2012

Caregivers and Computers: Key Lessons from the Adoption and Implementation of EMR in New York State Nursing Homes

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Abstract

This chapter presents an overview of our evaluation of the introduction of electronic medical records (EMR) in 20 nursing homes located in the New York City region. These organizations were part of an EMR demonstration project cosponsored by the for-profit segment of the nursing home industry in the region and 1199SEIU United Health Care Workers East, the union that represented frontline staff in these organizations. We report central lessons from our evaluation, which took place over the course of four years and included multiple data sources. The primary purpose of our research was to examine the effects of EMR adoption on employment and labor relations in the participating organizations. Findings are based on a longitudinal study of EMR adoption in 15 of the 20 organizations that received the EMR technology and five "control" organizations, which did not receive the technology, employing a mixed methodological design with both quantitative and qualitative data collection methods. Results from our research inform the existing EMR adoption discussion in two ways. First, we find mixed evidence associated with EMR implementation. The adoption of this new technology enhances certain organizational outcomes, but it seems to hinder others. Second, findings from our research highlight the importance of preexisting organizational factors as predictors of EMR- associated outcomes. EMR-associated outcomes, positive or negative, are likely to be contingent on key organizational characteristics and on managerial adoption strategies. Our study's findings imply that the meaningful use of EMR needs to take into account not only the technical specifications of EMR but also the organizational characteristics of the physician practices and healthcare facilities adopting the technology. Healthcare organizations vary in their capacity and ability to make optimal use of health information technology, which should be incorporated into public policy and organizational practices designed to increase adoption.

Keywords

EMR, nursing homes, workplace, employment relations, technology acceptance, management strategy

Disciplines

Geriatric Nursing | Health Information Technology | Health Services Administration | Labor Relations | Other Medicine and Health Sciences | Other Nursing

Comments

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Abstract

This chapter presents an overview of our evaluation of the introduction of electronic medical records (EMR) in 20 nursing homes located in the New York City region. These organizations were part of an EMR demonstration project cosponsored by the for-profit segment of the nursing home industry in the region and 1199SEIU United Health Care Workers East, the union that represented frontline staff in these organizations. We report central lessons from our evaluation, which took place over the course of four years and included multiple data sources. The primary purpose of our research was to examine the effects of EMR adoption on employment and labor relations in the participating organizations. Findings are based on a longitudinal study of EMR adoption in 15 of the 20 organizations that received the EMR technology and five "control" organizations, which did not receive the technology, employing a mixed methodological design with both quantitative and qualitative data collection methods. Results from our research inform the existing EMR adoption discussion in two ways. First, we find mixed evidence associated with EMR implementation. The adoption of this new technology enhances certain organizational outcomes, but it seems to hinder others. Second, findings from our research highlight the importance of preexisting organizational factors as predictors of EMR-associated outcomes. EMR-associated outcomes, positive or negative, are likely to be contingent on key organizational characteristics and on managerial adoption strategies. Our study's findings imply that the meaningful use of EMR needs to take into account not only the technical specifications of EMR but also the organizational characteristics of the physician practices and healthcare facilities adopting the technology. Healthcare organizations vary in their capacity and

ability to make optimal use of health information technology, which should be incorporated into public policy and organizational practices designed to increase adoption.

INTRODUCTION: MOTIVATION AND PROJECT BACKGROUND

Motivation

This chapter presents a summary and overview of our evaluation of the introduction of electronic medical records (EMR) in 20 nursing homes located in the New York City region. These nursing homes included in this study participated in the New York State Nursing Home Demonstration Project, which was cosponsored by the for-profit segment of the nursing home industry in the region and 1199SEIU United Health Care Workers East, the union that represented frontline staff in these homes. A significant feature of the demonstration project was the collaboration between the nursing home operators and the union. The two sides in collective bargaining, often adversaries in previous years, worked closely together throughout the demonstration project. First, the parties jointly lobbied the New York State Legislature and the governor and obtained $9 million in state funding to subsidize the installation and implementation of EMR in 20 nursing homes of approximately 140 for-profit facilities in the New York City region. Second, the parties worked closely together throughout the process of installing and implementing the new technology.

We summarize the central lessons and findings from our evaluation, which took place over the course of nearly four years (2006-2010) and included multiple data sources. The primary purpose of our research was to examine the relationship between EMR adoption, on the one hand, and employment and labor relations in the participating nursing homes, on the other. To our knowledge, there have been no previous studies that have examined the relationship between EMR adoption and these organizational relationships in nursing homes. The findings

reported below are based on a longitudinal study of EMR adoption in 15 of the 20 nursing homes

that received the EMR technology and five "control" homes, which did not receive the

technology, employing a mixed methodological design with both quantitative and qualitative

data collection methods.[1]

Assessing the relationship between EMR adoption and key workplace outcomes in 15

nursing homes has the potential to contribute to the broader debate regarding EMR's costs and

benefits. An important element in President Obama's economic stimulus package, the American

Recovery and Reinvestment Act, passed in February 2009, was the inclusion of $19 billion to

support the installation of EMR in U.S. healthcare institutions (Pub.L. 111-5, 2009). President

Obama has explained his support of investing federal dollars in EMR on numerous occasions.

For example, in discussing his proposed stimulus package in a radio address in December 2008,

he said:

> [T]he economic recovery plan I'm proposing will help modernize our health care
> system—and that won't just save jobs, it will save lives. We will make sure that every
> doctor's office and hospital in this country is using cutting edge technology and
> electronic medical records so that we can cut red tape, prevent medical mistakes, and help
> save billions of dollars each year.

In emphasizing the need for EMR, President Obama has followed the advice of numerous

healthcare experts who have pointed out that the healthcare sector lags behind other industries in

the use of information technology (Ash & Bates, 2005; Bates & Gawande, 2003; Fiscella &

Gelger, 2005). EMR proponents maintain that the widespread use of EMR would help to

improve patient safety (Bates & Gawande, 2003), control the costs of healthcare (Hillestad,

Bigelow, Bower, Girosi, & Meili, 2005; Poon et al., 2006), and lead to significant improvements

in the quality of healthcare Americans receive (Chadhry et al., 2006). As is evident from the

intense public policy discussion around EMR adoption, the expectations from this innovation are

extremely high, yet the empirical evidence is still incomplete (Blumenthal & Glaser, 2007; Harrison, Koppel, & Bar-Lev, 2007; Koppel et al., 2005; Linder, Ma, Bates, Middleton, & Stafford, 2007). Thus, we believe the results we report here should contribute to the state of the EMR debate. It is also important to note that much of the research examining the relationship between EMR and healthcare and workforce outcomes (and referenced in this chapter) has been conducted in physician practice and hospital settings. Research on EMR in nursing homes has been much less prevalent (Brandeis, Hogan, Murphy, & Murray, 2007; Pillemer et al., 2011; Subramanian et al., 2007).

Despite high expectations about the benefits of EMR, recent studies have found mixed evidence regarding the effect of EMR on patient care outcomes (Blumenthal & Glaser, 2007; Sidorov, 2006; for mixed evidence in nursing homes, see Pillemer et al., 2011). For example, Linder et al. (2007) examined 17 quality care indicators in ambulatory medical units and found that the adoption of EMR had a significant positive effect on only two of them; one quality indicator was negatively affected. Similarly, DesRoches et al. (2010) examined the relationship between EMR adoption and quality and efficiency outcomes in 3,049 U.S. hospitals and found very modest effects at best. Other scholars maintain that alongside potential benefits, EMR can also have negative consequences, especially with regard to how providers interact and communicate (Harrison et al., 2007; Koppel et al., 2005).

One potential explanation for some of the mixed evidence regarding the effects of EMR rests on the absence of attention, by scholars and practitioners, to the organizational context in which the technology is embedded. Although less emphasized in the research on EMR adoption and implementation, there is also an implicit assumption that the use of this new technology may enhance the quality of employment relations. Previous research on EMR, however, has largely

ignored the effects of this technology on employment-related outcomes as well as the link between employment relations and the quality of care (for an exception see Litwin, 2010). The absence of research that linked the adoption of EMR to changes in the workplace and, in turn, linked changes in the workplace to changes in the quality of care was one of the principal factors motivating our nursing home project.

Background

The collective bargaining agreements between 1199SEIU United Health Care Workers East and operators of nursing homes in downstate New York provide for the establishment of the Quality Care Oversight Committee (QCOC), which is directed to "develop and monitor the establishment and performance of the Quality Care Committees [QCC] at the individual nursing homes." The QCOC has several responsibilities, including "the implementation of clinician-centric electronic medical records; automation of assessments, care plans, and prescriptions; improved data collection and provision of accessible consumer information and patient satisfaction."[2]

In March 2006, an arbitration award dealing with the implementation of these agreements between the parties directed the QCOC "to develop and commence research and demonstration programs" in a sample of nursing homes that provide for "the acquisition of electronic monitoring and data collection equipment; professional training of staff members in the use of such electronic equipment; ... revision of computerized systems and network communications," and related tasks.[3] The arbitration award prompted the union and the nursing home operators to work together in obtaining funds from the New York State Legislature to support the

introduction of EMR in a sample of for-profit nursing homes in the New York City area. The

joint lobbying effort by the parties resulted in the State of New York allocating $9 million to

support the tasks mandated by the arbitration award. The QCOC demonstration project offered

the opportunity to mount a unique, integrated, and multidisciplinary study that would likely have

implications for our understanding of how the implementation and diffusion of new technologies

affect workplace relationships and, ultimately, outcome measures.

EVALUATION METHODOLOGY AND DESIGN

General

In our evaluation of the Demonstration Project, we employed a longitudinal mixed-

method research design using a number of original survey instruments and a detailed qualitative

interview protocol.[4] Our research design combined both quantitative and qualitative dimensions

at two points in time - pre- and post-EMR implementation. For our quantitative evaluation, we

used a quasi-experimental design that incorporated 15 (out of the 20) homes that received the

technology and five control homes that did not. Table 1 provides the name of each treatment and

control facility and some basic descriptive statistics about these facilities. As the table shows, all

of the treatment and control homes were either in New York City (i.e., the boroughs of Brooklyn,

Bronx, Manhattan, Queens, and Staten Island) or on Long Island (i.e., in Nassau or Suffolk

County). The organizations ranged in size from a low of 120 beds to a high of 320 beds. The

control nursing homes were carefully selected to provide a close match to the 15 treatment

nursing homes. Whenever possible, we selected a control home that had common ownership

with a treatment nursing home. We designed a number of survey instruments that captured the central constructs examined in this evaluation across different categories of employees. The development of the survey instruments was iterative and benefited from the input and engagement of different project stakeholders, including the QCOC, the EMR vendor (eHealth Solutions), and the project coordinator.

Insert Table 1 Here

Quantitative Data Collection

Baseline Survey Data Collection

The nursing homes that participated in the demonstration project were required under the terms of the contract they signed with the QCOC to cooperate with the research team conducting the evaluation. Through the office of the project coordinator, we requested that each home provide us with an up-to-date and complete list of all staff employed by the home, including their job title, home telephone number, and e-mail addresses. From these staff lists, we selected all of the direct caregivers (registered nurses (RNs), licensed practical nurses (LPNs), and certified nursing assistants (CNAs) and allied professionals) in the 15 treatment homes and the five control nursing homes for inclusion in our survey. We excluded from the survey administrators and supervisors who were not usually in day-to-day contact with residents in the nursing homes.

Our baseline survey instrument was administered by Cornell's Survey Research Institute (SRI). We collaborated closely with SRI on the design of the survey instrument and the

administration of all the surveys we conducted as part of our study. The baseline and follow-up surveys were conducted by telephone; SRI assumed responsibility for training the interviewers (principally graduate students or part-time employees recruited from the Ithaca area). After conducting a small pilot survey to verify the validity and reliability of our survey instrument, we administered the full survey. With the assistance of SRI, we developed a so-called "announcement letter" that we mailed to the home address of each staff member included in our survey population. The announcement letter, which briefly described the purpose of our survey and assured the respondent of the confidentiality of his or her responses, was mailed approximately seven to ten days in advance of an SRI interviewer calling the respondent at his or her home phone number to administer the survey.

We conducted the baseline survey immediately before the installation of the EMR technology by the vendor in each of the 15 nursing homes we included in our evaluation. Simultaneously, we also conducted a baseline telephone survey in the five control nursing homes. The same baseline instrument was used in both treatment and control nursing homes. The vendor, eHealth Solutions, installed its EMR technology, called SigmaCare, in two and three homes at a time between June 2007 and the Spring 2008. We timed our baseline survey to occur at that point at which the technology was ready to "go live," but the staff in the nursing home had not yet begun training in its use. In general we had a two- or three-week window at each home in which to conduct the baseline survey. At the time our baseline survey was conducted, the interview population across the 20 nursing homes (the 15 treatment homes and the 5 control homes) included 3,177 employees in the occupational categories we included in our survey. We completed interviews with 1,241 employees; after omitting employees with inaccurate contact information and those who were unable to complete the survey from our sample, our response

rate for the baseline survey stood at approximately 50 percent. Table 2 provides the number of completed interviews at each of the 15 treatment facilities and 5 control homes. (To insure confidentiality, here, and in the final report we submitted to the sponsors, we use only letters of the alphabet to identify individual homes in our study; the order of the homes listed in Table 2 does not correspond to the order of the homes listed in Table 1.)

Insert Table 2 Here

Follow-Up Survey Data Collection

We conducted a follow-up (or "second-wave") survey between August 2008 and July 2009. The follow-up survey was timed to occur approximately one year after the installation of the technology. The procedures we followed in conducting the follow-up survey were virtually identical to those we used in the baseline survey. Again, we aimed to conduct the follow-up survey within a two- or three-week window, so the data for the respondents in the second- wave survey was collected between fifty and fifty-four weeks after the installation of EMR. To evaluate the degree to which the adoption of EMR technology was related to key organizational and employment variables, the primary instruments for the first and second wave were very similar. However, the second-wave instruments included additional items to assess the overall acceptance of the technology and the manner in which it was being utilized by frontline staff. In addition, our second-wave data collection included both employees who had left the organization after the implementation of the EMR technology and new employees who joined after the technology was in place. We tailored specific instruments for both of these categories to evaluate

the manner in which EMR technology affected both employees who left the nursing home and employees who were hired in the course of the year. In our follow-up survey our interview population across the 15 nursing homes in the treatment group and the 5 homes in the control group included 3,735 employees in the occupational categories included in our survey.[5] As with the baseline data collection, our response rate for this wave was approximately 50 percent, with 1,276 completed surveys across the different respondent categories. Table 3 provides means for some of the principal descriptive statistics for the Time 1 and Time 2 samples.

Qualitative Data Collection

In addition to collecting individual-level quantitative data through surveys, we also conducted qualitative field visits to 10 of the participating treatment nursing homes. (We limited our field work to 10 homes principally because of budget constraints.) In common with the survey data collection, we conducted pre- and post-EMR implementation interviews. Our first visit to each of the 10 nursing homes took place just prior to the introduction of the new technology. A year later we returned to the same 10 nursing homes and conducted a new round of interviews, usually with the same interviewees we had interviewed a year earlier. In contrast to the survey data collection, we did not conduct field research in control nursing homes. This decision was driven primarily by our interest in focusing on as many of the organizations that were receiving the technology as we possibly could, given our limited resources.[6]

Insert Table 3 Here

In our field visits, we generally spent at least half a day at each home, and we scheduled our visits based on the availability of the top administrator of the nursing home. We always interviewed the top administrator, and we usually interviewed the director of nursing services, the assistant director of nursing services, and several registered nurses (RNs), licensed practical nurses (LPNs), and certified nursing assistants (CNAs). In some cases we were able to interview the owner of the nursing home (who was sometimes the administrator as well). We also tried to interview union delegates at each of the nursing homes. Although we developed a protocol for our field interviews (and used variations of the protocol, depending on the individuals we were interviewing), we exercised flexibility in using our protocol. Quite often an interview evolved into an extended conversation about the interviewee's views on relevant matters. Unless the interviewee objected (and very few did), we recorded and then transcribed all of our field interviews. Typically, we interviewed at least a dozen individuals in each of the homes; in some homes (especially in the case of union representatives) we interviewed three or four individuals simultaneously. We interviewed about 150 individuals across the 10 nursing homes.

These field visits inform this evaluation in a number of important ways. It is through this qualitative component of our evaluation that we were able to observe firsthand how the technology was adopted and accepted at the organizational and individual levels. In our interview protocols we included questions designed to elicit information about an organization's implementation strategy. We did our utmost to use "neutral" questions, rather than leading questions, to avoid biasing the answers of the respondents. Although we had hypothesized that management strategy would play a key role in the implementation of the technology, we began our study with no preconceived notions about the types of strategies the nursing homes might pursue.

Finally, we have had the benefit of being involved in the project almost from the outset - shortly after the New York State Legislature funded the project - and therefore we have had an opportunity to attend various meetings at which the project was formed and developed. We had numerous conversations with the chair and members of the QCOC, the coordinator of the project, the vendor's management team, and various other stakeholders throughout the course of the project. Many of the lessons we learned over the course of conducting our research are based not only on the interviews we conducted in the field and the hard data contained in our surveys but also on our interactions with all of the key players during the nearly four years we conducted the evaluation.

KEY LESSONS OF THE STUDY

In this section, we summarize the major lessons that emerged from our nearly four years of immersion in this demonstration project. We offer a set of observations that should inform practitioners and policy makers who are contemplating the use of EMR in healthcare, which are, to be sure, not only based on our survey data and field interviews but also based on all the interactions we have had with all of the players involved in the project.

We need first to note that from a technical perspective the EMR technology was successfully installed and implemented in all 20 homes - an achievement that was in doubt at the start of the project and should properly be considered a threshold test of the success of the project. However, the major theme that emerges from our study of the New York project is one of variation. Its effects on the workplace, the workforce, and the quality of healthcare varied

substantially across the organizations studied. In the following sections, we discuss the variation in the effects of EMR as well as other lessons that grow out of our research.

The Adoption and Implementation of EMR Varied Greatly across Homes

Although all the homes adopted and implemented essentially the same technology, and although all frontline staff were required to use the EMR system, the implementation process as well as the manner in which they used the technology varied substantially across the nursing homes in our study. For some of the nursing homes, the use of electronic records did not differ measurably from their previous use of paper records. The administrators and staff in these nursing homes appreciated the greater accessibility of resident records that EMR allowed, and they realized that electronic records had other benefits, such as timeliness and reduction in errors, that paper records did not afford. Administrators in these homes generally recognized that the technology allowed them to monitor staff performance more carefully than they had been able to do using paper records. But these nursing homes did not fully reap the potential benefits available from the use of the technology. They did not appreciate the analytical and learning possibilities in having all resident records easily accessible in a common database.

In other nursing homes, by contrast, the administrators did understand that having resident records in electronic form permitted analysis of the data in ways that would have been nearly impossible when the records were in paper form. In at least a couple of nursing homes, top administrators came to realize that the use of the records for assessing the operation of their nursing homes was limited only by the boundaries of their imaginations. Some of the administrators apparently had some understanding of statistics and research methods, and they

undertook "studies" of practices in their homes that they thought might lead to cost savings, more efficient use of staff, or improved resident care. In one home, for example, a rigorous assessment of the use of certain medications led to some significant cost savings.

In sum, there was optimal use of EMR technology in some homes but suboptimal use in others. What accounted for this variation across homes?

The Optimal Use of EMR Is Largely a Function of Leadership and Management Strategy

One of the central findings that emerged from our qualitative and quantitative data was that the managerial strategy of a nursing home's operators and top administrators largely determined how the organization adopted, implemented and used the technology. By *management strategy,* we mean the degree to which the top administrators in a facility develop and advance their proposed linkages between EMR implementation and use and the achievement of the organization's broader goals and objectives. Furthermore, we found that the greater the extent to which the nursing home's strategy was based on the integral linkage between the EMR technology and the potential for workforce up-skilling and empowerment, the greater the likelihood that the nursing home would make optimal use of the EMR technology. Analysis of field interviews and staff surveys demonstrated that the nursing homes studied followed one of three overarching strategies for the adoption of EMR. We labeled these strategies *command, efficiency,* and *empowerment.* In nursing homes that followed a command strategy for EMR adoption, top administrators viewed the adoption of EMR as a means of increasing their ability to keep staff under surveillance and impose discipline within the organization. These nursing homes had a more traditional top-down management style and regarded EMR as an additional

tool that would enhance their control and authority over frontline staff and middle managers. Three of the nursing homes in which we conducted field interviews clearly represented the command approach.

In homes that followed an efficiency strategy, top administrators did not view EMR primarily as a means to increase managerial authority and control. Rather, administrators in these nursing homes focused on the cost savings and financial gains that might be delivered by EMR. In nursing homes adopting an efficiency strategy, administrators viewed EMR primarily as a means of reducing operating costs and increasing Medicare and Medicaid reimbursements. Four of the nursing homes in which we conducted field interviews seemed to be following an efficiency strategy.

In nursing homes that followed an empowerment strategy, top administrators emphasized the link between EMR adoption and employee participation in decision making, skill development, and broader organizational learning. Administrators in empowerment homes saw a direct link between EMR and their ability to increase staff involvement in the care of residents and to improve employment-related outcomes in an industry where staff satisfaction, recruitment, and retention present ongoing organizational challenges. Three of the nursing homes in which we conducted field interviews clearly pursued this strategy.

Critical to our focus on EMR and employment and labor relations, our data also documented that the type of strategy employed by a nursing home was correlated with both the organization's overall employment and labor relations approach and its adoption of resident-centered care. Our research supports the argument that nursing homes that pursued an employee empowerment strategy were more likely to make optimal use of EMR technology than those that

pursued a command strategy (also see Lipsky & Avgar, 2009, pp. 75-95; see also Lipsky, Avgar, & Lamare, 2009).

By "optimal use" we mean whether a nursing home was able to tap the potential uses of the technology in improving clinical and workforce outcomes. Meeting the threshold tests of installation and operation was, in many respects, a *necessary* condition for optimal use but was not a *sufficient* condition. Reaching the full potential of the use of the technology appeared to depend on more than simply demonstrating the technical abilities of the administrators and the staff. Rather, optimal use required a nursing home strategy that viewed EMR adoption as a part and parcel of a broader workforce and quality of care organizational transformation.

Thus our study highlights the critical distinction between the installation and operation of EMR technology and what we term the "optimal use" of that technology, a distinction rarely made in the existing research on the use of EMR in healthcare. Previous research has defined successful implementation of EMR almost entirely in technical terms. Our research and findings regarding nursing home variation strongly suggest that the successful implementation of EMR is not merely a technical matter but is, at its core, an organizational matter.

EMR Had No Effect on Staff Turnover but Improved a Nursing Home's Ability to Recruit New

Staff

One of the motivations for the demonstration project was the expectation that the introduction and use of EMR would reduce staff turnover in the demonstration homes. Some skeptics, particularly among the union officials, feared that the use of EMR would increase job dissatisfaction and lead to higher rates of turnover. One year after the introduction of EMR, the

evidence suggests that turnover rates were unaffected: although rates varied across the nursing homes. Based on nursing home archival data on turnover and new hires and as reported in Fig. 1, overall the turnover rate was approximately 17 percent in the year preceding the introduction of the technology and remained at 17 percent in the year following the introduction of EMR. As seen in Fig. 2, the overall turnover rate in the five control nursing homes was nearly identical. Clearly, a host of factors externally affect turnover in the healthcare setting. Nevertheless, the fact that turnover rates remained unchanged both prior to and after EMR adoption as well as in comparison to a control group that did not introduce the technology suggests that EMR does not have a measurable effect on turnover rates, positive or negative. It should be noted that turnover rates in New York City nursing homes are lower than turnover rates in nursing homes elsewhere in part because wages are higher in these unionized settings (and healthcare and retirement plans more generous) than is the norm for the industry.

Insert Figure 1 Here

Insert Figure 2 Here

Survey data from employees who left their nursing home after the introduction of EMR indicates that this innovation played a minor role in explaining respondents' exit behavior. As shown in Figs. 3 and 4, of the 153 respondents who left their nursing home after the introduction of EMR, only a small minority agreed that this decision was affected by the introduction of SigmaCare in their facility in general (12.5 percent) and by apprehensions of using this

technology (5.3 percent). This evidence suggests that the adoption of EMR does not create retention difficulties for nursing homes and that employee turnover is not directly explained by the decision to innovate in this way.

Our Time 2 survey also included 230 employees who had begun their work after the introduction of EMR technology. Our survey data indicates that nearly 80 percent of these new employees were not aware when they applied for a position that the facility that hired them had EMR. Nevertheless, as seen in Fig. 5, of the 20 percent of the new hires who knew the facility used EMR, a clear majority said in our interviews that EMR had a positive influence on their decision to work for the home. On a practical level, this finding suggests that nursing homes would benefit from "marketing" the fact that they use the EMR technology in their recruitment efforts.

Insert Figure 3 Here

Insert Figure 4 Here

Insert Figure 5 Here

The Belief that the Workforce in Nursing Homes Is a Barrier to Successful EMR Implementation

Is a Myth

In June 2009, we conducted a workshop dealing with the New York Nursing Home Demonstration Project at a conference sponsored by the American Health Information Management Association in Baltimore, Maryland. One of the participants in our workshop, a top administrator from a major nursing home, expressed her viewpoint in roughly the following terms: "We all know that the kind of staff we have in our homes won't be able to learn to use EMR effectively. We are better off using paper records." At the inception of the New York project, some of those involved also believed that learning how to use the technology would be a challenging - and perhaps impossible - task for many of the nursing home employees. As we noted earlier, a substantial proportion of the workforce in the New York homes (45 percent at the start of the project) had less than a high school education and many were recent immigrants who were not fully proficient in English. These workforce characteristics were, for the most part, not a barrier to the successful adoption and implementation of EMR. We did find that the amount of time an employee had spent on a computer outside of work prior to the adoption of EMR significantly affected the employee's view of the ease of using the technology at work. But other variables, such as job satisfaction and organizational commitment, were more important in explaining employee attitudes about the new technology.

The vast majority of the employees across all organizations successfully completed training in the use of the technology and later reported that they preferred to use EMR rather than paper. A handful of the rank-and-file CNAs became so skilled in the use of the technology that they assumed responsibility for training their peers. Only a very small number (in our survey

results fewer than 20) left their nursing home jobs because of their dissatisfaction with the technology. Also, our findings on employee acceptance of the technology showed that factors such as age, gender, and education level had no significant effect on employee attitudes about the use of the technology. In sum, we uncovered no evidence in our research suggesting that the nature of the nursing home workforce was a barrier to the adoption and implementation of EMR.

The Union's Participation in EMR Adoption Was Important

The partnership between the union and the nursing home operators was an especially important (and possibly unique) dimension of the New York nursing home demonstration project. In our interviews in the field both top administrators and rank-and-file employees agreed that without the union's commitment to the project it would have been more difficult for the project to succeed. In New York, there was clearly political risk for 1199SEIU's leaders to engage in a partnership with the nursing home operators in a project designed to support the adoption of EMR. That risk was mitigated by an increasingly cooperative relationship between the parties in collective bargaining. Although it must be acknowledged that the collective bargaining relationship was not free of conflict, nevertheless there had been a growing recognition by both sides that collaborative problem solving was usually a more fruitful approach to the parties' principal challenges than an adversarial one. Some of the factors that helped to promote a collaborative relationship were factors that have affected the healthcare sector more generally: escalating costs, growing concerns over medical errors, increasing regulation, restructuring of the industry, shortages of skilled professionals, high rates of turnover, and the looming prospect of national healthcare reform. It was also universally acknowledged by

all the major players that the arbitrator who served as chair of the QCOC had played a unique and especially important role in fostering a cooperative relationship between the parties.

In launching the demonstration project, the operators and the union agreed that it was important to have a labor-management committee at each of the participating homes that would oversee the introduction of the new technology. A facilitator from the 1199SEIU Training and Employment Funds was assigned to each of the local committees. The authors of this chapter were able to sit in on several committee meetings during their field visits. In our field interviews, we also asked our interviewees about the operation of these labor-management committees. The evidence we have suggests that the performance of these committees varied across the organizations studied.

In organizations pursuing an empowerment strategy the labor-management committees seemed to work most effectively, while in homes pursuing a command strategy the local committees seemed to work least effectively. In one of the command homes we visited, we observed that the labor- management committee was more a forum for airing grievances than it was a means of facilitating the introduction of EMR technology. In one of the empowerment homes we visited, we observed that the labor-management committee played an integral role in planning and implementing the new technology; both administrators and union representatives in this home lauded the work of the joint committee. Some of the committees helped to ease the anxieties employees had about the effects of the new technology.

The operators and the union also delegated another key function to the labor-management committees. The operators, the union, and the vendor developed a strategy for introducing the technology in each of the homes that focused on preparing the staff in each home for the transition to EMR. The labor-management committees were delegated significant responsibility

for implementing this strategy. Training was, of course, an important part of the preparation for the transition, but another important element focused on communication: an effort was made in each home to market or "sell" the technology to the members of the staff, and this marketing effort was designed not only to assuage anxieties about the new technology but also to excite the staff about the advantages they would enjoy in a paperless world. The labor-management committee played a major role in overseeing the marketing effort. Absent a more systematic assessment of the work of these committees, it is difficult to gauge the net effect of all of their efforts on the adoption and implementation of EMR. But we do have the impression that the most effective committees made a positive contribution to the successful transition to EMR.

In sum, our evidence suggests that the union role in the success of the New York project was especially important.

Guaranteeing Job Security Was Also Important

At the inception of the New York project, the QCOC required, as a condition for participation in the demonstration project, that no member of a bargaining unit would lose his or her job as a consequence of the introduction of EMR. We believe this requirement was a factor that contributed significantly to the success of the New York project. In particular, the job security condition helped to sustain the union's commitment to the project throughout its duration. In our site visits we observed that the assurance that EMR would not result in the loss of union jobs was a message that had been carried to the rank-and-file by the union representatives. To our knowledge, the nursing home operators and administrators fully complied with the job security condition throughout the project.

The job security agreement, however, did not apply to members of the nursing home staffs that were not represented by the union. In several of the nursing homes there were nonunion employees who were assigned record entry and recordkeeping responsibilities. These employees were not protected by the job security agreement, and in some of the homes the employees were either reassigned or their jobs were eliminated by attrition or layoff.

EMR Probably Has the Potential to Reduce Medical Errors and Increase Quality of Care

Although the focus of our evaluation was on the implications of EMR adoption for workforce-related issues, we also collected data on the effects of new technology on the reported quality of resident care provided by employees.[7] It is important to emphasize that these data are based on employee responses to survey questions on resident care and are therefore a reflection of frontline employees' and supervisors' perspectives. Two sets of findings reported below support the claim that EMR adoption can improve the quality of resident care provided by employees.

First, as seen in Fig. 6, analysis of our survey data from the treatment facilities documents a statistically significant reduction in the percentage of employees who reported observing medical errors. At Time 1, approximately 25 percent of the respondents reported observing a medical error or near miss in the three months prior to the survey date. At Time 2, the percentage of employees reporting an observed error or near miss in the three months prior to the survey declined by approximately five percentage points to close to 20 percent of the sample. This decrease in observed errors or near misses was statistically significant ($p = .014$). In contrast,

analysis of the survey data from employees in control facilities did not document a statistically significant change in the percentage of employees reporting observed errors or near misses.

We also examined the change in number of observed errors and near misses reported at Time 1 and Time 2. As part of our survey, we asked those employees who reported observing errors and near misses at Time 1 and Time 2 how many incidents had they observed. As shown in Table 4, the number of reported errors and near misses decreased at Time 2. At Time 1, the average number of reported errors or near misses over the preceding three-month period was 6.32. At Time 2, the average number of reported errors or near misses reported was 4.45. In addition to a decrease in the average number of reported incidents, Table 4 also documents a dramatic reduction in the variation of employee responses. At Time 1, the standard deviation for reported errors or near misses was 13.04. At Time 2, the standard deviation was 5.98. In other words, there appears to be greater consistency in terms of the reported number of observed errors or near misses at Time 2 than at Time 1.

Insert Figure 6 Here

Insert Table 4 Here

Insert Figure 7 Here

Finally, in addition to survey items regarding observed errors or near misses, we also asked respondents about how EMR technology affected the resident care they provide. As seen in Fig. 7, close to 50 percent of the 596 employees who responded to this survey question at Time 2 perceived an improvement in the quality of care they were able to provide residents since the adoption of the EMR technology (31 percent reported being able to provide better care and close to 19 percent reported being able to provide much better care). Forty-one percent of the respondents perceived no change in the quality of care they were able to provide. Nine percent of the respondents perceived a decrease in the quality of care they were able to provide (7.7 percent reported that the care they were able to provide was worse and 1.3 percent reported that the care they were able to provide was much worse). This evidence also supports the claim that the adoption of EMR can enhance the ability of frontline staff to care for their residents.

EMR Can Free Up Time for Staff to Devote to Residents

One of the proposed changes associated with the adoption of EMR is the amount of time spent by frontline staff with residents. According to proponents, the use of EMR should reduce the time spent documenting resident care, allowing for more time to be spent with residents and their families and for conducting tasks more directly related to resident care. To assess whether both of these changes (reduced documentation time and allocation of time to resident care) in fact took place in the 15 treatment nursing homes, we included a set of survey items that explored how technology affected employee allocation of their time.

As shown in Fig. 8, employee responses to the question of technology- related time savings varied. On the one hand, 39 percent of the 596 respondents reported spending either

"much less" or "less" time documenting resident care. This suggests that for a relatively large

number of employees, technology facilitated a reduction in documentation work. On the other

hand, approximately the same percentage of responding employees (40 percent) reported

spending either "much more" or "more" time documenting resident care.

Insert Figure 8 Here

For those employees who reported spending less time on documentation, we asked them

to estimate the amount of time they saved per day using EMR. As shown in Table 5, of the 376

employees who said they had saved time on documentation, the plurality reported saving

between one and two hours daily (46.5 percent). Another 12.2 percent reported saving between

two and three hours daily, and approximately 7 percent reported saving three or more hours

daily. However, 128 respondents (34 percent) who initially said they had saved time on

documentation then reported that in fact they had saved "almost no time" at all. These findings

suggest that although EMR technology has the potential to reduce the time devoted to

documentation, it does not achieve this objective uniformly.

We also examined what employees did with the time they saved using EMR. We asked

those employees reporting any amount of time saved using the technology how they allocated

this additional resource. As shown in Table 6, a significant proportion of responding employees

reported using the additional time with residents (83 percent), and by assisting coworkers (68

percent). Table 6 also shows that 26 percent of the responding employees reported spending the

time the technology saved them with the residents' families. Thus, where employees were able to

use the technology in a manner that reduced the time spent documenting resident care, they

devoted more time to other meaningful resident care tasks.

The net effect of our survey findings suggests that about one-third $(.39 \times .83)$ of the

frontline staff in the nursing homes that installed EMR spent an hour or more daily with residents

than they had before the use of EMR. At the same time, however, the fact that 40 percent of the

respondents reported spending more time on documentation (and presumably less time with

residents and coworkers) implies that on balance EMR had virtually no effect on the allocation

of staff effort. But if we are correct in assuming that over time EMR will allow a higher

proportion of staff to spend significantly less time on documentation and more time with

residents, then it is reasonable to believe that in the long run EMR will have a positive effect on

the quality of resident care.

Insert Table 5 Here

Insert Table 6 Here

Staff Acceptance of EMR Technology Can Be Influenced by the Organization

In our study we examined the factors that influence staff acceptance of EMR technology,

using three measures of technology acceptance: usefulness, ease of use, and organizational

support. Overall, we found that staff acceptance of the technology was relatively high on all

three of the dimensions we measured; however, there was a great deal of variation in staff

acceptance across the nursing homes in the New York demonstration project. There was, in fact, a fairly close correspondence between the style of management used in the home and the level of staff acceptance of the technology. In the nursing homes that we placed in the empowerment category staff acceptance of the technology was relatively high, whereas in the homes we placed in the command category staff acceptance was lower. Regression analysis revealed that certain independent variables significantly affected staff acceptance of the technology, although there was no consistent pattern across the measures of technology acceptance we used. In most of our regression models, employment status had a significant effect on technology acceptance: not surprisingly, full-time employees had higher levels of acceptance than part-time employees. Depending on the dependent variable used in the model, variables such as job satisfaction, employees' commitment to their union, and organizational trust had significant effects on technology acceptance. At the same time, the respondents' personal characteristics (such as age, gender, education, and seniority) had no effect on acceptance.

These results suggest to us that technology acceptance is very much an organizational phenomenon and is largely independent from the personal characteristics of the workforce. If that is the case, then the acceptance of EMR technology is largely under the control of the administrators and managers of the organization (and of union leaders, if there is a union). To the extent that managers and union leaders can build trust and commitment on the part of their employees, the employees will be better prepared to accept new technologies.

CONCLUSIONS AND IMPLICATIONS FOR ORGANIZATIONS AND POLICY

MAKERS

The American Reinvestment and Recovery Act, passed by Congress and signed into law by President Obama in February 2009, was designed to stimulate the American economy and help it recover from the deep economic recession that began in 2008. Title XIII of the Act consists of the Health Information Technology for Economic and Clinical Health Act, also called the HITECH Act. The objective of the HITECH Act is to encourage the adoption of electronic health records (EHRs), including EMRs, by providing incentive payments to physicians and healthcare institutions.[8] For example, starting in 2011 physicians became eligible to receive up to $44,000 in incentive payments from Medicare if they could show that they have made "meaningful use" of a certified EHR; physicians reimbursed by Medicaid may receive up to $63,750 based on guidelines defined by the state in which they practice (Hogan & Kissam, 2010; Jha, 2010).

Although the media have generally reported that $19 billion is available under the ARRA to subsidize the introduction of EHRs, the incentive schedules built into the Act could potentially drive that number to $51 billion. The HITECH Act requires healthcare providers to use "qualified EHR" that provides meaningful use of the technology, but does not define the meaning of either "qualified EHR" or "meaningful use." It authorized the U.S. Department of Health and Human Services (HHS) to set guidelines for determining the meaning of these terms, and HHS established the Health Information Technology Policy Committee (HITPC) to provide it with recommendations on these matters. Through 2009 and 2010 HITPC worked to establish criteria for certifying EHR systems. On July 13, 2010 HHS released the final criteria defining

meaningful use. These criteria apply to 700,000 clinicians in 5,000 acute care hospitals in their use of EHR. But to date no meaningful criteria have been established for nursing home facilities, and at the time of this writing there is no prospect that criteria for meaningful use will be established for nursing homes in the near future (U.S. Department of Health and Human Services, 2012; HIT Policy Committee, 2012; U.S. Department of Health and Human Services, 2011).

It appears that the federal government will define "meaningful use" largely in technical terms. In our view a technical definition of meaningful use is certainly a necessary but by no means a sufficient method of allocating taxpayer dollars to support the use of EHRs. Our study of New York nursing homes strongly leads to the conclusion that the meaning of meaningful use needs to take into account not only the technical specifications of EHR but also the organizational characteristics of the physician practices and healthcare facilities receiving the stimulus money. A central theme that emerges from our study of the introduction of EMR in nursing homes is that these nursing homes - and by implication other healthcare organizations, including physicians' practices - vary in their capacity and ability to make optimal use of health information technology. Identical technologies installed at identical costs in different facilities are likely to produce different healthcare outcomes. The extent and nature of the training provided to the workforce in the facility is certainly a critical determinant of the success of the technology, but in the New York project the nature of the training was identical across all the facilities. The difference in the results obtained from using the technology was largely a function, first, of the leadership and management strategy of the facility receiving the technology and, second, of certain key organizational characteristics of the facility.

We recognize that a government agency charged with allocating billions of dollars of public funds to thousands of facilities cannot possibly do an in-depth study of each of the facilities that is a candidate for the funds. In the case of the HITECH Act, allocation of the funds will be delegated to regional organizations. But even regionalization of the task will not allow public officials to identify easily the leadership and management traits that we believe are associated with the optimal use of the technology. Public agencies virtually always rely on objective - or seemingly objective - factors to allocate public funds, and developing a set of objective factors that are capable of capturing traits associated with visionary and strategic managers would be, to say the least, a daunting task.

But we believe there may be a set of proxies sufficient to help guide public officials who want to identify facilities likely to make the best use of the technology. In the case of the nursing homes in our study, two simple proxies that come to mind are (1) the turnover rate in the facility and (2) the portion of agency or temporary employees employed by the facility. Nursing homes that have low turnover rates and a high proportion of permanent staff are likely to make better use of the technology than nursing homes without these characteristics. Also, staff participation in decision making appears to have an important influence on the optimal use of the technology. That participation might be through a union, but in a nonunion facility it could be through committees or other mechanisms that promote employee participation. Healthcare facilities that also promote the training and professional development of their staffs are probably in a better position to make productive use of EHRs than facilities that do not provide such opportunities. We do not argue here that proxies of this type should be dispositive but only that they might provide guidelines public officials can use in making their decisions.

Allocating public funds on the basis of workforce characteristics would at the very least be inappropriate and might possibly be unlawful, but our study makes clear that workforce characteristics, such as age, gender, and race, are not related to the use of the technology. Policy makers and public officials should take some comfort in knowing that it is organizational and not workforce characteristics that determine the optimal use of EHR technology.

NOTES

1. The selection of 15 of the 20 homes receiving the technology was dictated, principally, by funding constraints.

2. In the Matter of the Interest Arbitration between Southern New York Associates, L.L.C. et al., and 1199SEIU United Health Care Workers East (Martin F. Scheinman, Impartial Chair), March 2006, p. 13.

3. *Ibid.,* p. 14.

4. We obtained the approval of the Institutional Review Board at both Cornell and Illinois to conduct surveys of and interviews with the administrators and staff in the homes included in our study.

5. The interview population in the follow-up survey is larger than the population in our baseline survey because we included both employees who had left their nursing homes and employees who had been hired after the baseline survey. In the aggregate the employment level across the 20 homes did not significantly change between the baseline and the follow-up survey.

6. The co-authors of this chapter jointly conducted the majority of the field interviews in the 10 homes both before and after the implementation of EMR. We were usually accompanied by Kelly Pike, a Ph.D. candidate at Cornell. In a small number of cases only one of the co-authors conducted the interviews with Ms. Pike assisting.

7. It is important to note that our Cornell colleagues, Karl Pillemer and Rhoda Meador, conducted an evaluation regarding the effects of EMR technology on nursing home residents and produced a final report detailing their findings. In general, they did not find a statistically significant EMR effect (positive or negative) on a variety of healthcare outcome measures.

8.   The principal difference between EHR and EMR is that EHR allows patients or residents

to have access, within the limits of confidentiality, to their healthcare records.

Table 1

Table 1. Number of Beds, Number of Residents, and Occupancy Rates in the Treatment and Control Facilities, 2008.

Facility Name	Demographics			
	No. of Beds	No. of Residents	Occupancy Rate (%)	County/ Borough
Treatment facilities				
Four Seasons	270	266	99	Brooklyn
Glengariff	262	227	87	Nassau
Sands Point	180	168	93	Nassau
Keser	200	190	95	Brooklyn
Highfield Gardens	200	187	94	Nassau
Huntington Hills	320	309	97	Suffolk
Terrace	240	235	98	Bronx
Bronx Center	200	194	97	Bronx
Northern Manhattan	320	311	97	Manhattan
Woodcrest	200	191	96	Queens
Park Gardens	200	196	98	Bronx
Port Jefferson	120	116	97	Suffolk
Crown	189	177	94	Brooklyn
Golden Gate	238	221	93	Staten Island
New Surfside	183	178	97	Queens
Control facilities				
Cliffside	218	206	94	Queens
Townhouse	280	270	96	Nassau
Queens Center	179	174	97	Queens
Woodmere	336	315	94	Nassau
Eastchester	200	188	94	Bronx

Source: New York State Annual Survey of Long-Term Care Facilities.

Table 2

Table 2.   Completed Surveys Time 1 Data Collection by Facility.

Facility	Total Number of Surveys
A	37
B	65
C	106
D	77
E	52
F	35
G	144
H	37
I	71
J	55
K	44
L	33
M	104
N	51
O	51
P	51
Q	71
R	26
S	89
T	42
Overall	1,241

Table 3

Table 3. Descriptive Statistics (means) from Our Sample at Time 1 and Time 2.

	Time 1	Time 2
Age	47.31	47.7
Tenure (years)	8.31	8.01
Member of union	75.7%	68.2%
Gender		
Female	92%	89%
Male	8%	11%
Education level		
Below high school	45.4%	37.7%
High school and above	54.6%	62.3%
Employment status		
Full	77.1%	71.8%
Part	22.9%	28.2%

Table 4

Table 4. Comparison of Mean Number of Reported Errors or Near Misses and Standard Deviations at Time 1 and Time 2.

Number of Reported Errors or Near Misses	Time 1	Time 2
Mean	6.32	4.45
Std. deviation	13.043	5.981

Table 5

**Table 5.** Amount of Resident Care Documentation Time Saved Using EMR Technology Compared.

How Much Time Do You Save Using EMR Daily?

	Frequency	Valid Percent	Cumulative Percent
Almost no time	128	34.0	34.0
Between 1 and 2 hours	175	46.5	80.6
Between 2 and 3 hours	46	12.2	92.8
Between 3 and 4 hours	17	4.5	97.3
More than 4 hours (specify how many)	10	2.7	100.0
Total	376	100.0	

Table 6

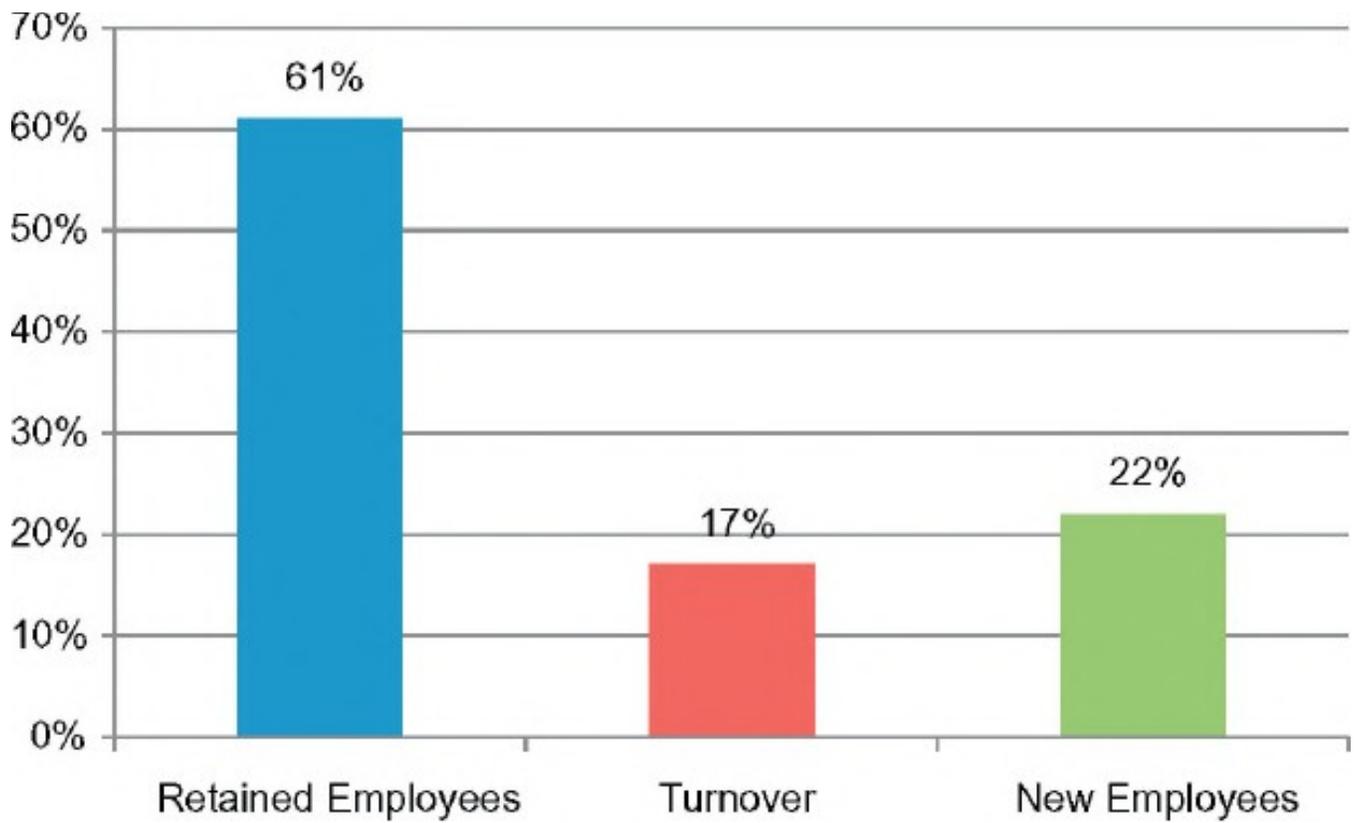*Table 6.*   Use of Time Saved by Frontline Staff. "How Do You Use the Time Saved Using EMR?" (All That Apply).

(a) Used Saved Time with Residents			(b) Used Save Time with Residents' Families			(c) Used Saved Time to Help Co-workers		
	Frequency	Valid Percent		Frequency	Valid Percent		Frequency	Valid Percent
No	64	16.6	No	285	74.2	No	120	31.2
Yes	322	83.4	Yes	99	25.8	Yes	265	68.8
Total	386	100.0	Total	384	100.0	Total	385	100.0

Figure 1
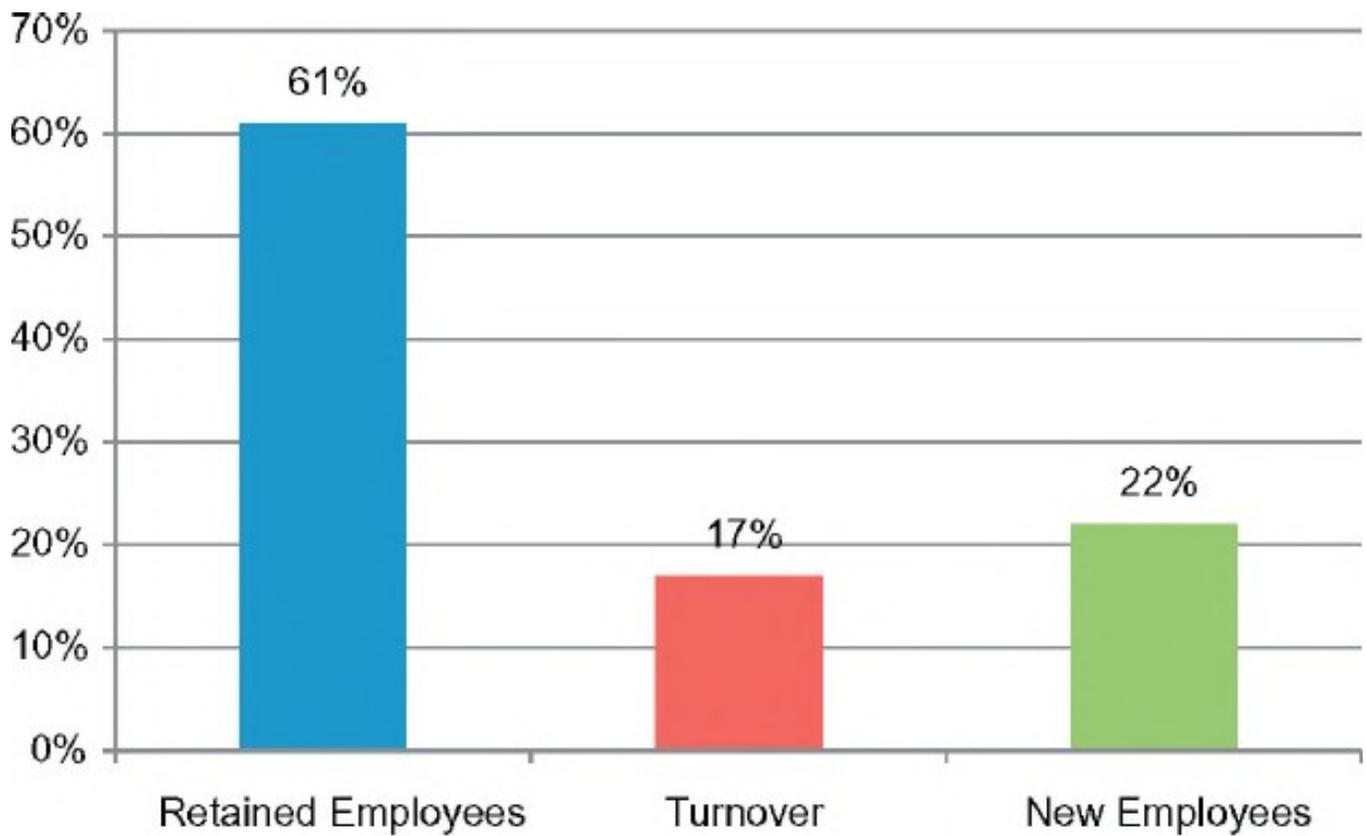
Fig. 1. Turnover and Recruitment Rates for Treatment Facilities.

Figure 2

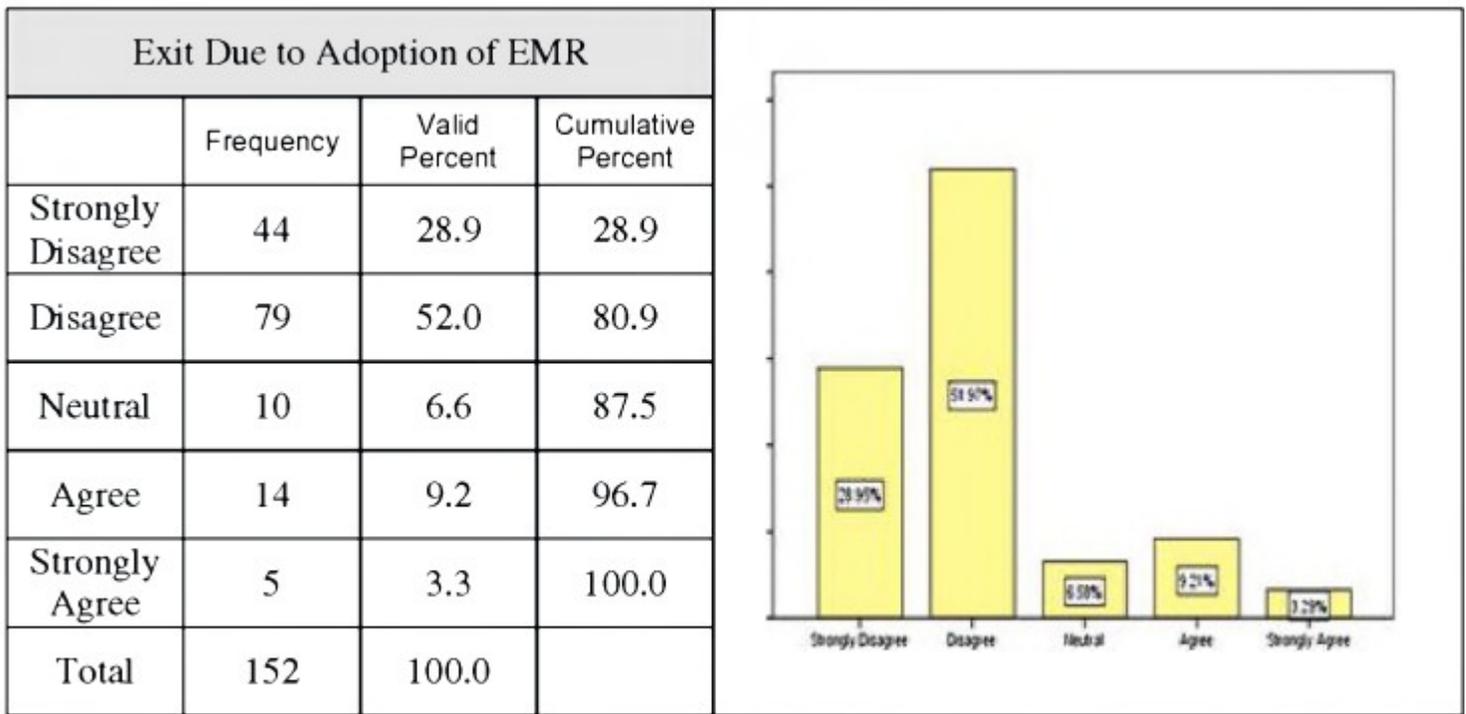*Fig. 2.*   Turnover and Recruitment Rates for Control Facilities.

Figure 3

Exit Due to Adoption of EMR			
	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	44	28.9	28.9
Disagree	79	52.0	80.9
Neutral	10	6.6	87.5
Agree	14	9.2	96.7
Strongly Agree	5	3.3	100.0
Total	152	100.0	

Fig. 3. Decision to Leave Nursing Home Due to Adoption of EMR.

Figure 4

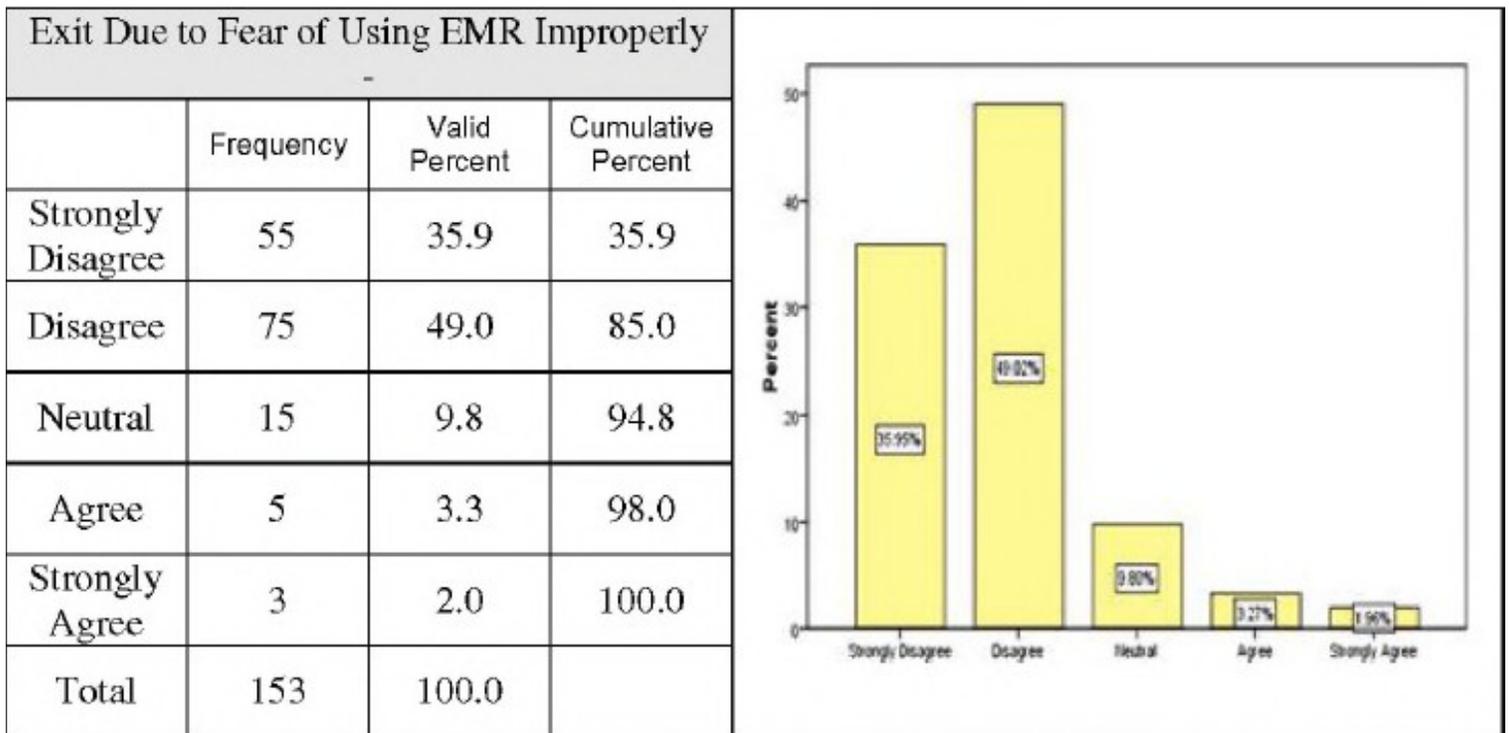| Exit Due to Fear of Using EMR Improperly			
	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	55	35.9	35.9
Disagree	75	49.0	85.0
Neutral	15	9.8	94.8
Agree	5	3.3	98.0
Strongly Agree	3	2.0	100.0
Total	153	100.0	

Fig. 4. Decision to Leave Nursing Home Due to Fear of Using EMR.
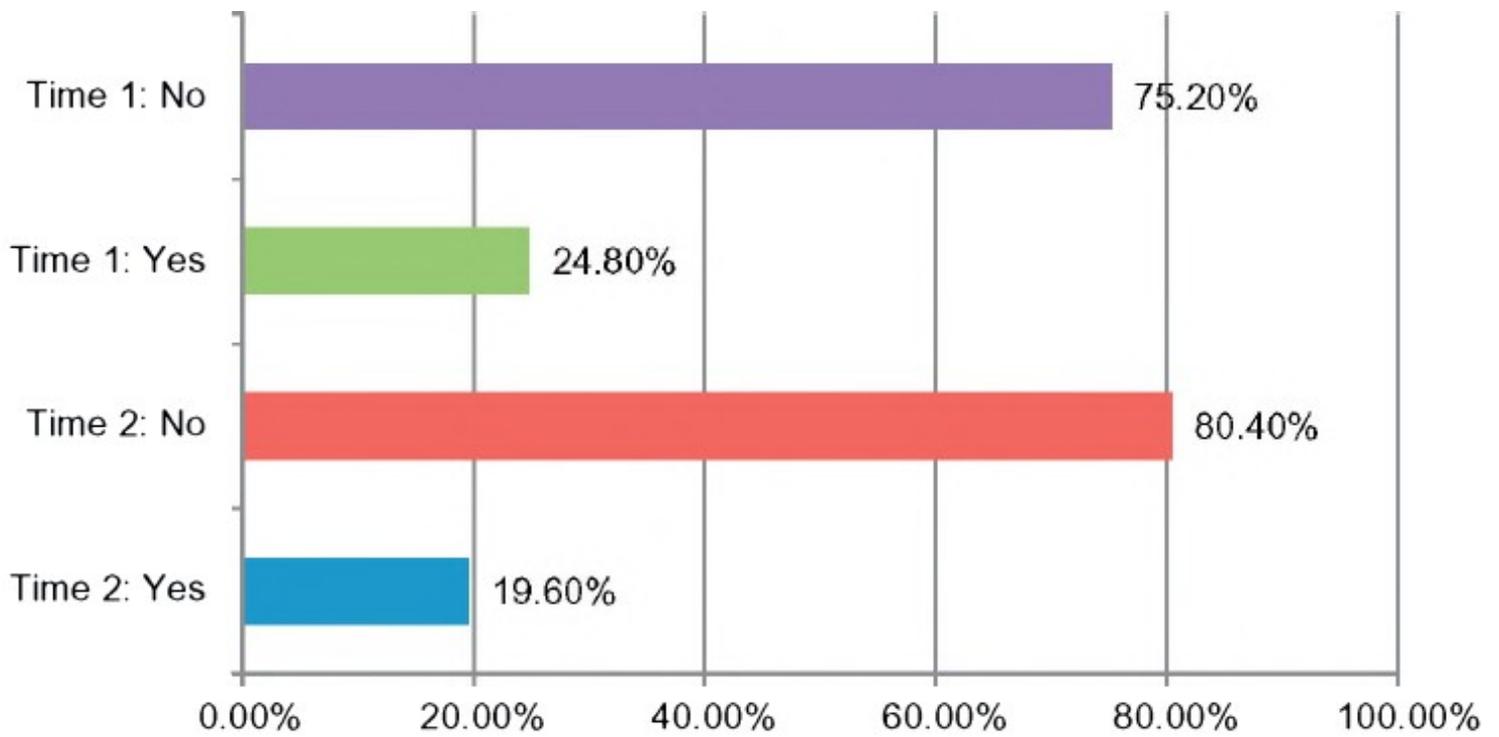
Figure 5
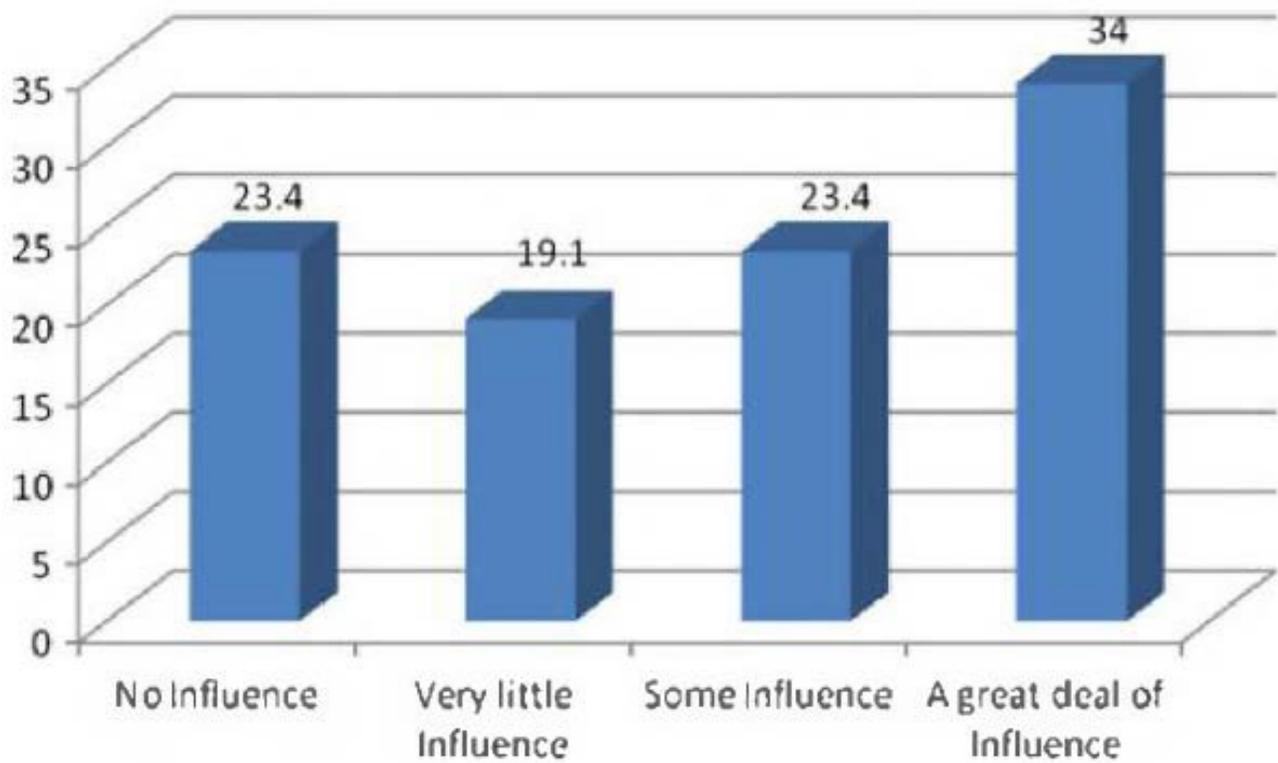
Fig. 5.   EMR Influence on Decision to Work for Nursing Home.

Figure 6

Fig. 6.   Percentage of Employees Observing Errors and Near Misses over a Three-Month Period at Time 1 and Time 2.
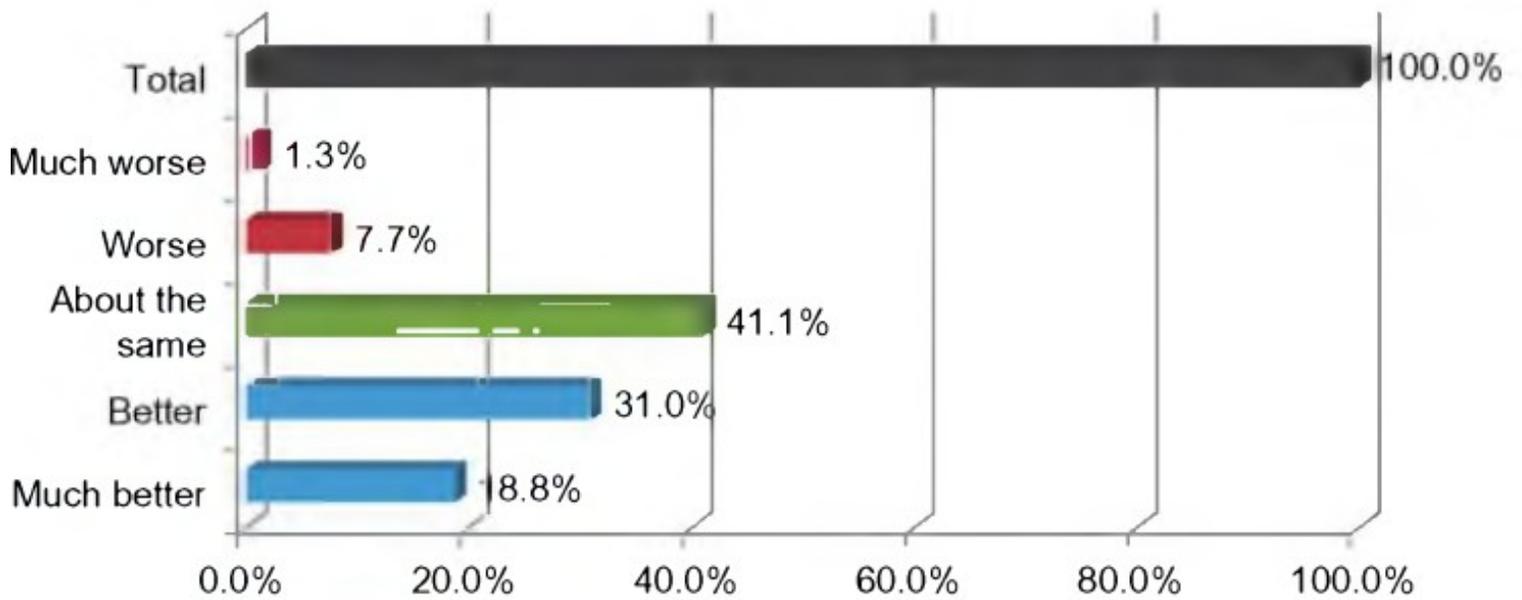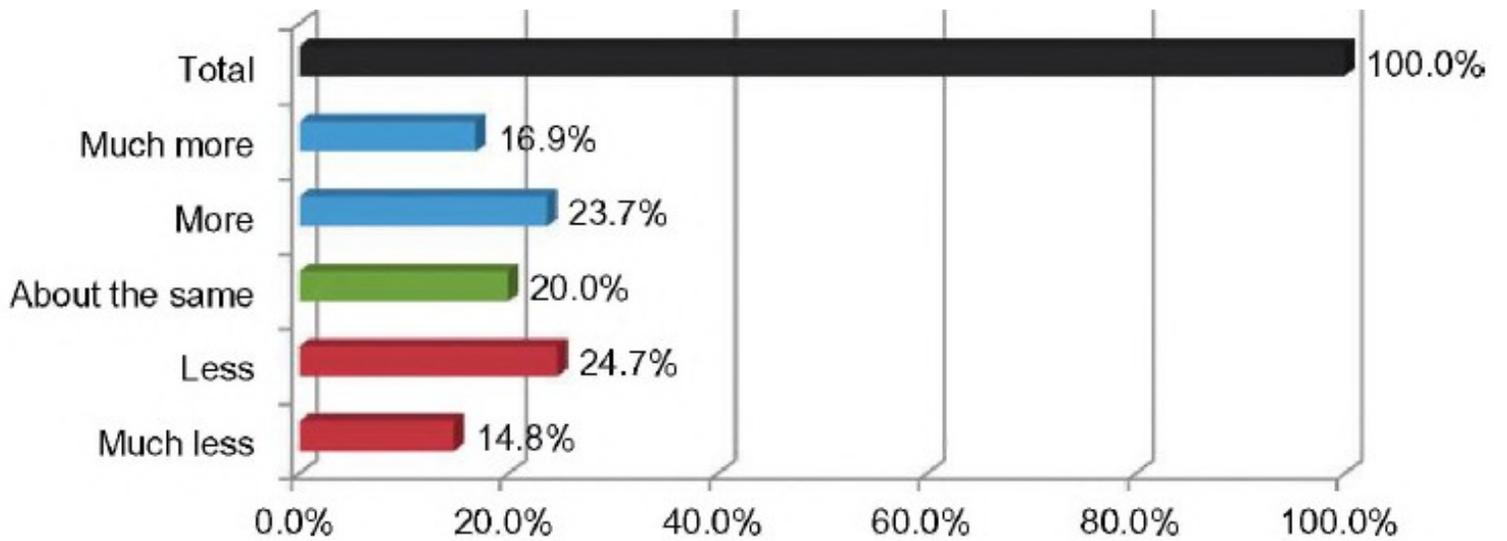
Figure 7

Fig. 7.   Employee Perceptions of Quality of Care Provided Using EMR.

Figure 8

Fig. 8. Time Spent Documenting Resident Care One Year after the Introduction of EMR Technology.

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