider Follow Up Process

The study ties the provider call volume to the provider, using the provider's Tax Identification Number (TIN). The TINs were used to identify the provider type and state in the payer's provider record system. The state was determined by the primary billing address of the provider where the provider practiced in multiple states. Large providers, those that billed more than one thousand claims per month, were used in this sample because of the resources required to support EDI technology. In addition, many small providers use third party vendors for billing, denial management and the researcher has no visibility as to when those organizations were using some or all of the available EDI transactions. Vendors and third parties do introduce some potential variation and noise to the call volume numbers because they are compensated for collections and the administrative rework of phone calls was not entirely borne by the provider. Large providers primarily utilize their employees to collect on denials and under pays (payments that are below the expected value), meaning they have a vested interest in reducing administrative expense because those savings are realized directly within their organizations.

The study includes a total of 105 TINs (n=105) across 23 states, 77 hospital systems and 28 physician practices. Claim volumes for these entities range from 50 to 32,917 per month. Monthly call volumes range from zero to 467. The researcher selected a 12 month period from January 2011 through December 2013 and data was collected for each TIN for the six months prior to their implementation of the transactions and the six months following implementation. The monthly call volumes were aggregated to align the pre and post months. Call and claim data was normally distributed. Standard two sample t-tests were used to test hypothesis. In order to

reduce risk or seasonality and some of the noise in the data, the ratio of calls per 1000 claims was used as the measure for final determination of hypothesis outcome.

The study collected the following information from the provider records.

Table 2. Variable Table

| Variable Name          | Variable Name Description and Operational definition   | Dependent or Independent? |
|------------------------|--|---------------------------|
| TIN                    | Nominal categorical variable.<br>Tax Identification Number (blind in the final analysis) a series of numbers that is unique to each provider   | Independent               |
| Name                   | Provider name (blind in the final analysis)  | Independent               |
| State                  | State of the provider's primary billing address  | Independent               |
| Claims                 | The total number of claims submitted each month  | Dependent                 |
| Calls                  | The total number of calls for claim status from the provider to the payer each month   | Dependent                 |
| Calls per 1000 claims  | Continuous quantitative ratio variable.<br>A calculation of the ratio of calls per 1000 claims by month  | Independent               |
| Provider type          | Nominal categorical variable.<br>Provider type has three potential values: (physician, ancillary or hospital)  | Independent               |
| Month                  | Nominal categorical variable.<br>Implementation month of the transaction (self-identified by the provider) with twelve potential values (Month 1, Month 2, etc.)                       | Independent               |
| Implementation grouper | Nominal categorical variable.<br>One of two potential values, Y or N to identify whether a provider had (Y) or had not (N) successfully implement the EDI transaction for claim status | Independent               |

## CHAPTER IV

### RESULTS

It is important to note that the transaction content and structure are non-negotiable per the regulation. Providers that were identified as not implementing the claim status transaction decided not to integrate that information into their claim status workflow. For those 47 providers that did implement the transaction into their workflow, one way to look at the call data was to measure total call volume both before and after the implementation of the EDI transactions (Figure 8). This provides an immediate picture of administrative burden in terms of total call volumes.

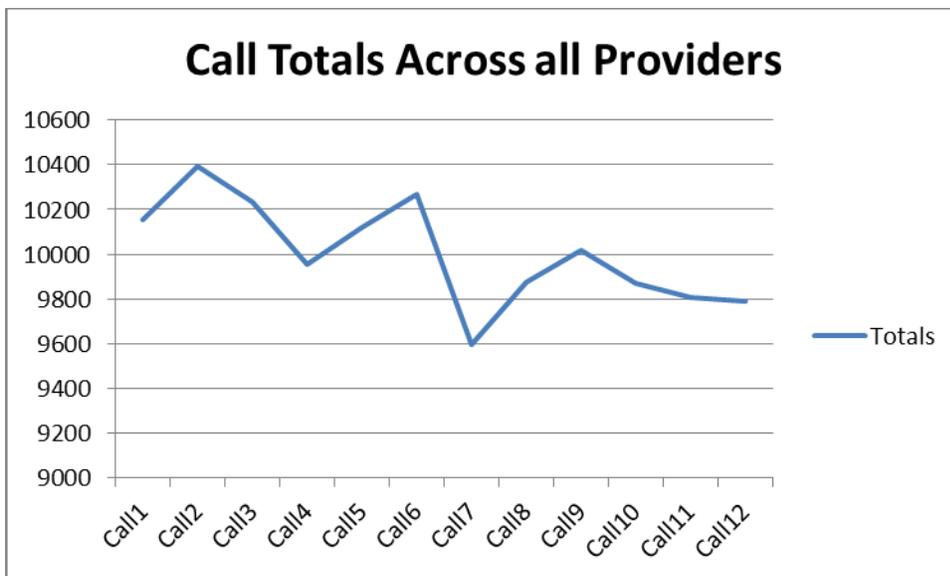


Figure 8. Call Totals Across all Providers

A second way was to adjust the call volume for claim volume. A reduction in the number of claim submissions will naturally require less follow up, and the opposite was also true. You can see from the difference in these trend lines the need to use the calls per 1000 claims measure to provide a measure of standardization.

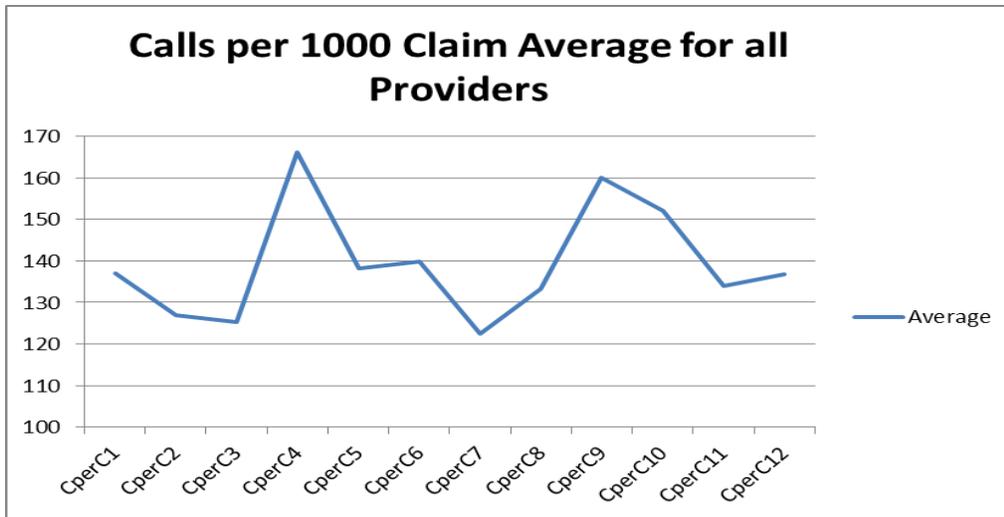


Figure 9. Calls per 1000 Claim Average for all Providers

In assessing the normality of data, it was found that the call volumes were distributed normally for the years 2010, 2011, and 2012. All testing was completed using SSA v4.0 add on for Excel 2010. With p values of greater than .05 for each of the tests (total calls, total claims and calls per 1000 calls), the researcher concluded that the data was normally distributed. The figure below provides the results of the normality test:

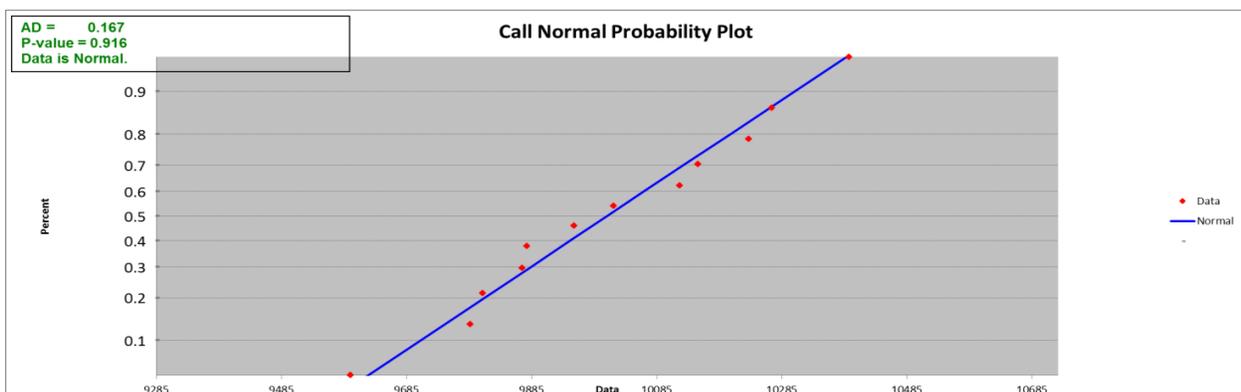


Figure 10. Call Normality Test

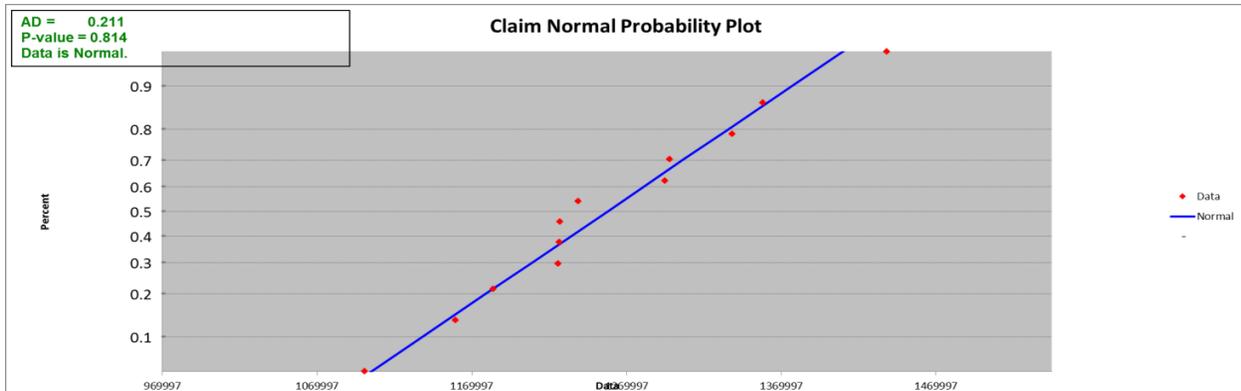


Figure 11. Claim Normality Test

Table 3. Statistical Results

| Test  | Result          | Conclusion   |
|---|-----------------|--|
| Test for normality total calls  | P value - .961  | Data was normal  |
| Test for normality total claims   | P value = .814  | Data was normal  |
| Test for normality average calls per 1000 claims  | P value = .150  | Data was normal  |
| t-test total call volume (6 months prior to implementation vs 6 months post implementation) all providers | P value = .0020 | There was a difference between pre- and post- implementation             |
| t-test for average Calls per 1000 claims all payers   | P value = .921  | There was no difference between pre- and post- implementation            |
| t-test total call volume for providers that implemented the transaction only                              | P value = .108  | There was no difference between pre- and post- implementation            |
| t-test total Calls per 1000 claims for providers that implemented the transaction only                    | P value = .991  | There was no difference between pre- and post- implementation            |
| t-test total call volume for providers that did not implement the transaction only                        | P value = .022  | There was a difference between pre- and post- implementation             |
| t-test total Calls per 1000 claims for providers that did not implement the transaction only              | P value = .883  | There was no difference between pre- and post- implementation            |
| t-test total Calls per 1000 claims for providers identified as hospitals                                  | P value = .837  | There was no difference between providers identified as hospitals        |
| t-test total Calls per 1000 claims for providers identified as physician groups                           | P value = .321  | There was no difference between providers identified as physician groups |

Having established the normality of the data, a comparison for those providers that did implement the use of the EDI transactions using ANOVA (Analysis of Variance) will test the significance of the means for each group. The groups are broken out between physician practices and hospitals within major state presences. For hospitals, Texas and Florida were the states with the greatest representation. For physician practices Florida and Missouri were the primary representatives. Each group is also compared against the field or other providers from different states that completed implementation.

Table 4. Summary of ANOVA Results

|  |               |  |
|--|---------------|--|
| ANOVA for Hospitals, comparing TX, FL and Other  | P value =.217 | P-value $\geq 0.05$ ; NOT enough evidence to conclude that one mean was greater than the others. |
| ANOVA for Physicians, comparing MO, FL and Other | P value =.909 | P-value $\geq 0.05$ ; NOT enough evidence to conclude that one mean was greater than the others. |
| ANOVA for Physicians, comparing MO, FL and Other | P value =.732 | P-value $\geq 0.05$ ; NOT enough evidence to conclude that one mean was greater than the others. |

#### Data Summary

The data analyzed provides an initial answer to each of the research questions. The null hypothesis could not be eliminated based on testing for all but one of the tests, comparison of call volumes. However, when controlled for claim volume that significance was eliminated as well. Based on the 12 months of data captured for each

provider, there was not enough evidence to conclude any significant changes due to the adoption of the 276 EDI transactions.

For research question number one: (“what effect does the implementation of the claim status ED transaction have on call volumes between the payer and provider?”), the answer appears to be “little to none.” Using both the call volume and call to one thousand claims ratio, both tests turned up p values above .05 indicating that there was not a significant difference between the call volumes or the volume of calls per one thousand claims. Using hypothesis one we can resolve this question.

*H<sub>01</sub>: C<sub>before</sub>-C<sub>after</sub> ≠ 0. There was not a statistically significant difference in the call volumes for providers after the implementation of the 276/277 EDI transaction.*

*H<sub>a1</sub> C<sub>before</sub>-C<sub>after</sub> = 0. There was a statistically significant difference in the call volumes for providers after the implementation of the 276/277 EDI transaction.*

Using both calls and calls per 1000 claims, we cannot reject the null hypothesis and conclude that there was a difference.

For research question number two “does the provider organization type impact the success of using EDI to reduce calls associated with claim status?”), the provider type of hospital or physician group was used as the identifying category. Hypothesis two positions the evaluation.

*H<sub>02</sub>: (H<sub>before</sub>-H<sub>after</sub>)-(P<sub>before</sub>-P<sub>after</sub>) ≠ 0. There was not a statistically significant difference in the call volumes for providers after the implementation of the 276/277 EDI transaction based on whether they are hospitals or physician groups.*

*H<sub>a2</sub>: (H<sub>before</sub>-H<sub>after</sub>)-(P<sub>before</sub>-P<sub>after</sub>)=0. There was a statistically significant difference in the call volumes for providers after the implementation of the 276/277 EDI transaction based on whether they are hospitals or physician groups.*

## CHAPTER V

### CONCLUSIONS AND RECOMMENDATIONS

#### Summary and Interpretation of Findings

The implications of this dissertation are: 1) Technology adoption or change management requires a thorough and detailed approach regardless of the technology type, and 2) Regulations without a legal mandate leave the potential for individual interpretation and inaction. In order to successfully implement change through the adoption of standards, there must be a stick to go with the carrot. 3) Perhaps most practically, more detail was needed in any successful claim status rework reduction solution, so that providers and payers can clearly communicate the actions required for payment.

Throughout the literature review, the theme of change management was clearly associated with technology adoption. It was clear from the writings, whether scholarly or promotional, that every technology value proposition was at risk of failure if the user experience is insufficient for adoption. Regardless of who bears the cost, usability and functionality will ultimately determine whether or not a user will adopt the process into his or her individual workflow. Tools that deliver the user experience however are rushed by competing objectives run a risk of failure as well.

Legal mandates are different than standards, and while the standards have been agreed upon across the industry, their effectiveness will remain in question if they are not also implemented across the country. The 5010 EDI transactions are sufficient examples of both a technology and practice standard that has been supported by

governmental and industry groups alike. However, because the legal requirement was limited (only an agreement on the standards, not further requirement on their use), nearly half of the providers in our study chose not to implement the data provided in the claim status transaction into their workflow. With that kind of participation, we can hardly call the transaction an industry standard.

Finally, the lack of specifics contained in the standard claim status transaction make the information useful in the narrowest of scope. Providers repeatedly indicate that the transaction works; however, the data contained was insufficient to take account closing action. Since the 5010 testing completed, some providers have even found that they are receiving less information that they used to. “A major payer used to tell us quite a bit of information in their 277 response, however since they have met the legal requirement and definition; they have stopped providing the detail” (Johnson, A., personal communication, June 16, 2015). A standard that does not allow for actionable data was not delivering on the promise of reduced cost.

In the process of speaking with providers, this researcher expected a much different result in the data. For years the expectation was that the 276 requests and partnering 277 response transactions would enable providers to quickly clear their accounts receivables to manageable levels. The data in this study showed no significant difference in rework performance, or call levels, within six months of implementing the transaction. This indicates that the information contained in the 277 transaction itself was not enough to allow providers to stop calling and close out their accounts. This dissertation has shown that a standard by itself was insufficient to reduce rework without the proper level of detail and regulatory support.

## Recommendations for Future Research

The ever rising cost of healthcare provides an opportunity to look at administrative and operational processes across the board. Electronic Health Records (EHR) and their adoption within hospital and medical settings have much of the same challenge as EDI transactions in adoption. Leadership was needed both publicly and privately. Additional research continues to delve into the reasons for a lack of adoption. Sima Ajami and Razieh Aram-Chadegani found that “barriers that have been identified are technical issues, system interoperability, concerns about privacy and confidentiality, lack of health information data standards, lack of a well-trained clinician informatics workforce to lead the process, the number of vendors in the marketplace, and the transience of vendors” (Ajami & Arab-Chadegani, 2013, p. 214). Competing on technology requires investment such that “many observers believe that in the years to come, providers that invest in early technology that supports greater analysis of patient data and population health infrastructure will be amply rewarded” (Bush, 2012, p. 2). These types of statements support the need to study technology adoption and the specific challenges in healthcare.

The differences in provider practices present a potentially valuable future topic as well. This study was able to compare physician and hospital practices at a high level; however, a more detailed breakdown of practice characteristics may make future research more valuable. Large hospital systems in metropolitan areas face different challenges with technology than rural private practices. As many as “fifty-six percent of hospitals in urban areas reported moderate or high information technology use” In other parts of the country “33 percent of rural hospitals did” (Bush, 2008, p. 34).

EDI as a technology was frequently overlooked because of the simplistic nature of the transaction's static interface. Sending a request will get you a response, but there was little individual back and forth sharing of information and a single question generates a single response. These transactions are designed for high volumes, not individual consultation. The rapid change of technology from transactions to such interactive business to business models like click to chat features or real time comment features have allowed the industry to take for granted the value of a standard claim status statement. Future research on this topic could explore 1) the nature of other regulations contained in the ACA and their downstream cost effectiveness as part of administrative simplification initiatives, 2) EDI transactions compared to other methods of communication such as phone calls or web information and 3) detailed case studies determining the proper level of detail for claims requiring additional information or medical records. Many sources determine that the opportunity in administrative cost reduction was nearly 300 million dollars in savings over the next 10 years; however, the detailed case studies that support those numbers are scarce. Such case studies could provide the regulatory and standard bearers the business cases needed to continue the adoption efforts. Such direction will enable administrators and executives to pour resources into the ideas and concepts with the highest return on investment. A final area of primary interest was the opportunity of rework in general. As illustrated in this research, there was a lifecycle associated with revenue and claim payment. Many of the elements of rework that organizations struggle with are repeatable events. These events, like requests for medical records or additional insurance information, could be

remedied with solutions that correct errors earlier in the process, even before claim submission.

Dependencies on organizational factors in any kind of system implementation will most likely have a large scale impact on the success of that implementation. Payers that partner with providers “can see distinct advantages clinically and administratively” (Miller, 2000, p. 46) however the level to which that partnership involves technology and a shared change agenda was an interesting topic when discussing the reduction of administrative costs. The growth of healthcare as a business could very well mean that the scale by which we measure our costs may not be identical year to year. The cost benefit model for any technology may be comparable across years, however utilization may not be.

### Limitations

A number of important limitations for this research should be considered. One of the key challenges was collecting data, considering anonymity was required from data sources. Because of this requirement, details and examples were not available for review. As this study revealed, those details are required to take this research further. There were a few items of potential bias in the collection of data as well. Providers were identified as part of an existing payer network; out of network, providers were excluded. Also, providers self-identified as to whether or not they had implemented the claim status transaction into their workflow. In fulfillment of the anonymity requirements, incentives, process impact, and training and technical support are factors that will have an effect on the adoption and utility of any technology or change management effort.

## Conclusions

Perhaps it was unfair to expect that healthcare systems, which are in the business of delivering care to patients, also are on the cutting edge of accounting and collections practices. It was fair though I suppose to expect them to invest in systems that are so core to the success of the business end of their process. Across other industries we would expect large multi-billion dollar companies to become proficient, if not innovative leaders, at non-core processes. We might be surprised to find out if Honeywell's Aerospace division did not effectively collect on their contracts from commercial and government sources. We would probably be equally surprised to find out if Apple was not able to collect payments for their iPod sales. However despite the potential complexity of user agreements and government contracts, there does not appear to be the challenges in revenue management the likes of which we find in healthcare.

Much of this complexity was driven by the variety of stakeholders that have little or nothing to do with the care being delivered. Administrative tasks employ millions of employees and significant capital investment that support contract negotiations, accounting and customer management functions. Some of these departments or vendors support the revenue cycle with services that help to bill accurately or appeal claim denials efficiently. However in order to make the most of the tools available the industry as well as individual payers and providers must look for opportunities to improve standardization, innovation and transparency.

Coordination of Benefits (COB) is a denial category in which most claims are eventually paid, however they take months to complete. The denial results because the

payer has information that makes them think that the member, or patient, as other insurance that may pay the claim instead of them. In a service setting this could be on a forty dollar physical therapy claim or a one hundred and fifty thousand dollar surgery and hospital stay. In any case, regardless of the amount of the claim the payer usually reserves the right through contract agreement to deny or pend the claim until the patient attests to the fact that they do not have other insurance or that they do have other insurance and that the claim should be paid by that party. If resolution is not met in a timely manner, sometimes a year, the bill will be lifted from the payer responsibility and the patient will be left with the bill which is far less likely to be paid in full. Finding a way to share the information that insurance companies have with each other and the payer is a solution that is so often overlooked when discussions of socialized medicine and electronic medical records are prominent. There are clearinghouses, but they focus on the claim data and claim standards not so much relevant eligibility information across patients, payers and providers.

EDI in general presents a bit of a challenge when trying to use information for complex problem solving. Health systems and payers looking to improve their performance need to coordinate between themselves and even their competitors to answer questions in relevant detail. One of the most common pieces of feedback regarding the 276/277 transaction was that it does not give enough information. As a payer, a substantial investment in EDI responses that mimic the kind of detail found in a phone call is incredibly high as each claim type and status scenario may be an entirely unique response nearly impossible to replicate with efficiency and quality. Organizing standard detailed response that give providers actionable information, or information

that they can use to pursue payment effectively, should be the priority for the industry overall. Again, as talk of national healthcare exchanges and policies take center stage in modern politics, the nuts and bolts of any relevant approach should emphasize the opportunity to push standard activity in collections and payments. Groups like the NCQA, the National Committee for Quality Assurance, works to build standards and consensus within the healthcare industry. That consensus can influence policy that will drive the kind of action that has been discussed in this paper as well as eligibility information, prior authorization and notification acceptances.

There are a number of continuous improvement methodologies. Some are healthcare specific and some cut across business and industry lines. One common theme, however, was the idea of continuous improvement which means making improvements then continually revising and adjusting based on feedback and outcomes. As healthcare changes and evolves so should the type of information exchanged between payers and providers. A single static mandate from federal health agencies may have an immediate impact, but a method of reviewing and updating the standards and their use was crucial to developing standards that have large scale impacts, especially in the area of rework. Research and monitoring of the 277 response and the payment results and timing will illustrate the strengths and opportunities of using an EDI tool in providing claim status updates that, in the end, reduce rework as opposed to creating additional need for information. A solution that answers most of the questions was one that was also ensuring that phone calls and other costly administratively intense and costly solutions will be pursued to achieve payment.

Transparency in healthcare pricing and payments was another opportunity to utilize technology, specifically standards and reporting, to determine the accuracy and relevance of a payment. EDI transactions that can illustrate whether or not the claim was paid to the correct fee schedule or contract will help eliminate rework that causes multiple phone calls and reviews. Transparency does not just mean letting an organization know whether they were paid the correct amount or not, but also whether or not that amount matched what was expected. That measure, contract match rate, would take a popular reason to call payers away, and illustrate what was paid vs the amount in the contract and what you anticipated.

This pricing data can also be taken to the consumer. Imagine a transaction with a hospital or physician group where you have already been prepared for what the payment will be, the amount the insurance will cover and your expected reimbursement might be. There are tools that will capture that information on the post-payment side, however proactively scrubbing claims within the claim submission process, with payment and eligibility data, was just starting to become a reality and using EDI transaction data to do it.

Transparency means the workflow as well. The difference between a pended and denied claim can be irrelevant to a provider as they seek payment. Providing clear and concise instructions for next steps is crucial as illustrated in this research paper. Transparency within the workflow means telling a provider or collections team where the claim is in relation to payment. Timing information is an opportunity to illustrate that a claim has been submitted but not touched by a processor. Allowing processor notes or instructions as part of the transaction will be helpful for organizations with rapidly

increasing AR. A recommendation to add to this process is the potential timing of each step in the workflow. It is one thing to know the claim was submitted, another to know where in the workflow that claim is (e.g. processing) and an even larger impact, setting an expectation of when that claim can be paid or at least move to the next steps. That is most likely the answer that a user is asking for on the phone. By adding claim payment timing, a collections agent can set a reminder for post payment in the hopes that the remainder will never pop up because the claim was paid on time and prior to the alarm or reminder.

EDI transaction usage will grow in healthcare as the technology becomes more flexible and informative. Per transaction it remains very low cost. Organizations that invest in interpretation software that will translate the flat EDI files into a workflow tool or user friendly interface, are anticipating the improved transactions and the information that they share across payers and providers. The 276/277 has been introduced as a potential time save, however the limited shared data observed in this research was insufficient to have a significant or relevant impact on phone calls to a payer or other related workflows.

The immediate conclusion for this research is that the 276/277 transaction did not, in the existing format, provide a useful tool in reducing administrative rework. In peeling back the place this transaction has in the provider/payer relationship, this appears to be a policy or process issue, not a technology issue. The ACA and HIPAA regulations have identified the correct steps in the process that need to change to limit or eliminate the waste associated with follow up phone calls. However the lack of requirement and detail is hindering the effort to make this a seamless industry solution.

Policies that limit information also limit the effectiveness of the transactions and their utilization as a rework reduction tool. By bolstering the legal requirements that make up claim denial descriptions for this transaction, policy makers can effectively support the change management challenge that lies ahead for the industry.

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