

## Multiple Sites, Multiple Technologies, One Objective:

A Work in Progress

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**Abstract**--This paper reports on the early stages of a demonstration project in which selected technologies are introduced into eight facilities which provide care to individuals with Intellectual and Developmental Disabilities or Severe and Persistent Mental Illness. A two-year planning process emphasized that the project was to determine which technologies would be introduced, not if technologies were to be introduced. Thus, emphasis was placed upon evaluating: how the technologies altered staff performance; the quality of care; and the ability to be reimbursed for the care provided.

**Keywords**—*telecare; multiple technologies; demonstration project; intellectual and developmental disabilities; severe and persistent mental illness*

### I. INTRODUCTION

The necessity to contain the cost of health care has seen the development of new technologies, as well as the innovative use of existing technologies, in an ever enlarging number of care models. Thus, it should not be surprising that technologies aimed at the provision of care and services to individuals with Intellectual and Developmental Disabilities (IDD) and with Severe and Persistent Mental Illness (SMI) are increasingly being developed and used [1][2]. As in the use of new technologies, in each and every care model there are challenges to using innovative technologies in addressing the needs of these two populations, but the necessity to contain, and if possible, reduce the cost of providing care to these populations, makes the use of technology, in some form, inevitable.

There are two main reasons for the urgency to develop more efficient care models for the IDD and SMI populations: the cost of care; and the aging of the populations. Deinstitutionalization, in both the United States and Europe took place from the mid-1960's through the 1970's, had a dramatic impact on the care models used for both populations [3][4]. Prior to the deinstitutionalization the majority of care was provided for individuals with IDD and SMI in large institutions which were often dehumanizing. The impact of deinstitutionalization on the cost of care varied significantly, but the impact on the care model was significant as most individuals with IDD and SMI moved into the community, many living in some form of group home. The number of individuals living in any particular group home varies based upon the needs of the individuals. The most common number of residents is four with some group homes having as many as eight to ten residents. In the most severe cases, a resident could live

alone. Although costs of providing care to the residents in group homes vary based upon the needs and location, the average cost is between \$40-50,000 per year per resident and if an individual needs to live alone, the cost can top \$150,000 per year [5][6].

Adding even greater cost to the care of IDD and SMI populations is the rapidly increasing number of such individuals brought about by the same demographic factors as for the general population [7]. As individuals with IDD or SMI age they are as susceptible to chronic illnesses as the general population, but the cost of caring for them is much greater. For example, care for an individual with IDD who has congestive heart failure costs approximately eight times more than for a person without IDD [5]. The ratios for other chronic diseases and individuals with IDD versus SMI vary somewhat, but the reasons are consistent. Many individuals with IDD and SMI make poor lifestyle decisions—use tobacco products and abuse alcohol and drugs. In addition, many are unable to self-manage disease, e.g., adhere to complicated medication regimes and follow complex health care instructions. Thus, greater cost of care for individuals with IDD and SMI when combined with the cost of residential care in general, results in a compelling reason for attempting to use technology to contain costs.

In the next section, the overall project is described including the eight locations, the technologies being introduced, the economic model employed and the changes needed in how care is to be delivered. In Section III, the methodology employed to evaluate the effectiveness of the technologies in the delivery of care is discussed, as well as the common methods which are being used across the eight locations. In the concluding section, the reasons for the success of the project, up to this point, is presented.

### II. THE PROJECT

I was hired in March 2013 as a consultant by a large (\$500 million annual revenue) multi-state care organization to help develop, organize and evaluate a multi-year, multi-site demonstration project of a variety of technologies aimed at aiding in the provision of care to individuals with IDD and SMI. Even though my previous work was with at-risk elderly individuals living in their own residences, there was agreement that my experience could translate well to the IDD and SMI populations [8]. As a consultant, I have not been responsible for the major decisions concerning the scope of the project, nor have I had the ability to play a

major role in the selection of the sites or technologies to be included in the project. However, I have been more than a passive observer as I have been asked to help develop installation, training and evaluation protocols. In addition, I have had access to material describing the staff and clients to be included in the demonstration project and I have reviewed each of the technologies to be employed. Perhaps my most important contribution has been to emphasize that the project is not a test of whether the various technologies work, but rather an evaluation of whether and how the technologies can be incorporated into the organization's care models. In other words, the project's focus had to be on people and how they did their jobs, not the technology.

### A. The Planning Process

Planning for the demonstration project began in mid-2012 with a statement from the CEO of the organization emphasizing the need to introduce innovative technologies. A committee was formed, headed by an upper administrator, and employees were encouraged to propose sites at which new technologies could be used. During the remainder of 2012, proposals were received and evaluated based upon specific criteria: administrative and staff buy-in; existence of suitable technology; evidence that technology would enhance care provision; evidence that, if successful, the technology could be used at a large number of other care facilities within the organization; and a financial model showing that the technology was sustainable—the organization would be reimbursed for its use. Finally, there was an attempt to achieve a rough balance among the different care models employed throughout the organization. This process took over a year, which frustrated individuals who wanted to move more quickly, but afforded a thorough evaluation of the resources available at each of the selected sites. The final decision was confirmed at an all-day meeting of administrators and representatives from each of the chosen sites in the fall of 2013.

### B. The Selected Sites

Eight sites were selected for inclusion in the demonstration project. In order to ensure confidentiality, no names, or even locations, are used to identify the sites, but rather, the sites are numbered consecutively. Given the large number or identical sites within the organization, reference to the specific care model and the number of residents at each site should not jeopardize the sites' identity. Six of the sites provide care to individuals with IDD:

**Site 1** community group home, four females with physical disabilities;

**Site 2** community group home, four males each medically fragile;

**Site 3** congregate intermediate care facility, sixteen individuals with physical disabilities;

**Site 4** community intermediate care facility, five males with medical issues;

**Site 5** community intermediate care facility, four males with physical disabilities;

**Site 6** day program, variable number of males and females with physical disabilities.

Two of the sites provide care to individuals with SMI:

**Site 7** long term structured residence, eight individuals some with predatory sexual behavior;

**Site 8** outpatient clinic with approximately 150 individuals in the project.

Team leaders were appointed at each of the sites and staff at all levels was included in the planning for the introduction of the technology. Start dates were sequenced in order to reduce the stress on both local staff and administrators if and when things went wrong. The first sites began their projects during June 2014 and the final sites began operation at the end of November 2014.

### C. The Selected Technologies

Unlike other projects with which I have been associated, there was no one-size-fits-all approach to the selection of the technologies. Thus, staff at each of the eight sites was charged with researching, testing and recommending the technologies which best suited the needs of their clients and the specific care model. Allowing staff at each of the sites to select the technologies to be used took much more time than if administrators had imposed a centrally selected technology. However, the benefits of allowing local administrators and staff to choose the technology to be employed, not only ensured buy-in, but also established ownership over the demonstration as a whole. This is not to diminish the complexity of vetting numerous technologies, negotiating with several, rather than one, vendor, nor the time it took to get each separate technology and vendor approved by individuals at each of the eight locations, the organization's administrative committee, and ultimately by the organization's chief operating and chief financial officers, but the benefits of this approach far outweighed the added time.

There was, however, overlap in the selected technologies. For example, in five of the sites (1, 2, 4, 7 and 8) it was decided that vital signs needed to be collected—blood pressure, weight, temperature and pulse rate—and the decision was made to work with a single vendor. In this way, not only would the cost be reduced, but there would be more comparable data collected across the sites. At the other end of the spectrum, bed and door monitors are being employed in only one of the sites (3), smart televisions in only one site (5) and a specialized computer interface system in one site (6).

#### D. Paying for the Technology

An essential consideration in the selection of any technology to be used in the provision of health care is, “who pays.” In my previous work, the question of who pays for the technology after the pilot project ended was always the most perplexing question; and the one question that was never adequately addressed during the project [9]. A key factor in answering this question in this project is that a significant majority of the organization’s revenue derives from Medicare and Medicaid reimbursement for services. Thus, any new technology employed by the organization has to be a “billable service” to Medicare and Medicaid if the use of the technology was to be sustainable over time.

On one level, it didn’t matter whether the selected technology worked as proposed and that it aided in the provision of care. It really didn’t even matter if the technology actually reduced the cost of delivering care. What mattered was that the selected technology was considered a billable service under existing Medicare and Medicaid regulations. A brief example illustrates how the reality of reimbursement impacted the selection of the technology to be used in the project. One of the objectives of using vital signs sensors was so that alerts indicating an abnormal reading could be sent off-site to a nurse who could contact the live-in care provider and assess the severity of the situation without traveling to the residence. The problem was that if the nurse traveled to the residence her visit was a billable service, if she solved the problem over the phone, it was not. Quite simply, if Medicare and Medicaid did not change its reimbursement policy, there is no point to install and use the new technology because the organization could not be paid for the services it provided. The good news for the project is that Medicare and Medicaid are in the process of changing their policy and will reimburse virtual nursing visits.

#### E. Change in Care Models

Equally important as the issue of resolving who pays for the successful introduction of a new technology is the recognition of and the planning for a change in how people will do their jobs after the technology is introduced. In my experience, if there is no plan to deal with the fact that after the introduction of the new technology, people at all levels within the organization will have to change how they do their jobs, the technology will not be adopted [9]. This is the case even if the upper administrators are committed, there are champions for the use of the technology and there is a general belief that the technology works. It may be trite to state that people don’t want to change how they do their jobs, but being trite doesn’t make it wrong.

The almost two years of planning for the demonstration project has allowed for a thorough discussion of how the introduction of the new technologies would alter jobs. In particular, there is the recognition that, for example, some

nurses will be spending more time looking at computer screens and talking to people on the phone rather than driving to residences. The nurses who are looking at screens are clearly providing care; it is just through a different care model. It is a fact of life that some people are more willing to alter how they do their jobs than others and some care providers only want to have a face-to-face relationship with a patient, while others are comfortable making care decisions at a distance. Administrators and supervisors at the organization have been careful to channel individuals who are willing to change into the demonstration project, while allowing others to remain outside. This approach has worked very well for the demonstration project, but other strategies will have to be adopted when the technologies rollout throughout the organization.

### III. METHODOLOGY

My major consulting role has been to develop a means of evaluating the demonstration project. This evaluation is complicated by the number of sites, the variation in the care models employed and the fact that different technologies are employed in different sites. It would obviously be a simpler task if the project consisted of a single site or if only a single care model was included or a single technology employed. However, the real world of care provision is not that simple and the selection of sites, care models and technologies were based upon the belief that a number of new technologies must be incorporated throughout the organization and thus, the evaluation must deal with the existing complexity.

#### A. What is *Not* Being Evaluated

The technology itself is not being evaluated. All the products being used in the project have been on the market for years and, from a technology perspective, do what they were designed to do. What is being evaluated is how the technologies can be used to bring about better and timelier care while being cost effective. Additionally, the organization is not using the demonstration project to determine whether it wants to introduce new technologies. The strategic decision has already been made that new technologies must be incorporated into the organization. The objective of the demonstration project is to determine which technologies can be the most beneficial to the provision of care.

#### B. What is Being Evaluated

As a consequence, the evaluation is focused on: 1) the way that staff uses the technology to provide care to their clients; and 2) on how the clients are impacted by the introduction of the technology. To facilitate this evaluation a series of very specific outcomes were developed for each of

the sites along with the factors that needed to be measured in order to gauge whether the outcomes were achieved.

For example, at **Site 1** the desired outcomes are: improved physical health; better chronic disease management; decreased visits to the emergency room; and decreased hospitalizations. In order to assess whether these outcomes were achieved, five factors need to be assessed: vital signs for each of the residents; information on the communication of vital signs information to medical personnel; data on number of visits to emergency rooms; and number of and reasons for hospitalizations. In addition, it was decided to use both a short life satisfaction and depression scales in order to determine if the introduction of the technology brought about change in the residents' well-being. The actual instruments to be used are a combination of self-created and "packaged" products. At **Site 1** the vital signs are automatically recorded by the system that is being used, while a baseline for each of the residents has been established by recording the information in the resident's medical records for the last six months. An incident form has been created to record events that require medical intervention whether by a nurse, a referral to a physician, an emergency room visit or a hospitalization. Once again, a baseline has been established by extracting this information for each resident for the six months prior to the start of the project. Standardized life satisfaction and depression scales have been administered at the beginning of the project and at three month intervals during the project.

In contrast, at **Site 5** the desired outcomes are: to improve the residents' quality of life; to offer new opportunities in order to increase independence; and to create efficiencies in operation. Thus, the factors to be measured at **Site 5** are: residents' level of participation in meal preparation; residents' independent access to kitchen equipment; and monthly utility costs. As at **Site 1**, both a short life satisfaction and depression scales are used in order to determine if the introduction of the technology brought about change in the residents' well-being. Once again, the actual instruments to be used are a combination of self-created and "packaged" products. Obviously, the utility bills are standardized and can be easily compared from before and after the project's initiation. Similarly to **Site 1**, standardized life satisfaction and depression scales have been administered at the beginning of the project and will be at three month intervals. Residents' independent access to the kitchen and participation in meal preparation have been recorded by staff on a daily basis for approximately three months prior to the start of the project and will continue to be recorded throughout the project.

### C. Common Methods

Although in general, the outcomes, the factors to be measured and the instruments employed are site specific, there is a relatively large degree of overlap. The same scale to record vital signs data is being used, the same life

satisfaction and depression scales are being administered at the same time intervals and the same incident form is being used. Therefore, there will be an opportunity to compare findings across sites at which the same data have been collected. However, the main emphasis is on evaluating the contribution made by the selected technologies on the provision of care at each individual site.

## IV. CONCLUSION

The project is now underway at all eight sites. This is not to say that there have not been some problems. There were initial difficulties with the use of the vital signs technology at two of the five sites in which it is being used. The problem, however, was not with the technology per se, but instead with the staff's use of the system. Additional staff training alleviated this problem. Remodeling at **Site 5** took two months longer than anticipated, thus delaying the start of the project at this location. The start of the project at **Site 8** was delayed by almost three months because of the complexity inherent in the use of innovative technologies at an outpatient clinic; especially the need to train non-professional individuals in the use of the vital signs technology and ensuring that the organization would be reimbursed for the cost associated with the collection and transmission of the resultant data. However, overall the project is proceeding well and data from all of the sites should be available by the end of the year.

There are several, on the surface, simple reasons why the project has gone as well as it has. First and foremost, the decision by the organization's upper administration to make the introduction of new technologies a key element in the organization's strategic vision was essential. Second, the thorough planning taking two years allowed all stakeholders to be involved at each of the project's stages: selection of sites; choosing the technologies; developing outcome measures; and deciding which instruments to use. Third, from the very beginning, the emphasis of the project was on making the technologies financially sustainable. The project was not a pilot to see if the technologies worked, but instead a demonstration of how the technologies could be incorporated into the organization's care models and, at the same time, ensuring that their use was billable. Only when the data collected are analyzed will it be possible to judge the overall success of the project, but, the fact that such analysis is possible elevates this project far above many other similar projects.

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