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Information Systems for Disability Determination: A Multi-Stakeholder Assessment of Electronic Medical Evidence Needs and Processes

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Abstract:

This study focuses on Health Information Technology (Health IT) in improving the decision-making process concerning disability benefits. Using a multimethod, multilevel approach that includes case analysis and semi-structured interviews, this study examines the practices, challenges, and potential solutions or methods involved in adequate and timely collection of medical evidence through information technology (IT) to support disability determination. Researchers collected qualitative data through fifty-six semi-structured thirty-minute interviews with Disability Determination Services (DDS) personnel in three states. Based on site observations, interviews, and document analysis, they developed two provider case studies. To demonstrate the adequacy and timeliness of medical evidence collection, the study also examined and reviewed twelve disability claimant cases. Findings suggest that, at the payer and provider levels, electronic solutions provide more adequate and timely responses to medical evidence requests. Based on the case studies, implemented Health IT reduces incomplete medical evidence and decreases provider turnaround time in processing a payer's requests. Among the claims examined, 50 percent received low scores for adequacy of medical evidence and 33 percent received high or medium scores for delay of return of medical evidence of record. This examination of disability determination demonstrated that Health IT holds promise for clinical data use in this context.

Keywords: Health IT, electronic health records, disability determination

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I. INTRODUCTION

The 2005 U.S. Census data [Brault, 2008] reported that more than 54 million people, or 18.7 percent of the population, claim some level of disability, and 12 percent of these have a severe disability. Almost 30 percent of workers entering the workforce will experience a disability before retirement [SSA, 2010]. These statistics, coupled with high rates of unemployment, lead to more than 3 million U.S. Social Security Administration (SSA) disability benefit applications per year [Robitaille, 2009]. A major component of disability determination is collection of medical information, which SSA terms *medical evidence development*. A study by the Government Accountability Office (GAO) found that unnecessary delays in collecting medical evidence are common and cause unneeded problems for many Americans who become disabled and apply for benefits. This same study discusses the immediate need for SSA to keep pace with industry standards in using existing electronic health information, or developing standardized health information systems, to realize the benefits of information systems for gathering information and streamlining processes. Additional studies suggest that using information systems to collect and develop evidence could potentially accelerate the determination process, reducing delays that lead to high societal costs and increase claimants' financial and medical stress and uncertainty [U.S. Government Accountability Office, 2008; Feldman and Horan, 2011; Horan et al., 2010]. The research reported on herein considers the role of Health IT as an information system for accelerating the disability determination process.

II. BACKGROUND

Three key stakeholder groups—payers, providers, and claimants—have interdependent relationships during disability determination. Over the course of an illness, a claimant typically has multiple encounters with medical care providers. When it appears that the claimant will not be able to work for at least a year, the patient files a disability benefits application with SSA, the payer. SSA then requests medical records from the providers who cared for the claimant (see Figure 1). Currently, most stakeholder interactions take place in a manual, paper-based environment. However, over the last two years, Health IT methods, including electronic health records (EHRs), personal health records (PHRs), and electronic developments by SSA, support some stakeholder interactions in an electronic environment. SSA's active involvement in Health IT included being the first to transmit live patient information across the National Health Information Network (NwHIN) for disability determination. Examination of the SSA context promises to be quite valuable.
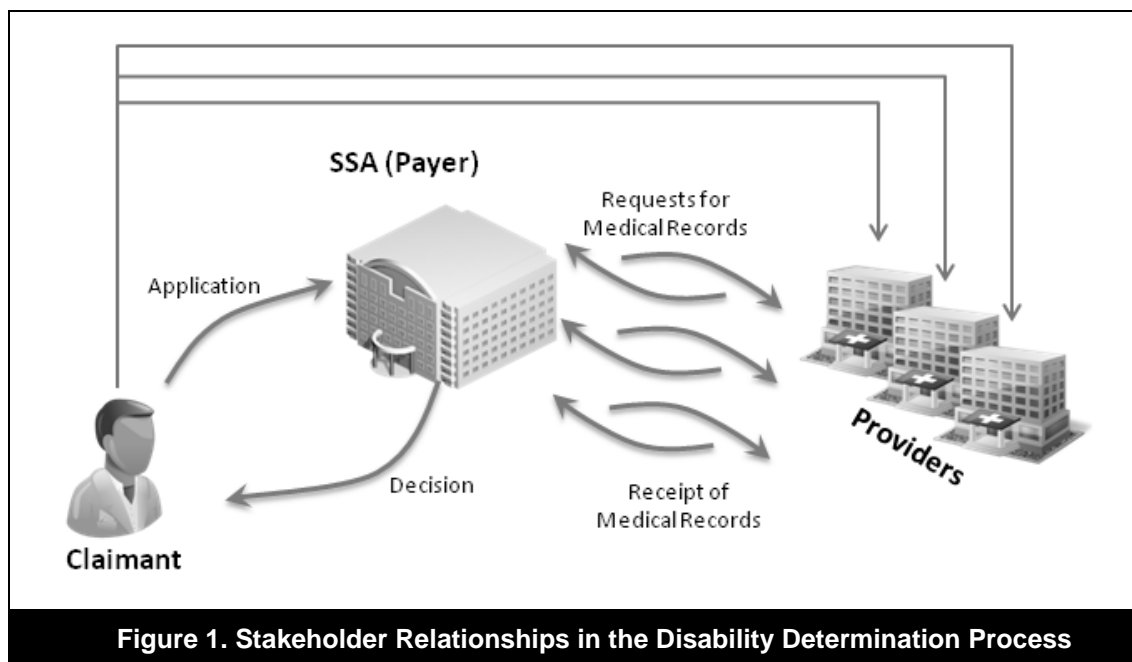

Figure 1. Stakeholder Relationships in the Disability Determination Process

The *payer*, in this case SSA, is responsible for receiving the application from the claimant, developing the medical information, or evidence, to substantiate the claimant's claim, and rendering a determination. Successful and timely medical evidence collection is a key component of disability determination and requires appropriate resources to be

available. "Inadequate evidence," defined here as missing, incorrect, or incomplete medical evidence, prolongs case development, introducing the risk of errors of inclusion or exclusion. Both technical and organizational solutions can improve this component of the claims process.

The *provider* is responsible for answering SSA's request for medical evidence, and processes exist for providing medical "files" to requesting agencies such as SSA. The process, however, is viewed from an economics perspective. The provider's cost of producing and releasing the medical evidence, in terms of human resources, can be greater than that paid by SSA.[1] From a small group practice with one person responsible for all medical information requests to a large metropolitan hospital that outsources its release of medical information, most providers rely on inefficient manual processes for locating, copying, and sending records [Tulu et al., 2006; DesRoches et al., 2008]. Depending on which clientele a provider serves (e.g., cancer institutions), providers may receive thousands of requests annually for release of medical evidence.

The *claimant* is responsible for applying for disability benefits from SSA, which can be stressful and time-consuming. One challenging task is to provide adequate (i.e., accurate and complete) provider information, such as name and address, early in the application process. The difficulty of this task is compounded by multiple layers of care episodes frequently incurred by applicants for disability benefits. One claimant noted: "It was so hard for me to remember all of the details that they wanted—I was preoccupied with how I was going to pay my heating bill" [Anonymous, 2008]. Inaccurate or incomplete provider information inevitably leads to delays in medical evidence collection, resulting in downstream medical evidence collection expenses that could be avoided [Tulu and Horan, 2009; Horan et al., 2009].

Health IT as implemented today in many healthcare organizations focuses primarily on diagnosis, treatment, and payment, but Health IT methods can also be used to increase efficiency and timeliness in developing medical evidence for disability determination. These solutions include EHRs, PHRs, and applications that provide intelligent guidance in medical evidence development and analysis that can help reduce delays in the request for and collection of medical evidence. The goal of this study is to better understand how Health IT can address issues of incomplete and inadequate medical evidence collection and make disability determination more efficient.

III. STUDY OBJECTIVES

Disability incurs great societal costs [Brault, 2008]. Electronic Disability Records (EDRs) show a potential for reducing these costs by streamlining the manual processes currently associated with medical evidence collection. Previous research outlined the use of EDRs and provided a general functional architecture supporting the components of an EDR that are readily available in some Health IT methods [Tulu and Horan, 2009; Horan et al., 2009].

The present study explored the research question: "What is the present and potential role of Health IT in streamlining medical evidence development from various stakeholder perspectives?" The research objective was to examine the practices, challenges, and potential solutions involved in timely collection of adequate medical evidence. The study assesses these factors across the three stakeholder levels: (1) payer (SSA), (2) provider, and (3) claimant.

IV. METHODS

This study used a multi-method, multilevel approach to accomplish its objectives. As Table 1 shows, researchers conducted semi-structured interviews, case studies, and case analyses over a four-month period, including payer, provider, and claimant perspectives.

At the *payer* level, the interview protocol provided guidelines for exploring issues related to three themes: (1) general processes and challenges of medical evidence collection, (2) perspectives on medical evidence collection, and (3) opportunities and solutions for more adequate and timely medical evidence collection.

The researchers collected qualitative data through a series of fifty-six semi-structured thirty-minute interviews with Disability Determination Services (DDS) personnel in California (CA), Florida (FL), and Massachusetts (MA). Selection of these states depended on their diverse degrees of technology use in medical evidence development. Figure 2 illustrates the uptake of EHRs relative to electronic submission practices. The researchers selected CA

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[1] It is important to note that SSA pays for this service. The amount paid by SSA for medical evidence varies between states. The average is approximately $15 per record.

Table 1: Methodology Summary			
Data Source	Data Type	Method of Collection	Timeline
56 SSA DDS participants in 3 states (CA, MA, FL)	Role-specific perspectives	Semi-structured (interviews, face-to-face or telephone)	July 2008–December 2008
2 providers	Productivity data Work-flow changes Satisfaction data	Interviews with key personnel handling disability determinations Observations User surveys Productivity logs	MGH: April 2008–July 2008 BIDMC: December 2008
12 disability claims	Time-related claim processes and decisions	Document analysis Interview with the claimant representative	August 2008

because of anecdotal reports of low use of electronic services (low EHR use by providers and low electronic submission of medical evidence practices to SSA). They chose Florida due to anecdotal reports of low EHR use but high electronic submission practices to SSA. And they included Massachusetts for its early adoption of both EHRs and electronic submission practices to SSA. This variety of data sources would provide insight into the role of Health IT in medical evidence development. Interviewers talked with interviewees face-to-face or by telephone, depending on each interviewee's availability. The purpose of the interviews was to better understand and demonstrate the process and the challenges, opportunities, and solutions or methods of medical evidence development. During the interviews, one of the researchers took extensive field notes on the conversation. At the conclusion of the interview, the interviewer summarized key concepts for verification of accuracy by the interviewee. Afterwards, two researchers reviewed the field notes for accuracy and three researchers synthesized the interviews. Following standard analysis methods for qualitative data [Creswell, 2008], open coding led to general themes, then axial coding facilitated linkages between the themes. Finally, the researchers compared results across the three states. The following table (Table 2) shows examples from the payer interviews with subsequent themes.

At the *provider* level, researchers conducted case studies at Massachusetts General Hospital (MGH) and Beth Israel Deaconess Medical Center (BIDMC). The researchers selected MGH and BIDMC (see MA in Figure 2) due to their early adoption of EHRs and electronic submission practices for medical evidence development. A case-study methodology was appropriate for understanding the role technical factors play in release of medical evidence, how and why organizational structures help frame opportunities for growth, which governance and/or policy issues to consider, and how to define and capture the metrics for success [Yin, 2008]. The case-study component involved site visits and discussions with stakeholders. Researchers also interviewed key personnel who handle SSA requests for medical evidence. Independent observations, user surveys, and examination of productivity logs contributed further to data acquisition. The following table (Table 3) shows examples from the provider interviews with subsequent themes.

At the *claimant* level, researchers obtained appropriate consents from each claimant in order to work through a disability representative to conduct in-depth analyses of twelve claim cases. The claim cases were chosen as purposive or "convenience" sample of claims representing a range of claim processing times. Complete processing of these cases ranged from 103 days to more than 750 days from initial application to a favorable decision (Figure 3). The claims included review, processing, and comparison along two dimensions: (1) adequacy of medical evidence (enough medical information to support the disability allegation) and (2) collection of medical evidence (timeliness and process).

For each case, the initial step was to review each claim file and develop a detailed flow diagram of the disability claim, from its initial filing to ultimate determination. While this was conducted for each case reviewed, we use Figure 4 as an example of James' case—a complex and lengthy case.

To facilitate comparison, researchers scored the medical evidence in terms of its adequacy and timeliness. A scale of low, medium, or high adequacy principally assessed the need for additional consultative exams (CE) to supplement the medical evidence.[2] The scoring of medical evidence collection ranked timeliness of collection as low (less than or equal to five months), medium (greater than five months, but less than or equal to ten months), or high (greater than ten months).

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[2] CEs are examinations by outside providers who specialize in the type of information needed by Disability Determination Services (DDS) to determine disability.

Table 2: Sample Payer Interview Coding Structure
(Sorted by State, then Code, then Theme)

| ID	Code	Response	Theme		Coding Legend	
p-ca	a	We hardly use technology.	technology use		a	technology
p-ca	b	We get inaccurate information.	accuracy		b	accurate information earlier in the process
p-ca	b	We need more accurate treating sources on the application.	accuracy		c	education
p-ca	b	We need a telephone number that actually works.	accuracy		d	provider
p-ca	c	The claimants just do not know what is needed on the application.	claimants		e	inadequate records
p-ca	c/d	Providers use HIPAA as a reason to not send records.	provider issues		f	claimant issues
p-ca	d	Providers are not responding.	provider issues		g	Human resources
p-ca	d	The size of the provider sometimes matters.	provider issues		h	social issue
p-ca	e	need to order consultative exam	accuracy/adequacy		i	economic issue
p-ca	e	Mental health and sensitive diagnosis are not included.	adequacy		ID Legend	
p-fl	a	We use secure fax.	technology use		p-ca	payer-CA
p-fl	a	Secure fax has improved our collection efforts.	technology use		p-ma	payer-MA
p-fl	a	scanning records into a digital format	technology use		p-fl	payer-FL
p-fl	e	need to order consultative exam	accuracy/adequacy			
p-fl	f	Language is an issue.	claimants			
p-ma	d	Mass General uses ERE, and this is very helpful.	technology use			
p-ma	d	Everything from Mass General comes so fast.	technology use			
p-ma	d	Disability case processing system makes things so much more efficient.	technology use			
p-ma	d	With disability case processing system, we can transfer records.	technology use			
p-ma	f	homelessness	claimants			
p-ma	h/i/f	able to make decisions faster	technology use/claimants			
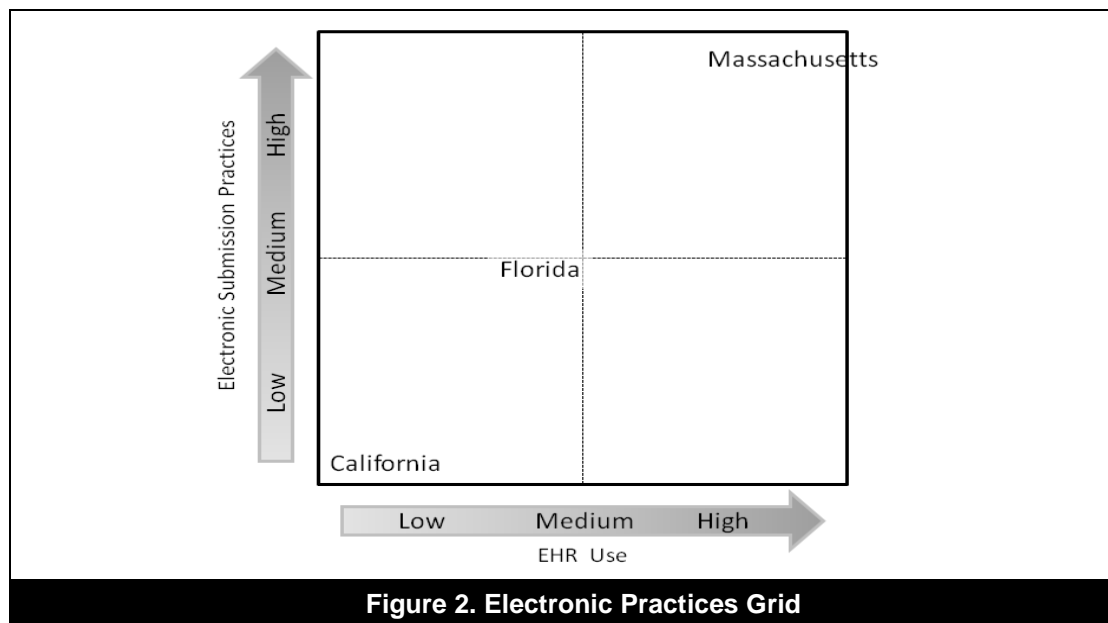
Figure 2. Electronic Practices Grid

Table 3: Sample Provider Interview Coding Structure (Sorted by Provider, then Code, then Theme)					
ID	Code	Response	Theme	Coding Legend	
pr-b	d/a/h	We wanted to be associated with this kind of technology advancement.	provider issues/technology	a	technology
pr-b	h	enhanced service to patients	claimants	b	accurate information earlier in the process
pr-b	h	value to the claimants	claimants	c	education
pr-b	h	earlier access to healthcare	claimants	d	provider
pr-b	h/i	hard for us to track actual productivity at this point	provider issues/technology	e	inadequate records
pr-b	i	This will lead to savings.	claimants	f	claimant issues
pr-m	a	use of ere was a tipping point for us	provider issues/technology	g	Human resources
pr-m	a	Use of something like ERE for other instances could be valuable.	provider issues/technology	h	social issue
pr-m	a	abstractors handling more records	provider issues/technology	i	economic issue
pr-m	a	abstractors with faster turnaround times	provider issues/technology	ID Legend	
pr-m	a/g	increased workflow efficiency	provider issues/technology	pr-b	BIDMC
pr-m	g/i	staff repurposing	human resource savings	pr-m	MGH
pr-m	g/i	no need to hire new staff	human resource savings		
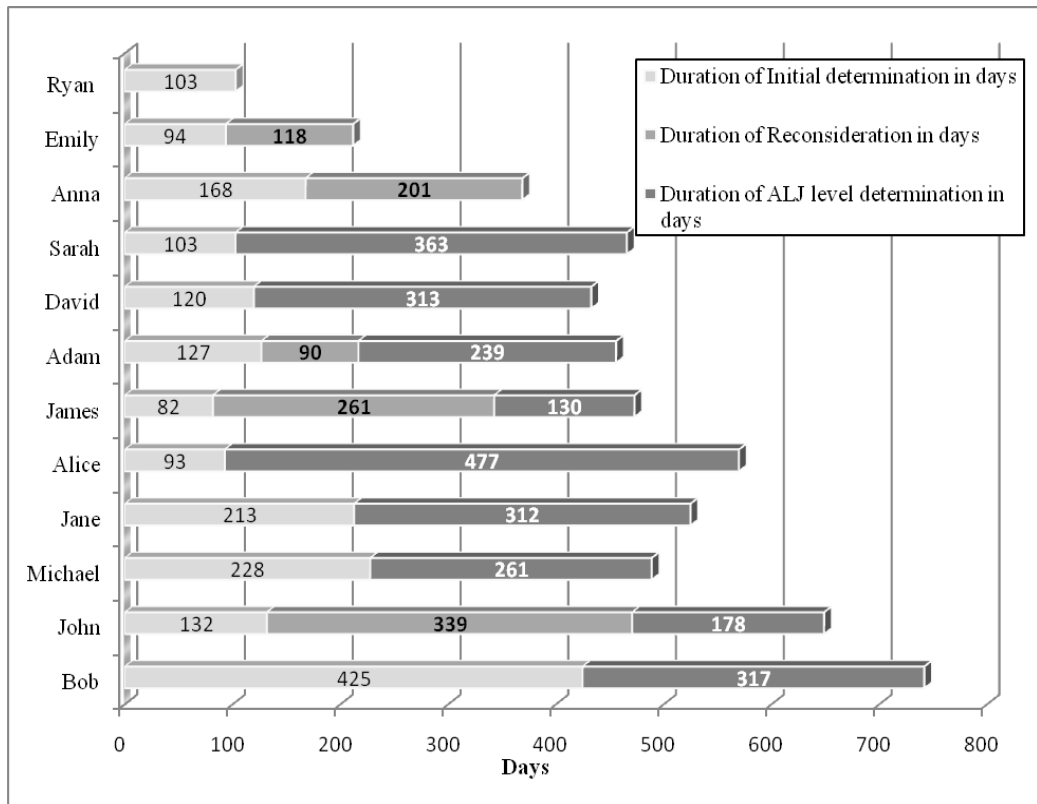
Figure 3. Case Days to a Favorable Decision per Determination Level

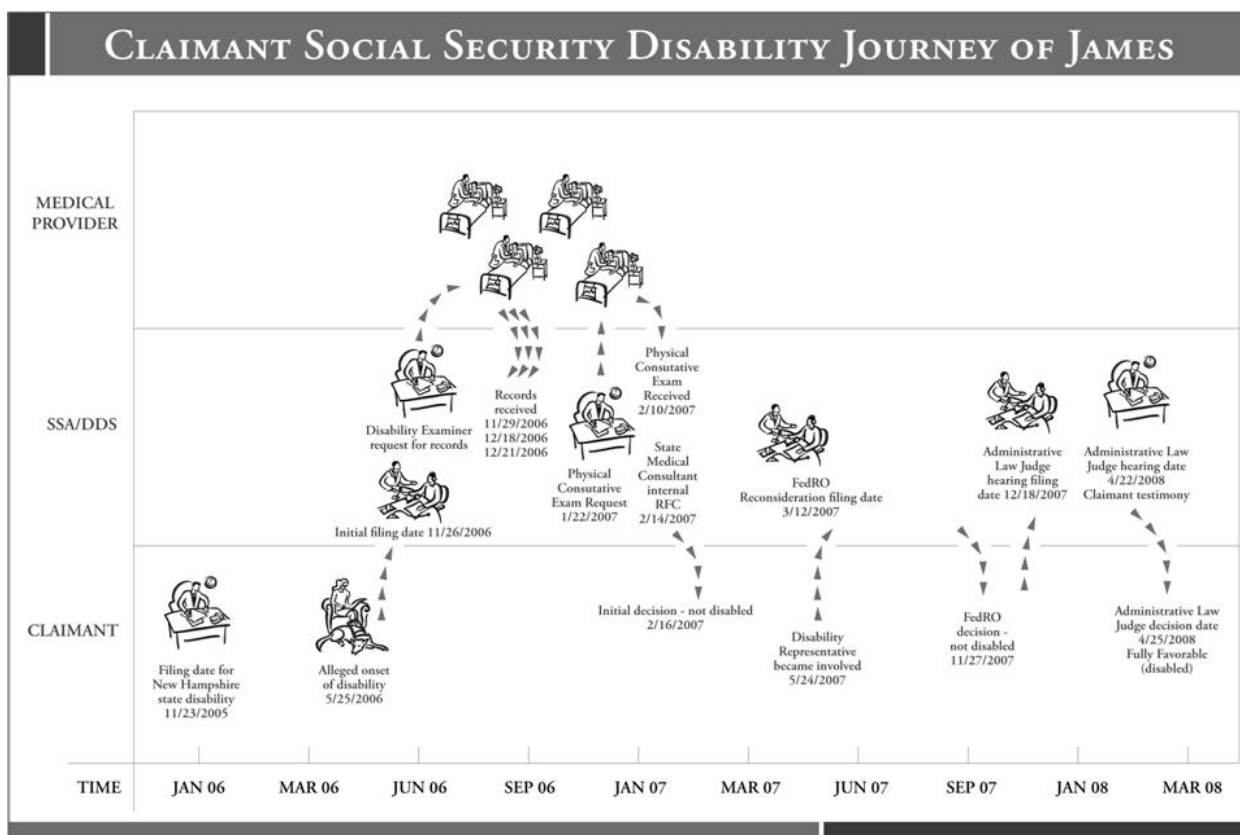**CLAIMANT SOCIAL SECURITY DISABILITY JOURNEY OF JAMES**

Figure 4. Graphical Representation of the Data Collected in a Claim File

This study incorporated in-depth case analysis for several reasons. For both adequacy and timeliness, case studies enhanced our understanding of the type of medical evidence requested from providers, as well as the number and sequence of follow-up requests by the state DDS examiner. Researchers took de-identified notes and developed timelines to facilitate analysis of where delays resulted from incomplete or inadequate medical evidence. Case studies also showed to what extent inadequate or incomplete medical evidence delays medical evidence development and overall disability determination. In addition, case analyses suggested how using Health IT for medical evidence collection specifically, and disability determination generally, could mitigate these delays.[3]

V. RESULTS

Research Element 1: Payer (SSA) Perspective

The purpose of this component of the study was to examine and understand the payer's (SSA) role in medical evidence development and disability determination, and the role of Health IT in that process. This section discusses the findings from fifty-six interviews with DDS representatives from California, Florida, and Massachusetts.

California

Interviewees noted that California rarely uses information technology (including secure fax) for the request and transmittal of medical evidence. They reported that an estimated 80 percent of their case documentation was paper-based records exchanged through the postal service. Examiners perceived that this largely paper-based system contributed to inefficiencies for the entire disability determination process. A major challenge is the lack of accurate information provided by claimants in disability applications, especially regarding treating sources. "It starts from the very beginning, from when the field office representative interviews the claimants. The more information you get, the better. If you can get the correct treating source, a telephone number that actually works, a medical record

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number—getting all this information accurately would aid so much in the overall process," noted one of the more experienced examiners.

Based on our interviews, an incomplete or inaccurate claim application creates hindrances and delays for the entire disability determination process. In order for DDS representatives to request medical evidence, the submitted claims must include correct and complete provider contact information, as well as information pertaining to the claimant's alleged disability. Many interviewees indicated that inadequate completion is due to insufficient education or awareness of the claimants: "Education, an overview of our program, would simply be of value. Education at the field offices and community hospitals would [help] us do our job more efficiently."

Even with these claimant issues, the consensus among California interviewees was that the lack of provider participation was a larger issue. One interviewee noted, "The biggest challenge is obtaining records. [There is a] lack of participation from the sources' side: the private hospitals and treating physicians. They feel that they do not have the obligation to submit the records." This lack of responsiveness to the request for medical evidence delays the entire process.

The challenge of provider non-responsiveness is widespread and is not unique to California. As mentioned previously, turnaround times for release of information can vary, depending on provider size and type. Many DDS representatives interviewed indicated turnaround time to be "… about 30–60 days, depend[ing] on how quickly the providers can send us the records. Bigger hospitals are usually slower, such as Kaiser and County [Los Angeles County–USC Medical Center], unlike smaller clinics where everything is housed within one area. They can simply find it and send it to us."

Adding to the challenge of unresponsiveness, California DDS offices often receive incomplete or inadequate medical evidence. This situation is more frequent when the case being examined has a mental-health claim requiring evaluation. One representative noted: "The match between the disability allegation and the guidelines can take time; they need to have the complete information relative to the claim. For example, the person can have physical and mental elements (parts to the claim), yet the medical information has only physical evidence. So this can all chew up time in developing the medical evidence."

When it comes to releasing medical evidence that contains mental health or sensitive diagnostic information like HIV/AIDS, state laws differ and govern what can be released. The primary underlying challenge is that the healthcare providers and SSA follow different privacy and security principles with regard to sharing medical information. As part of the initial benefits claim process, claimants are required to submit a signed authorization to disclose information (SSA-Form 827). This form authorizes the provider to release medical evidence to SSA. However, DDS examiners noted much misunderstanding about medical evidence release outside the guidelines of the Health Insurance Portability and Accountability Act (HIPAA), especially for provisions outside of payment. Strict interpretation of the nuances of HIPAA and SSA's Form 827 leads to more conservative release of information by providers. Therefore, many requests for release of medical evidence for mental health or sensitive diagnosis allegations are not answered, necessitating costly and time-consuming CEs.

The challenges of unresponsiveness and incomplete or inadequate medical evidence create delays in the entire process, primarily affecting the claimant. They also force DDS to take another course of action, most often CE requests. CE requests add delays to the overall disability determination process. Most importantly, because SSA must pay for the CEs, they incur further unnecessary costs. In the State of California, these unnecessary costs total approximately $35 million annually [State of California, 2008].

Florida
The Florida DDS developed a set of practices to encourage electronic submission of medical evidence using multiple types of information systems. Note that the primary type of system used to connect DDS with the providers is secure facsimile (fax) transmission. Internally, however, all states rely on the use of SSA's legacy disability case processing system to conduct many aspects of disability determination. Most of the Florida interviewees felt that implementing and using these information systems improved the overall efficiency of disability determination, particularly in collecting the required medical evidence.

The Florida DDS interviewees said that most providers in Florida did not use EHRs and instead submit paper-based medical evidence via fax. This pattern contrasts with Massachusetts (whose process is described in the next section), where 23 percent of physicians overall and 52 percent of hospital-based physicians use EHRs [Simon et al., 2007]. Paper-based record submission, such as that described by Florida DDS interviewees, involves faxing records to a SSA-contracted data-copying service. The service, in turn, scans the records into a digital image format for routing to the claimant's electronic folder. The electronic folder is set up within SSA's electronic data center for

secure storage, retrieval, and sharing of claimant cases electronically within the DDS network. This time-saving process replaced the previous mailing of records to the copying service, which would then mail them to SSA.

The disability case processing system used in the Florida DDS, in conjunction with faxing technology, led to a less paper-intensive system. These information systems empowered DDS examiners by providing tools such as alerts, reminders, summary screens, and the ability to electronically bookmark and highlight specific medical evidence. The convenience means that "everything is at my [DDS examiner's] fingertips, and I can use my time more efficiently. This is just more efficient, because it does a lot of the organization for us, such as [sending] reminders." Interviewees also cited the ability to use electronic folders. "It is easier to shift cases geographically now" between the DDS offices.

Although electronic systems currently used by the Florida DDS eliminate some human processing and create efficiencies, examiners face other challenges. As in California, receiving incomplete and inaccurate claim applications from the claimants is a major challenge. A further complication is that "language is sometimes an issue—Spanish and Creole languages create a time delay in getting records interpreted."

Florida interviewees reported: "Records are back in a timely manner, but they are usually incomplete." They considered this an obstacle in making timely determinations, noting that "most medical records are for clinical care and not disability determination." Therefore, "I need to order a CE about 50 percent of the time to get the information I need." CEs add significantly to the cost of the determination process: During fiscal year 2001 Florida spent approximately $13.6 million [Social Security Administration, 2003].

Florida made strides toward implementing electronic methods of requesting and receiving medical evidence at the agency level, such as using their secure fax server. These advances added incremental efficiencies to an inefficient process. Such electronic implementations at the agency level enabled the DDS to reduce the overall amount of unresponsiveness from providers, but did not decrease the amount of incomplete or inadequate medical evidence. To improve the disability determination process, Florida healthcare providers could increase efficiency by adopting and implementing EHRs. This step might enable broader participation with SSA's medical evidence requesting and gathering systems.

Massachusetts

Of the three state DDS agencies interviewed, Massachusetts makes the greatest use of Health IT. This usage leads to a very efficient process of receiving requests for and transmitting release of medical evidence. Two healthcare providers in Massachusetts, MGH and BIDMC, have varying levels of electronic medical evidence submission systems in place. These information systems connect providers directly to SSA's information systems, enabling authorized electronic request for and receipt of medical evidence. The next section of this article explores this topic in greater detail.

Implementing these medical evidence transmission systems created a great opportunity to make the overall disability determination process more efficient. At the time of our initial DDS interviews, BIDMC was not using SSA's MEGAHIT (Medical Evidence Gathering and Analysis through Health IT) prototype, so interviewees could not provide input about requesting and receiving medical evidence using that system. With that in mind, almost every Massachusetts DDS official we interviewed made a point of emphasizing that "Mass General medical evidence is the only one that comes in fast. For them, there's not any more they can do for efficiency." The primary reason underlying this distinction is clearly the electronic system that MGH implemented.

As Massachusetts DDS officials noted, the MGH system increases their overall efficiency. The increased efficiency is related to the format and structure of the medical evidence reports that the system generates and provides to the DDS. There was a general consensus that "Mass General records are wonderful. The indexing is great. Getting more sources like that would be great. I love their system. It [the amount of records provided] can be more than you need, but I'm very happy with them."

After initiation of the MEGAHIT prototype, DDS examiners noted that some claims still required a time-consuming analysis of the record to validate the preliminary analysis report generated by MEGAHIT. Interviewees also noted that, as MEGAHIT use becomes more widespread, some business processes should be reexamined and modified: all business processes producing equal outcomes, MEGAHIT does not need to mirror previous manual tasks and processes.

In light of the comments above, it is important to note that MGH and BIDMC are only two of the many providers from whom the Massachusetts DDS office requests records. The Massachusetts DDS office still faces challenges when dealing with other healthcare providers. Apart from provider-level challenges, Massachusetts DDS officials observed

that they are faced with challenges at the claimant level. "The biggest challenge with homeless cases is establishing and maintaining contact with them. They move around and are hard to get [into] contact with. They sleep at the shelters but are usually not there during the day. Keeping contact is also hard." While this may seem like a small population, the 2009 Annual Homeless Report to Congress would suggest that the homeless is a high impact population, with almost 40 percent experiencing a disability [United States Department of Housing and Urban Development, 2009].

As in California and Florida, DDS officials in Massachusetts commented that another challenge they face is that "[d]octors are not responding. Certain doctors never do and never will. I get all kinds of notes from the doctors, and it can be difficult to get [medical evidence] from larger facilities." The reasons for the lack of response were thought to be many, such as: the office is inundated with requests, the doctor forgets, and it is not a priority for the doctor. Some DDS examiners noted that even though SSA pays for requests, requests from attorney and insurance firms pay so much more than those from SSA and require the same amount of work; perhaps the attorney and insurance requests get filled first and there is no time left to fill SSA's requests.

Research Element 2: Provider Perspective

This component of the study focused on evaluating, analyzing, and understanding the provider's perspective on disability determination. With this goal, we studied two healthcare provider organizations: MGH and BIDMC, early adopters of the electronic transmission of medical evidence for disability determination. These providers were particularly important to the study because they represented early adoption of Health IT with SSA. Beginning in 2007, MGH implemented Electronic Records Express (ERE), an SSA-based electronic application for the release of medical information. Then, in 2008, BIDMC participated in MEGAHIT, a proof-of-concept implementation for electronic request and release of information. Both case studies examined these medical evidence request and collection systems from organizational and technical perspectives.

MGH Case Study

The MGH case study focused on the organizational impact of implementing electronic solutions to aid in collecting and developing medical evidence, from a provider's perspective. Healthcare organizations must understand that technology can help raise productivity and eventually reduce costs, while increasing the efficiency of handling medical evidence requests and releasing information. This case study describes the system for electronic release of medical information implemented by MGH. The study also investigates the impact of implementation on the overall response to medical evidence requests and resulting productivity at MGH.

MGH receives more than 41,000 medical evidence requests annually (Table 4). These requests come from different sources, such as other healthcare facilities and provider offices, insurance companies, patients, SSA, etc. In 2008, twelve full-time-equivalent (FTE) employees, called abstractors, handled the requests. Approximately 7,000 of the 41,000 requests received in 2008 were for SSA disability determination; one full-time abstractor handled all 7,000 requests. Prior to implementing MGH's electronic system to interface with ERE, the handling process for all medical evidence requests, including SSA requests, was highly paper-based and very inefficient. Although MGH used EHRs for most of the in-patient services provided in its facilities, researchers observed that those EHRs still required inefficient paper printing before being scanned to a digital image in the process described earlier in this article.

| Table 4: MGH Requester Type Summary FY 2008		
Requester Type	Requests Completed	Overall Percentage
Healthcare facilities	9,840	24.00%
Attorney offices	6,970	17.00%
SSA (for disability determinations)	6,560	16.00%
Physician offices	4,510	11.00%
Insurance companies	4,100	10.00%
Patients	4,100	10.00%
Government entities	1,640	4.00%
Others	3,280	8.00%
Total	41,000	100.00%
Source: MGH		

To improve productivity, reduce costs, and increase revenues, MGH implemented an electronic information exchange solution. This system now replaces the paper-based system for a large number of medical evidence requests. An MGH official noted: "The use of Social Security's ERE secure server for the exchange of medical record information was really our 'tipping point' in the electronic exchange of records for MGH. The results of the

pilot with SSA were extraordinary, and we could easily see the benefit to developing a similar method for handling the thousands of other medical record copy requests we process each year."

The researchers were able to observe the workflow of an abstractor using the ERE system while the abstractor narrated the process. SSA sends medical evidence requests electronically to the MGH abstractor, who receives an e-mail notification indicating that a new request arrived. The abstractor then selects the relevant information from the EHR and Longitudinal Medical Record (LMR) systems, saves it as a PDF file, and, through secure access, uploads it directly to the ERE system.

MGH maintains statistics related to medical evidence processing. The abstractor monthly performance chart in Figure 5 shows a noteworthy increase in the performance of the SSA abstractor, starting when electronic processing of medical evidence requests entered the workflow.

In the first half of 2007, before ERE implementation, the MGH abstractor responsible for SSA requests processed an average of 278 medical evidence requests each month. This number was consistent with the monthly average of requests processed in previous years. In the second half of 2007, this number increased to 579, then increased again to reach 639 in the first half of 2008. Despite the increased volume, MGH realized a 24 percent improvement in turnaround time after ERE implementation.
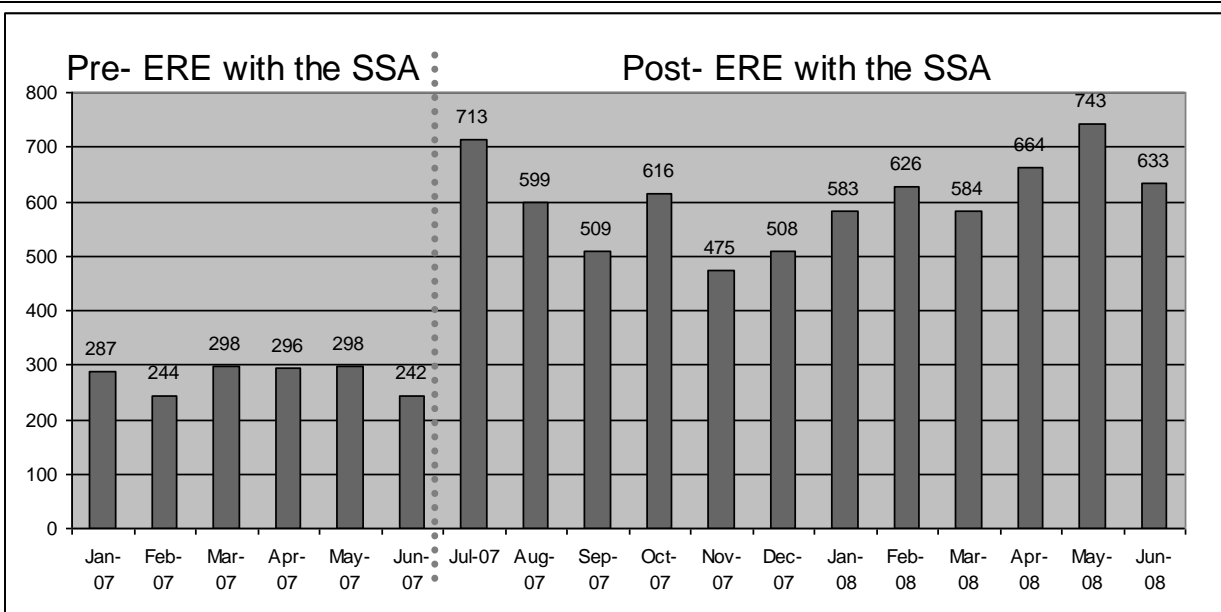
Source: MGH

Figure 5. MGH SSA Abstractor Performance Pre- and Post-ERE

The successful results derived from MGH's use of a secure server to respond to medical evidence requests encouraged MGH to apply a similar solution to other major requestors. Unlike SSA, however, other medical information requesters, such as insurance companies, attorneys, other providers, and the patient, did not have secure servers for electronic sending and receiving requests. This lack prompted MGH to establish its own Secure Delivery Server (SDS) in order to have a better solution in place for processing interorganizational health information requests. The SDS allowed MGH and requestors the same or similar efficiencies realized with SSA.

The MGH experience resulted in using electronic systems to improve productivity and increase efficiency of existing workflows. At the time of this study, the improved productivity and increased efficiency did not translate to human resource cost savings; however, their response times to SSA were faster. An MGH official was quick to point out that the use of information systems in and of themselves does not mean that people will lose jobs. Rather, the improved efficiency would eventually lead to some repurposing of staff and, therefore, a cost savings downstream, in that MGH would avoid the need to hire additional staff. MGH staff also noted that this use of electronic systems to collect and submit medical evidence meant they were able to avoid hiring additional people to fulfill increasing medical evidence requests. With a solution designed for a single customer, MGH was able to realize greater value, as it "became the first hospital in the state to begin submitting medical evidence records to BCBS (Blue Cross Blue Shield) of Massachusetts electronically. This has been a win–win … for MGH and Blue Cross."

Overall, employee productivity increased due to efficiencies created by the information technologies. Customer satisfaction, including SSA's satisfaction, increased due to improved response time and the standardized electronic submission format. As a result of these improvements, MGH can handle a higher volume of medical evidence requests without increasing the number of employees needed to process them. Hence, MGH is able to respond to increased demands without increasing human resources.

By automating an existing paper-based process, the information system solutions used by MGH improved overall productivity and customer satisfaction. This case study also demonstrates how a solution used for one requestor (SSA) can be applied to others to increase productivity further within an organizational setting.

BIDMC Case Study

The next step in using electronic systems for disability determination is direct system-to-system communication between payer (SSA) and provider. BIDMC collaborated with SSA to develop a next-generation system to expedite the authorized request for and release of medical evidence for disability determination. This prototype system, called MEGAHIT (Medical Evidence Gathering and Analysis through Health IT), started operation in August 2008 and facilitates authorized medical evidence requests from DDS offices in Boston and Worcester, Massachusetts. This case study was valuable for understanding the potential for providers to partner with SSA and to enable MEGAHIT to improve medical evidence development.

In terms of organizational context, BIDMC, located in Boston, has 1,200 physicians who see approximately 750,000 patients annually. Regarding Health IT, the spearheading efforts of BIDMC are well known. BIDMC develops and deploys information systems and technologies to provide patient information in a timely manner to different types of requesting organizations such as SSA, clearinghouses, and private insurance companies. BIDMC processes over 30,000 medical evidence requests annually, of which 17 percent are disability related (Table 5).

Table 5: BIDMC Requester Type Summary FY 2008		
Requester Type	Requests Completed	Overall Percentage
Workers' Compensation	126	.42%
All Subpoenas	790	2.61%
All Risk Management (BIDMC and others)	14	.05%
Patient	2,212	7.35%
Medicare/Medicaid	13	.04%
Government Agency	217	.72%
Fax	986	3.26%
Disability	5,059	16.73%
Continuing Care	11,269	37.27%
Business Office/Pt. Financial Services	17	.06%
All Others	1,153	3.81%
All Insurance	3,935	13.00%
All Attorneys	4,449	14.71%
Total	30,240	100% (rounded)
Source: BIDMC		

Before BIDMC collaborated with SSA to use SSA's MEGAHIT application, they report that their methods for processing and responding to medical evidence requests were inefficient and time consuming. As this study previously noted, processing and developing medical evidence requests often takes weeks, months, and even years when using paper-based records requiring human interaction. MEGAHIT converts the manual process into a system-to-system process that takes just seconds, with full automation of HIPAA-compliant authorization and subsequent medical record location, verification, and data transmission. The time saved can translate into savings and/or cost avoidance (such as not paying for CEs) for all the stakeholders: SSA, BIDMC, and the claimants.

As documented in a related analysis of the BIDMC case with SSA, the MEGAHIT prototype demonstrates the potential value of such system-to-system electronic data transmission [Feldman and Horan, 2011]. For this prototype, an identification combination of any of the four participating BIDMC facilities and the appropriate DDS office can trigger the MEGAHIT application. The triggering leads to a cascade of system-to-system communications and subsequent data transmission. During its first six months of operation (August 24, 2008, to February 28, 2009), SSA processed 396 authorized medical evidence requests electronically via MEGAHIT with an average processing time of forty-two seconds. As several BIDMC interviewees noted, it was precisely this type of technical advance that their organization wanted to be associated with, as part of its general leadership philosophy in Health IT. More specifically, the Chief Information Officer at BIDMC stated, "A successful pilot could lead to wide adoption of data

sharing in support of the disability process and integration of these workflows into the Nationwide Health Information Network. Best of all, the enhanced service to patients will likely result in lower overall costs, making implementation fundable from the savings of eliminating paper record transfer" [Halamka, 2009].

Additional value of a data transmission system such as MEGAHIT lies in the benefits to the claimant. The societal value of being in the business of helping claimants was evident throughout all the interviews. Interviewees often noted that when SSA receives requested medical evidence sooner, a benefit determination can be made sooner. Claimants can then receive their financial and health benefits sooner, leading to better access to healthcare and less disruption during what is usually a complicated period of their lives. As noted earlier, financial benefits are paid retroactive to the disability allegation date. However, health benefits (i.e., access to healthcare) are not retroactive and thus, claimants may not seek healthcare until there is a catastrophic need to do so. Such catastrophic health-seeking behavior can contribute to increase medical care costs. It important to note, that such health benefits result in payments to the provider for care provided. As such, there is no advantage to delayed submission of medical evidence.

At a general level, this case study is an example of using clinical data for nontreatment purposes. While that concept is not new (use of medical records for nontreatment purposes is not uncommon), the use and transmission of health record data between a provider and a major government agency is innovative: The electronic analysis and transmission of data occur without human interaction in a system-to-system manner.

Note that this case study occurred too early in the life of the prototype to identify any appreciable improvements in productivity. Using the previously described ERE system, BIDMC representatives report an average turnaround time of five days for SSA disability requests. While that seems fast, one BIDMC representative commented: "Every day for a person awaiting a benefit decision is a long day, and if we can contribute to making that faster, even by one day, we have done our job."

Massachusetts (MGH, BIDMC, and the MA DDS) represented an opportunity to examine the relationship between use of EHRs and electronic submission practices to SSA. In general, the providers felt that they could respond to medical evidence requests more efficiently and expeditiously. Likewise, examiners at the MA DDS felt they were able to make determinations much faster. DDS examiners discussed that this included both favorable and unfavorable determinations, however, once a claim is determined favorable, no further medical evidence development is necessary. To the contrary, an unfavorable decision requires development of all medical evidence and, when necessary, a consultative exam. While much of this information is anecdotal (only MGH supplied performance records), it may indicate the potential impact of Health IT on medical evidence development.

Research Element 3: Claimant Perspective

This component of the study served to illustrate the claimant's perspective on the disability determination process. To accomplish this goal, we examined twelve claimant files from New Hampshire that varied widely in terms of the adequacy of medical evidence received (Was a CE required?) and delays in the collection process (How quickly was evidence received?). Regarding the adequacy of medical evidence, ten of the twelve cases (all except Jane and Ryan)[4] required a CE to complete the initial determination. One study found that the initial determination process averaged five months from application to determination [Benitez-Silva, 1999], but the national average for initial determinations is 88.9 days [Social Security Administration, 2009a].

Researchers chose three claims from the twelve for analysis because they illustrated the range of claimant experiences: (1) a relatively expeditious claim, in terms of a favorable determination (Ryan); (2) a typical claim, in terms of time elapsed (James); and (3) an extremely delayed claim (Bob). These claims also highlighted different types of delays in disability determination: in one, the process appears to have operated optimally (Ryan); in another, the medical evidence received from the claimant's treatment sources was not adequate, necessitating a CE for a determination (James); and in the third, a delay in receipt of requested medical evidence affected the timeliness of the claim (Bob). Table 6 illustrates these three cases (in bold) representing various levels of medical evidence collection.

The first claim examined was Ryan's. Ryan was a truck driver before suffering a heart attack. As he recovered from his heart attack, his neurologist noticed that the neurological symptoms previously attributed to his heart attack did not subside as expected. Further investigation of Ryan's symptoms led his neurologist to diagnose Multiple

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[4] The claimant names provided in this document are fictitious and do not identify the actual name, gender, or ethnicity of the claimant.

Table 6: Levels of Delays Caused by Delay and Adequacy of Medical Evidence				
Claimant	Delay of Medical Evidence	Adequacy of Medical Evidence		
Ryan	**Low**	**High**	Delay of Medical Evidence*	
Emily	Low	Medium	Low	< 5 months
Anna	Medium	Low	Medium	> 5 and < 10 months
Sarah	Low	Medium	High	> 10 months
David	Low	Low	*Determination of 5–10 months based on	
Adam	Low	Medium	Benitez-Silva's 1999 findings as well as where a majority of our cases fall in Figure 3.	
James	**Low**	**Low**	Adequacy of Medical Evidence	
Alice	Low	Medium	Low	$CE \geq 1$
Jane	Medium	High	Medium	$CE = 1$
Michael	Medium	Low	High	$CE = 0$
John	Low	Low		
Bob	**High**	**Low**		

Sclerosis. Ryan was unsure about the Social Security disability program and initially telephoned his local SSA field office.[5] Still unclear on how to proceed, even whether or not to proceed with his claim for benefits, Ryan contacted a disability representative for help in filing his claim. At the initial determination level, he received a favorable determination qualifying him for disability payment.

Ryan's claim suggests that there was abundant medical evidence available for a determination. More than ten doctors were treating Ryan for his various conditions, which created substantial medical treatment notes and other medical evidence that the disability examiner could use in making a determination. As mentioned, Ryan used the services of a disability representative from the beginning of the process. This claim is representative of the national average (88.9 days) for determination at the initial level [Social Security Administration, 2009a].

As Ryan's case illustrates, having adequate and timely medical evidence at the initial level of determination is ideal and contributes to an expeditious decision. However, in many more cases, SSA receives the requested medical evidence in a timely manner, but the evidence is inadequate for a determination. When medical evidence does not provide adequate support for the disability allegation, the disability examiner commonly orders a CE. The CE provides a snapshot of the claimant's residual functional capacity (RFC) at the time of the examination. Although this "snapshot" may or may not provide a true picture of the claimant's capacity for work over an extended period of time, it potentially provides substantiation of the alleged disability.

The case of James, then a fifty-three-year-old printing press operator and printing estimator, is an excellent example of how inadequate medical evidence affects medical evidence development and subsequent decisions. The examiner assigned to James's case requested and received medical evidence from providers in a timely manner. However, the evidence received was not adequate for a determination, so the examiner scheduled James for a CE. Shortly after completion of the CE, James received notice that the CE report showed he had the capacity to perform other work. SSA subsequently denied James's disability benefits at the initial and reconsideration levels of determination. Frustrated and unsure of what to do next, James enlisted the assistance of a disability representative to help him navigate the appeals process. James eventually received a favorable decision on his claim for disability benefits after appealing at the Administrative Law Judge (ALJ) level. This level is the final state level of appeals in the Social Security disability determination process. The entire process took sixteen months after James filed the initial application.

One factor that apparently affected the time course of James' claim was the need to supplement the claimant's medical evidence with a CE. Physicians typically write treatment notes with a focus on diagnosis, treatment, and payment, but not on disability determinations. Therefore, the records frequently provide inadequate information to determine the claimant's RFC, which SSA needs for a disability determination. Another factor that contributed to the delay of this claim was the backlog of cases at the ALJ level.

The case of Bob exemplifies an extremely delayed claim. The processing spanned more than two years before reaching a decision that Bob was eligible for disability benefits. Bob was a forty-seven-year-old mechanic before he developed his disability from multilevel disc herniation, carpal tunnel, and arthritis, leading him to file for Social Security disability benefits. SSA notified him more than a year later that he was capable of doing light work and was

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[5] SSA field offices are community branch offices that handle SSA activities at a local level.

not eligible for benefits. Bob appealed the denial in July and had an ALJ hearing in April of the following year. One month after the hearing, the ALJ found Bob was eligible to receive benefits. Several factors appeared to affect the delay of Bob's claim. One was the backlog of appeals at the ALJ level, which delayed the ALJ hearing until approximately eight months after he filed the appeal. Missed CE appointments (due to lack of transportation) also contributed to this delay and compounded Bob's financial hardship during the appeal process.

VI. DISCUSSION

These multi-stakeholder findings provide insight into processes surrounding disability determination and the need for information systems to support the timely development of adequate medical evidence. Most importantly, although various electronic systems are in place at the different stakeholder levels and provide varying degrees of efficiency, frustrations still exist at each level examined. These findings suggest that information systems are not the only factor in reducing delays in medical evidence collection.

The following discussion considers the research question: What is the present and potential role of Health IT in streamlining medical evidence development from various stakeholder perspectives? We also consider three themes that emerged during data analysis: practices, challenges, and potential solutions involved in the timely collection of complete and adequate medical evidence collection. As above, the discussion follows the multi-stakeholder perspectives of the payer (SSA), medical provider, and claimant. Linkages between the themes and overall findings by stakeholder are illustrated in Figure 6 and explained in the sections below.
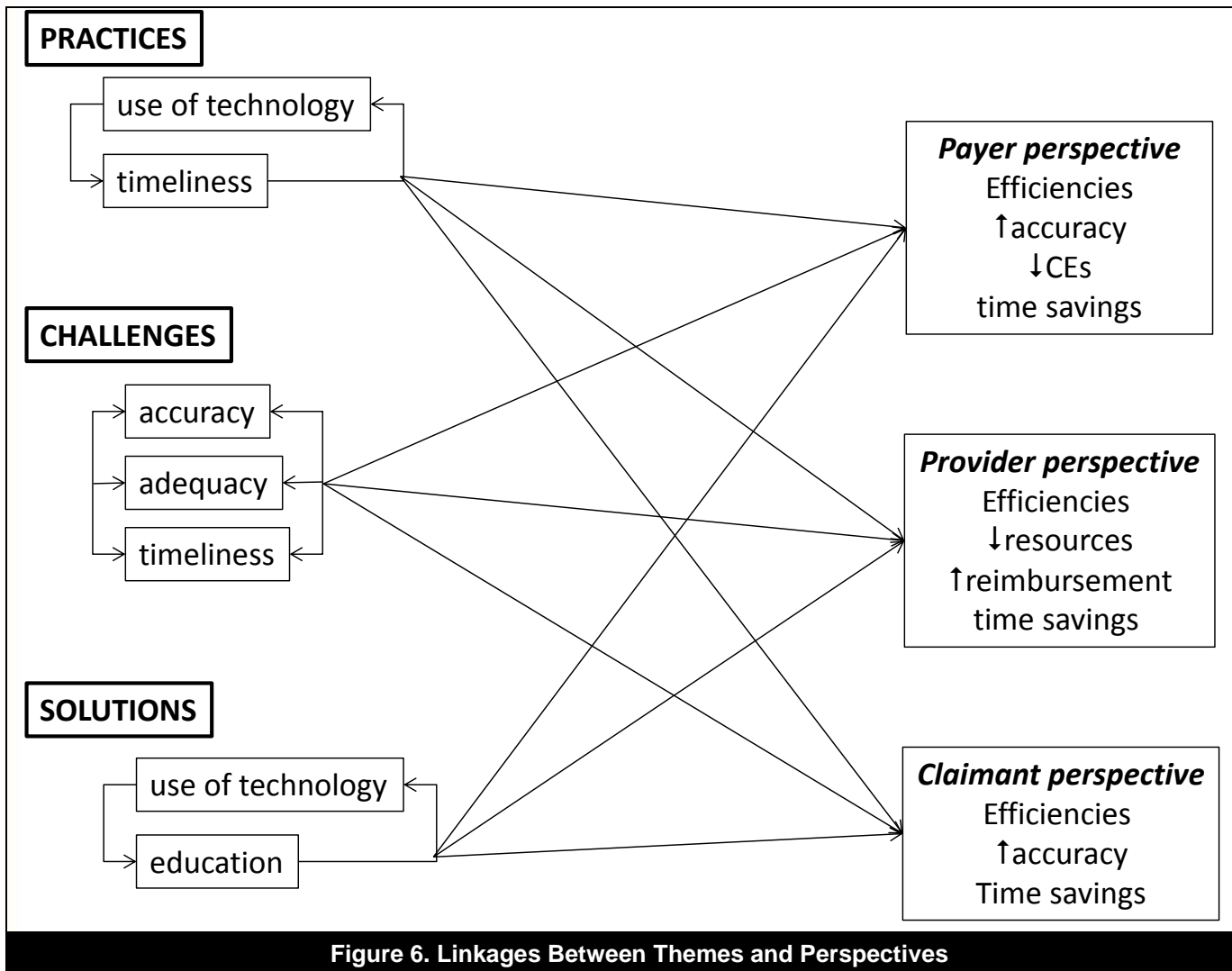
Figure 6. Linkages Between Themes and Perspectives

From the *payer*'s perspective, and comparing the three states, information systems evidently create greater efficiency in the overall disability determination process. This effect is clear when comparing California, which still operates in a primarily paper-based environment, with Florida, which operates electronically at the agency level but less so at the provider level. Comparing these two states to Massachusetts, which is electronic both at agency and

some provider levels (this study considered only MGH and BIDMC), illustrates the advantages of using EHRs and other electronic methods to efficiently collect and submit the medical evidence requested by SSA.

This study examines various levels of electronic practices and challenges in requesting medical evidence for SSA disability claims and variation in how each level affects timely collection of medical evidence. Collecting medical evidence is only one step in the medical evidence development process, and medical evidence development is just one component of the disability determination process. Understanding that disability determination begins with an application for benefits, the study results suggest that having more accurate provider information (i.e., physician name, address, and phone) when a claimant applies for disability can accelerate collection of medical evidence. The downstream impacts could lead to fewer CEs and significant time savings in the overall disability determination process.

Regarding the potential solutions and uses of Health IT at the payer level, our findings suggest that such systems can improve the timeliness and efficiencies in medical evidence request, collection, and even analysis. For example, MGH's 24 percent and BIDMC's 42 percent improvement in turnaround time suggest that the DDS is able to collect the medical evidence faster. Furthermore, when this medical evidence is received in a standardized format, as in these two instances, the opportunity exists for more efficient analysis. These improvements, in turn, create financial and operational efficiencies for both DDS and medical providers. Based on our cross-state synthesis, all three levels of stakeholders appear to play an important role in the overall process of disability determination. As a major step in progressing toward a more efficient process, both payer and providers need to implement electronic information systems. To complement this progression, using PHRs on behalf of claimants in order to store and retrieve accurate provider information could contribute further to the overall disability determination process, providing accurate provider information earlier in the process.

From the *provider*'s perspective, findings of the MGH case study show that information systems practices can help providers respond to medical evidence requests more efficiently while using fewer resources. Moreover, implementing and using Health IT results in faster turnaround times and a lower demand on resources. Based on the findings, the technologies implemented helped pave the way to a more standardized process of receiving and responding to requests for medical evidence.

In the case of BIDMC, the study showed how health information systems such as MEGAHIT, in concert with providers' use of EHRs, provide the opportunity for expeditious transmission of claimant information for nontreatment use. These system-to-system processes, involving no human interactions for requesting or collecting medical evidence, can reduce the occurrence of incomplete medical evidence. Less frequent occurrence of inadequate evidence significantly reduced collection times from weeks to minutes.

Regarding the benefits of such information system solutions, the SSA MEGAHIT solution used by BIDMC produces system-generated, organized, and standardized human-readable medical evidence for inclusion in the claimant's electronic folder. Medical evidence provided in this manner may tend to be more comprehensive in that it is pulled from EHRs, which typically contain more complete information than paper records. While multiple provider benefits occur, such as human and fiscal resource savings, other benefits also result. For example, faster turnaround time in processing medical evidence requests leads to faster decisions for the claimants. Faster decisions can lead to access to healthcare and subsequent provider reimbursement.

From the *claimant*'s point of view, filing an application for disability determination can be a frustrating procedure of providing the extensive information required to complete the disability application. Electronic systems, such as PHRs, could aid in gathering correct and complete information from the claimant about their various treatment sources. Such electronic systems would enable better record collection, potentially reducing delays in the process [Tulu and Horan, 2009; Social Security Administration, 2009a].

Underlying the potential role of Health IT in disability determination is the business model that would sustain this practice. The research established that the current system suffers from inefficiencies, and that Health IT could improve the process, thereby saving time. However, this research does not address the value propositions that participating parties would need to realize. Related research by two of the authors [Feldman and Horan, 2011] provides complementary analysis suggesting that the parties engaged in use of Health IT for disability determination realize blended value propositions. The "blended" value proposition is the bottom-line return on investment (ROI), as well as less tangible social value factors also important to payers and providers. However, we did not yet address the question of whether a blended value proposition is enough to merit sustained support by these parties (in their individual and collective perspective).

This study has both practical and research implications. In terms of practical implications, there is promising evidence that electronic systems can improve the request and collection of medical evidence for disability determination. Furthermore, these efficiencies can lead to faster determination times, thereby providing financial and healthcare benefits. However, information systems such as those presented cannot exist in isolation. The systems must be combined with corresponding modification of business processes to realize their full potential. Regarding its research implications, this study highlights the advances that EHR and other Health IT solutions can have on this high-impact population. Both of these contributions are unique in and of themselves, but also in the context of study–disability determination. However, the research also exposes the need for additional study in this area. Deeper practical and research implications likely exist in the future study of the business case for increased use of Health IT for disability determination.

This study has several limitations. First, at the payer level, the study design limited DDS interviews to three states: California, Florida, and Massachusetts. Selection of these states enabled the study to illustrate three points on the continuum of degree of electronic infrastructure supporting disability determination. At the provider level, the case studies occurred at two hospitals at the forefront of using Health IT and electronic submission of medical evidence for disability determination. Our findings show that integrating electronic systems into the functions of both the agency and provider creates the greatest efficiency in the overall process of disability determination. The case studies at MGH and BIDMC supported this argument to some extent, but this study did not attempt a quantitative estimate of the operational and fiscal savings provided by electronic systems. At the claimant level, the study analyzed twelve claims through a convenience sample. The in-depth analysis of these twelve claims (of which three were highlighted) is illustrative but by no means represents a comprehensive assessment of the full spectrum of cases. These limitations influenced our ability to perform in-depth, cross-state, multi-stakeholder analysis of the role of Health IT in medical evidence development and limited the possibility of generalizing from the findings. Even with these limitations, the findings illuminate other uses for Health IT located outside the sphere of the obvious. This area of study would benefit from future research that does an in-depth analysis of all stakeholders in several states, in order to gain more insight into the role of Health IT and the associated ROI in disability determination.

VII. CONCLUSION AND DIRECTIONS

Increased interest in using Health IT, especially in facilitating interactions within the triad of payer, provider, and patient, focuses on understanding the interrelationships of this triad from a clinical or operations standpoint. The present study investigated how this triad operates in the nonclinical but important realm of disability claims. Within the context of the disability claim process, the payer is SSA, the provider is any treating healthcare organization, and the patient is the claimant.

Indeed, passage and establishment of the American Recovery and Reinvestment Act of 2009 (ARRA) holds promise for accelerated adoption and implementation of EHRs [Department of Health and Human Services, 2009]. Consistent with this development, SSA announced that a significant portion the ARRA funding allocated to them will be used to expand their Health IT initiatives, including participation in MEGAHIT [Social Security Administration, 2009c]. This commitment demonstrates that SSA embraces the claim that Health IT, as suggested by MGH's 24 percent and BIDMC's 42 percent improvement in turnaround times, has a significant role in faster medical evidence collection. Such commitments attempt to improve a process that has inherent inefficiencies. The outcomes and economic benefits of such government expenditures represent an area ripe for future analysis. The DDS does not always receive adequate and timely medical evidence, the provider is overwhelmed with medical evidence requests, and the claimant frequently does not remember details about the multiple care providers. Although workflow challenges need to be addressed at the payer level, electronic systems (such as ERE and MEGAHIT) can aid SSA in obtaining medical evidence more rapidly. These electronic systems can also aid providers in making this information available in a cost-effective manner and can give claimants necessary guidance for supplying SSA with accurate and complete provider information. Thus, the successful design and deployment of such electronic systems provides value to all members of this triad of stakeholders.

In summary, as the Health IT landscape evolves, there will undoubtedly be a variety of innovations that improve the efficiencies of the triad. We hope this study demonstrates that research should not focus exclusively on technologies pertinent to clinical uses, but should encompass nonclinical uses as well. Health IT holds considerable value for nonclinical uses of health information. A role exists for Health IT in the disability determination process. This role is clear in the variety of promising solutions for providing more accurate provider information, enhancing timely collection of medical evidence, and increasing overall request, collection, and analysis using a "system-to-system" approach for data transmission. Given the heightened policy attention to Health IT, the time is ripe for advancing the use of these systems in the disability determination process. In so doing, the systems will improve the plight of millions of Americans who may need to rely on this process for their much needed benefits.

ACKNOWLEDGMENTS

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Editor's Note: The following reference list contains hyperlinks to World Wide Web pages. Readers who have the ability to access the Web directly from their word processor or are reading the article on the Web, can gain direct access to these linked references. Readers are warned, however, that:

1. These links existed as of the date of publication but are not guaranteed to be working thereafter.
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