

A Case Review: Designing a New Patient Education System

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Abstract

With shorter lengths of hospital stay, an increase in the number of persons with chronic disabilities, coupled with the increase in health information on the Internet, there is a need for creating and/or redesigning patient education systems. Through a case review of a quality improvement study, the goal of this paper is to describe the development of the New Patient Education System (NPES) and demonstrate the collaborative system-wide efforts to improve patient education delivery. Objectives are to review the Plan-Do-Study-Act (PDSA) cycles for developing: a) criteria and process for selecting resources; b) the resource collection and website; c) a professional and patient education database for medication and condition information; and d) the method for organizing and customizing patient and family education. Findings show that designing a new patient education system requires an improvement model that promotes change based on incremental and associated steps, creates collaborative structures, such as committees, whose membership changes depending on the goals, seizes the opportunity to respond, uses environmental turbulence as an opportunity to change, and believes that knowledge is a powerful tool.

LIST OF COMMON ABBREVIATIONS

RF - Rehabilitation Facility

HRC - Health Resource Center

PDSA - Plan-Study-Do-Act

EPM - Education Program Manager

NPES - New Patient Education System

CEPM -Clinical Education Program Manager

PEAC - Patient Education Advisory Committee

INTRODUCTION

Caring for persons with chronic conditions will be one of the public health challenges for the 21st Century (1). An estimated 125 million Americans have at least one chronic condition with the associated medical costs estimated at 510 billion dollars. By 2020, it is estimated that 157 million Americans will have at least one chronic condition and over 80 percent of medical spending will be associated with the treatment of these individuals (2). Shorter lengths of hospital stay, staff's limited time available for discharge teaching, accreditation agencies' drive to improve patient safety, and lack of resources require healthcare institutions to create systems that provide information and opportunities for consumers to make informed choices and decisions about their healthcare and learn how to care for their healthcare needs (3 , 4 ; 5 ; 6).

Meanwhile, the IOM states that "A concerted effort by the

public health and health care systems, the education system, the media, and health care consumers is needed to improve the nation's health literacy. If patients cannot comprehend needed health information, attempts to improve the quality of care and reduce health care costs and disparities may fail" (7). To that end, current emphasis is on using the Internet to obtain health and resource information as an avenue for promoting savvy health consumers (8).

A rehabilitation facility (RF) in a large Midwestern city has been at the forefront of medical rehabilitation for 50 years and promotes a philosophy whereby physiatrists, rehabilitation nurses and allied health professionals assist consumers to function to their fullest capabilities and optimize functionality. The RF prides itself on patient satisfaction. In 2000, findings from a hospital-wide satisfaction survey indicated a decline in patient and family satisfaction in preparation for discharge with in-patient education. This coupled with the current health care environment of shorter lengths of stay, a nursing shortage, and the lack of a standardized patient education system led to the development of the Health Resource Center (HRC).

After 2 ½ years of planning (1/2001- 8/2003), the HRC opened its doors August 2003. The top priority of the HRC was to improve the quality and delivery of patient education. Through a case review, the goal of this paper is to describe the development of the New Patient Education System

(NPES) and demonstrate the collaborative system-wide efforts to improve patient education delivery. Objectives are to review the Plan-Do-Study-Act (PDSA) cycles for developing: a) criteria and process for selecting resources; b) the resource collection and website; c) a professional and patient education database for medication and condition information; and d) the method for organizing and customizing patient and family education.

LITERATURE REVIEW

As the number of persons living with chronic conditions grows and the healthcare environment continues to change putting emphasis on educating consumers to be knowledgeable about their healthcare, it becomes essential for organizations to design efficient delivery systems, such as patient education. Often times, it is through collaboration that new systems come to fruition. For this reason, the following literature summarizes patient education and health care, the needs of persons with disabilities and the Internet, and perspectives on collaboration.

PATIENT EDUCATION AND QUALITY HEALTH CARE

In the literature, the terms of patient education and consumer education are often used interchangeably even though they are two different entities. Whereas, patient education/information is defined as the planned activity initiated by a health professional, whose aim is to impart knowledge, attitudes, and skills with the specific goal of changing behavior, increasing compliance with therapy and, thereby, improving health (9). Alternatively, consumer education/health information is information on health and medical topics provided in response to requests from the general public, including patients, and their families and it encompasses information on health promotion, prevention medicine, the determinants of health and accessing the health care system (10). During the last decade, the healthcare industry has witnessed a proliferation in the development of health resource centers and websites aimed at providing patient and consumer health education. For example, the Massachusetts General Hospital (MGH) has a consumer website and a private patient education website; Mayo Clinic has a public site that provides information on diseases and conditions, medications, and tools for healthy living.

In 2001, staff at a large Midwest RF conducted a Resource Needs Assessment Study prior to opening their Health Resource Center(11). Staff reviewed the websites and spoke

with administrators of 16 Health Resource Centers around the country. All of the Centers were members of the Family Consumer Health Information providers group and/or listed in the Consumer and Patient Health Information Section of the Medical Library Association (CAPHIS). Some key findings included:

- Eight centers provided primarily consumer health information, five provided consumer and patient education information, and three provided patient education, consumer, and professional health information.
- Eleven centers were located in acute care hospitals; four were in solo rehabilitation hospitals and one was off-campus from a university.
- The population served varied from eight centers primarily serving all age groups across the life span, five serving pediatrics (birth through age 21 years), and three serving solely adults (over 21 years).
- The majority of centers are linked to a website via the primary institution.

In conjunction with the emergence of consumer and patient education websites, health policy focuses on refining the quality of healthcare delivery and holding healthcare institutions accountable for providing efficient, safe, and effective care. In 2001, the Institute of Medicine released the report, "Crossing the Quality Chasm: A New Health System for the 21st Century" which recommended a framework and strategies for achieving improvements in the quality of health care. The Quality Chasm's framework consisted of: six aims for improving health care: i.e., making healthcare more safe, effective, patient-centered, timely, efficient, and equitable and the following ten rules:

1. Care based on continuous healing relationships. Patients should receive care whenever they need it and in many forms, not just face-to-face visits. This rule implies that the health care system should be responsive at all times (24 hours a day, every day) and that access to care should be provided over the Internet, by telephone, and by other means in addition to face-to-face visits.
2. Customization based on patient needs and values. The system of care should be designed to meet the

most common types of needs, but have the capability to respond to individual patient choices and preferences.

3. The patient as the source of control. Patients should be given the necessary information and the opportunity to exercise the degree of control they choose over health care decisions that affect them. The health system should be able to accommodate differences in patient preferences and encourage shared decision making.
4. Shared knowledge and the free flow of information. Patients should have unfettered access to their own medical information and to clinical knowledge. Clinicians and patients should communicate effectively and share information.
5. Evidence-based decision making. Patients should receive care based on the best available scientific knowledge. Care should not vary illogically from clinician to clinician or from place to place.
6. Safety as a system property. Patients should be safe from injury caused by the care system. Reducing risk and ensuring safety require greater attention to systems that help prevent and mitigate errors.
7. The need for transparency. The health care system should make information available to patients and their families that allows them to make informed decisions when selecting a health plan, hospital, or clinical practice, or choosing among alternative treatments. This should include information describing the system's performance on safety, evidence-based practice, and patient satisfaction.
8. Anticipation of needs. The health system should anticipate patient needs, rather than simply reacting to events.
9. Continuous decrease in waste. The health system should not waste resources or patient time.
10. Cooperation among clinicians. Clinicians and institutions should actively collaborate and communicate to ensure an appropriate exchange of information and coordination of care (12).

These six aims and ten rules have implications for patient and family education. For example, if a patient is

knowledgeable about his/her medications, then he/she can reconcile any discrepancies that may occur and result in a critical event. A critical event is defined as an occurrence that involves a potential threat to a patient's safety such as getting the wrong medication (13).

In response to the IOM's aims and recommendations, the Institute for Healthcare Improvement (IHI) has the Pursuing Perfection in Healthcare: The Quality Chasm funded in part by the Robert Wood Johnson Foundation. This program focuses on creating new systems that can improve healthcare delivery with a major focus on patient safety (14). Briefly, the IHI's pursuing perfection is founded upon Associates in Process Improvement. 15 It is a model that is based on accelerating improvement within organizations by asking three questions: setting aims, establishing measures, and selecting changes and then testing changes using the Plan-Do-Study-Act (PDSA) cycle. In short, the PDSA cycle is planning change, trying it, observing results and acting on what is learned. The PDSA cycle is not meant to replace change models that organizations already have in place, but to accelerate improvement.

Meanwhile, the Joint Commission on Accredited Hospital Organizations (JCAHO) 2005 Hospitals' National Patient Safety Goals are very specific about changing healthcare systems to deliver efficient and effective care. One example is the focus on medication management across the continuum of care.

“Accurately and completely reconcile medications across the continuum of care.”

1. During 2005, for full implementation by January 2006, develop a process for obtaining and documenting a complete list of the patient's current medications upon the patient's admission to the organization and with the involvement of the patient. This process includes a comparison of the medications the organization provides to those on the list.
2. A complete list of the patient's medications is communicated to the next provider of service when it refers or transfers a patient to another setting, service, practitioner or level of care within or outside the organization” (16).

Despite professionals having less time to spend on educating patients and families about their health conditions, providing

patient education is a fundamental responsibility of all healthcare professionals. Evidence in the literature supports the positive benefit that patient education has on health outcomes, Health Related Quality of Life (HRQOL) indicators, and empowerment (17 , 18 , 19 ; 20 , 21 ; 22 23).

In the rehabilitation field, collaboration among professionals and with the patient and family is a daily occurrence (24). A key activity is to provide up-to-date patient education throughout the continuum of care. Coordinated teams can optimize teaching opportunities in a busy 24-hour setting, e.g., acute rehabilitation facility (25 26 , 27). As a result of the myriad of cognitive, sensory, and motor deficits that most persons in rehabilitation face, professionals are accustomed to using multiple approaches to teaching, e.g., visual, audio, tactile, and role-play, to optimize the patient's functionality.

NEEDS OF PERSONS WITH DISABILITIES AND INTERNET USE

Disabilities, also known as activity limitations, are restrictions in the person's ability to perform activities of daily living (ADLS), e.g., toileting, bathing, mobility, or instrumental activities of daily living (IADLs), e.g., attending school, working, or socializing as a result of impairments, which are the result of either a congenital, e.g., cerebral palsy, or acquired disease, e.g., multiple sclerosis, arthritis, or traumatic event, e.g., spinal cord injury or traumatic brain injury (28). Persons with disabilities utilize services that result in higher costs of healthcare than the general population (29). Currently, there is not an integrated healthcare system designed to serve the needs of PWDs. Persons with disabilities receive services from an array of public and privately funded programs that provide single services, such as healthcare, social, and income services. As a result, PWDs and their families are forced to navigate through a complex service delivery system. As advances in medicine increase the life expectancy for persons with chronic diseases and disabilities, the number of disabled increases along with their life-long needs (30).

Persons with disabilities and their families experience similar needs as persons without disabilities that coincide with the developmental life-stages. These stages and need include: infancy—separation, autonomy, mobility skills; latency/school-age--peer and school relationships; adolescence and young adulthood—maturing body, sexuality, intimacy, career and post-secondary education, separation from family, peer relationships; adulthood and middle age---marriage, family, career; and older adulthood--

-family, career and contemplating about retirement, affects of aging process on health status. However, the difference between these two groups is that the intensity for need is heightened, the available resources are often fewer, and the societal barriers are often greater (31 ; 32 ; 33 ; 34 , 35).

Throughout the lifespan PWDs and their families require social, psychological, financial, and emotional support (36 , 37 38 39), integration and reintegration into the community, health information (40 ; 41); and caregiving (42 ; 43 ; 44).

Creating programs that can address the resource needs of PWDs and their families is essential to responsible public policy and program implementation. The Centers for Disease Control and Prevention redefines the function of public health in the field of disability to include preventing co-morbidities as a result of the primary disability (45 ; 46). As a result, program planning and monitoring efforts that take an ecological approach (focus on transportation, housing, school, employment, community life, and socialization) may have a greater contribution to secondary prevention and early intervention than programs that focus on one component, e.g., physical limitations.

In 2001 the HRC conducted a Resource Needs Assessment Study by collecting data from 123 key informant interviews with PWDs and their families and professionals. Specifically, collection occurred from the following four sources: (a) standardized consumer telephone interviews, (b) professional group interviews, (c) consumer discussion group interviews, and (d) telephone interviews with directors or representatives from consumer health resource centers throughout the country. Findings from the HRC's Resource Needs Assessment revealed that the top most pressing needs for PWDs were:

- Psychological Support
- Recreation/Socialization
- Caregiver Assistance
- Transportation
- Care/Treatment Information
- Equipment
- Medical Information
- Housing
- Financial

- Employment
- Education.

Similarly, Louis Harris and Associates conducted the National Organization on Disabilities (N.O.D.)/ Harris Survey (47). One thousand Americans with disabilities age 16 years and over were interviewed over the telephone. Based on all respondents data show the following were problems that they “sometimes face” are not having enough money, 68%; inadequate health insurance, 40%; inadequate work opportunities, 34%; not having a full social life, 51%; inadequate transportation, 27%; negative public attitudes, 31%, and poor access to public facilities, 25% (48).

INTERNET USE

Nearly half of all American adults (90 million) have problems understanding and using health information and there is a higher percentage of hospitalizations and use of emergency departments among patients with deficits in health literacy (49 ; 50). Health literacy is defined as the ability to which individuals are capable of obtaining, processing, and understanding basic information and needs to make appropriate decisions about their health (51). Use of computer and the Internet for PWDS is a critical issue (52 ; 53). For example, in comparing Health Related Quality of Life (HRQOL) indicators for persons who use the Internet and those who do not, data show that most HRQOL's were significantly better for persons who use the Internet versus those who do not (54).

Until recently, little was known about whether the content of on-line health information is accessible to PWDs and whether or not they use the Internet to search for health information. In 2004 Zeng & Parmanto conducted a study(55) looking at the web content accessibility for PWDs, findings showed that no website was completely accessible to PWDs and that government and education health sites fared better than their counterparts. A large disparity of Internet use exists between the persons with disabilities and persons without disabilities: persons without disabilities are four times more likely to use the Internet for health information than persons with disabilities (56). It this suggested that this finding is due to lack of accessibility to the web (57).

Findings from two surveys of consumers with disabilities--the National Center for the Dissemination of Disability Research (58) and the National Institute on Disability and Rehabilitation Research (59) show similar results about

computer usage and Internet access among PWDs. These results include: a) an increase in the availability and use of computers by consumers; b) increase in consumers getting information on the Internet as opposed to other mediums; and c) increase in the use of the Internet to find health information and research. However, these results do indicate that Internet use and access to health information is on the rise in the PWD population, it is still not equal to that of persons without disabilities.

PERSPECTIVES ON COLLABORATION

From its inception, the RF maintains a philosophy of teamwork to enhance organizational performance, foster creativity, and create innovative programs. Likewise, the HRC subscribes to a team or collaborative process evidenced by convening ad-hoc committees for problem solving and conducting the Resource and Needs Assessment Study for guiding program development. In the field of rehabilitation, collaboration has a key role in achieving patient outcomes (60 ; 61).

Research shows that collaboration is a process that focuses on recruitment of organizations or stakeholders who have a mutual interest for the purpose of solving a problem that no individual or organization can solve on its own (62 ; 63). Stakeholders are those individuals or groups who are directly influenced by the action of others” (64). With joint ventures and mergers of healthcare organizations and decentralized management, it is very common to create collaboration among sub-systems within one organization. The precursor to collaboration is often environmental turbulence that threatens the existence of the organization and heightens organizational interdependence (65).

In the studies above, environmental turbulence can take many forms. In the case study here, the researcher describes the formative evaluation of a new patient education system where at least part of the environmental turbulence comes from the decrease in patient satisfaction at discharge and the lack of a standardized system within one organization with many interdependent sub-systems. In a true collaborative process, resources are shared among members and the vehicle for this sharing is often a committee, advisory group, or coalition. Shared resources may include knowledge, insight, information, and contacts with other professionals (66 ; 67). Oftentimes, there is a positive relationship between the number of resources an individual member has and the amount of power that individual member possesses. Therefore, resources that members share in a collaborative

process, such as information and knowledge, can be construed as power (68). Members who are privy to special information or knowledge and are unwilling to share these resources may dominate other members who do not have access to the information and knowledge. The results may be a struggle among stakeholders that could have a negative effect on the development of collaboration.

In general, communication serves as the mechanism for sharing information and knowledge and thus allows individuals to enter a collaborative process (69). In this case study the communication occurs among professionals in one institution who are members of multiple systems within the institution, e.g., satellite clinics, patient units, disciplines, and management teams. The inclusion of a variety of members in collaborative efforts may have several benefits. First, members have knowledge of the problem that is based on first-hand experience that others lack, and which might be shared in collaboration. Second, the members have ideas and may propose solutions. And third, including members in the problem-solving and decision-making process provides opportunities for staff to have control over their working environment (70).

According to Gray the 10 tenets for judging and defining successful collaboration are the following:

1. Does the outcome satisfy the real issues in dispute?
2. Do parties feel they affected the decision?
3. Are the stakeholders willing and able to implement the decision?
4. Does the agreement produce joint gains for the party?
5. Was communication between parties increased and the working relationships improved?
6. Has the agreement held up over time?
7. Was the process efficient in terms of time and resources?
8. Does the solution conform to available objective standards?
9. Do the parties perceive the procedures were fair?
10. Did the procedures conform to accepted standards of procedural fairness? (71).

All of these tenets need not be present to constitute success. If the stakeholders view the process as having been fair and lasting, then the collaborative relationship may be viewed as successful. "One of the fundamental tenets of [successful] collaborative designs for addressing dispute is acknowledging the legitimate differences in how parties perceive a problem" (72). Collaboration can enhance the relationship and resources between individuals and agencies. By sharing information and engaging with community members, self esteem can be enhanced or validated.

Literature on collaboration offers three useful insights when developing and implementing a new patient education system. First, collaboration is a process, and not an end, initiated by the appreciation of the interdependence among organizations and sub-systems within the organization. Collaboration often requires the powerful to relinquish some power in order to have an equitable process. Second, stakeholders share resources and engage in a joint effort of problem solving or shaping the work environment. Third, developing a patient education advisory group or committee for whom the collaborative process is a norm may create opportunities for win-win situations.

To summarize, literature highlights the prevalence of persons living with disabilities and their comprehensive unmet needs that pose limitations in their ability to access resources and participate in society to their fullest capability. Innovative programs can strengthen and promote access to the necessary resources, highlight opportunities, and create attention to public policy issues affecting vulnerable populations, i.e., health literacy or accessible and affordable housing. Providing patient and family education is a paramount activity that relies on collaboration among all staff and systems of care and allows consumers to reconcile any differences.

METHODOLOGY

What were the Plan-Do-Study-Act (PDSA) cycles for developing: a) criteria and process for selecting resources; b) the resource collection and website; c) a professional and patient education database for medication and condition information; and d) the method for organizing and customizing patient and family education?

In order to answer these questions, the research method is mostly driven by retrospective single case study design of the development and implementation of a new patient education system using the Rapid Improvement Model. The case review methodology provides an interpretation of

events to examine contemporary phenomenon within its real-life context (73). Data collection methods are: 1) participant observation, 2) document review, and 3) survey analysis.

SAMPLE SELECTION

This paper describes a retrospective and single case convenience sample of the development of a NPES. The primary author⁷⁴, CEPM, is the facilitator of the NPES. Each PDSA Cycle is part of the case. A cycle may contain a sub-sample that is described. For example, staff satisfaction survey of piloting the new system.

BACKGROUND OF THE HRC AND PATIENT EDUCATION

Prior to the HRC, professional staff provided patient education to PWDs and their families who had sustained a stroke, spinal cord injury, or brain injury by material compiled in a binder and authored and published by RF staff in the 1980's and revised in 1996. Topics were: bladder, bowel, respiratory, skin, sexuality, employment, housing, finance and law, transportation, equipment, and home health care. If a patient had a different condition than those mentioned above, then he/she received educational material pulled from respective patient education materials maintained by individuals within the various allied health and nursing disciplines. For the most part, practice councils, consisting of senior members from their respective disciplines, e.g., nursing, speech, etc., oversee issues related to practice.

To date, there was not a comprehensive process or standard to review, update, format, and customize materials to address a patient's or family's need within or across the FR or affiliate sites. Until the HRC, the Learning Resource Center (LRC) housed medical journals and professional books that dated back to the 1950's. Since the RF is affiliated with a major medical university and library, the LRC maintained a limited collection that was reviewed on a quarterly basis.⁷⁵ Human and technological resources included a part-time librarian aide and one computer with access to the Internet and four VCRs.

With this in mind, the Chief Nursing Officer and the Past Medical Director/President/and Chief Executive Officer had a vision of building a HRC for the purpose of educating patients and families about disabilities and merging the LRC and its professional materials. With funds mostly from philanthropic endeavors and after two and a half years of

planning, the HRC opened in August 2003. The HRC's mission is to "...provide opportunities for learning, innovation, and empowerment for people with disabilities, their families, and their communities. It encourages inquiry, promotes productivity, and inspires all to achieve their greatest and fullest participation in life." Located on the first floor of its main hospital it offers the public, patients, family and staff a place to obtain disability-oriented resources including books, magazines, and videos during business hours: Monday, Tuesday & Thursday 9AM to 5PM, Wednesday 9AM-7PM, and Friday 9Am-3PM. Staff include a full-time program director, a part-time librarian, a part-time clinical education program manager, and three part-time program educators who offer visitor assistance in finding disability support resources -- about support groups, classes, government programs, and products and services especially designed for each individual's specific needs. Resources are categorized by eight life topics based on the Resource Needs Assessment Study (2001) and include: 1) medical care and treatment, 2) caregiving and equipment, 3) education and employment, 4) finance and law, 5) housing and transportation, 6) support and wellness, 7) recreation and leisure, 8) inspiration and hope. The HRC is also available online through RF's website and features over 3000 resources. Visitors can search the web, access e-mail or Microsoft Word® via six public computers.

Consistent with the RF's philosophy of teamwork and collaboration described in the introduction, the director and staff followed suit in developing and implementing the NPES by establishing the following four committees: 1) an ad-hoc committee to develop resource review policies and procedures; 2) an ad-hoc committee to select a comprehensive drug and medical information database; 3) an ad-hoc committee to pilot NPES; and 4) an on-going Patient Education Advisory Committee (PEAC). The format for the case study parallels the chronology of the following four PDSA cycles: 1) Developing a Resource Review Criteria and Process, 2) Building the Collection and Website, 3) Selecting a comprehensive drug and medical information database, and 4) Developing a method to organize and customize patient education. Each PDSA cycle represents a significant improvement change or activity/outcome.

PROCEDURES

Data were collected via participant-observation, document review, and survey analysis. Procedures for data collection are summarized under each respective PDSA Cycle.

Participant-Observation. The researcher also the clinical education program manager (CEPM), had an active role as project and committee(s) facilitator and therefore participant-observer throughout the development and implementation of the NPES. As participant-observer, the researcher documented the activities and outcomes of committee meetings, disseminated minutes and other materials to committee members, developed and administered surveys, provided web training, and other key resources. The CEPM reviewed the data to identify the PDSA cycles that represent key shifts in activity. Committee members confirmed the accuracy of the minutes and the HRC director and at least one committee member confirmed PDSA cycles.

Document Review. The CEPM collected and reviewed the following data to identify and confirm PDSA cycles: committee minutes and attendance records, evaluation model, training guides, resource needs assessment guide, and survey results. The purpose of the review was confirmatory in that documents provided evidence for PDSA cycles described in the findings. As stated above, the HRC director and an education program manager and at least one committee member confirmed PDSA cycles. Most data were at the nominal level, e.g., whether or not a document was completed [yes/no], continuous/interval level, e.g., number of resources in collection, or ordinal (categorical).

Survey. The CEPM or the nurse manager administered two Likert-Scale Surveys, each one page, face-to-face during a staff meeting. Both surveys were confidential and respondents voluntarily completed them. Surveys are further described in PDSA Cycles three and four.

OVERALL ANALYSIS AND FINDINGS

Each PDSA cycle is briefly described and illustrated in corresponding table that includes the source of data, analysis, and findings. Each cycle coincides with the overall aim or purpose which is that “the HRC is the clearinghouse and facilitator of all patient education, professional material and consumer health information for the RF system of care” and the objectives which are to provide professional standards and criteria for developing or selecting resources, to create a website that provides on-line access to up-to date resource materials, promote standard and consistent use of patient education resource materials, and to ensure that staff are informed and educated on how to use the resources⁽⁷⁶⁾. In addition, each cycle represents an incremental step in establishing the new patient education system and is a

dynamic process whereby changes are catalysts for subsequent cycles.

Descriptive statistics were used to analyze survey data; content analysis technique was conducted to review documents and notes from participant observation either confirmed or disconfirmed findings other sources. Data are either nominal (yes/no), ordinal (categorical), or interval (continuous--number of documents retrieved).

PDSA Cycle One: Developing a Resource Review Criteria and Process. As stated earlier, the impetus for developing the HRC and hence a patient education system was based on environmental turbulence that includes; shorter lengths of hospital stay, staff's limited time available for discharge teaching, accreditation agencies' drive to improve patient safety, and lack of standardized and up-to-date resources. In the spring of 2001, the HRC staff reviewed the literature to draft criteria and selection process that was sent to an ad-hoc committee facilitated by the CEPM. The ad-hoc committee consisted of 12 representatives from physical, occupational, speech, and recreational therapies, medicine, nursing, psychology, and the education and training center and met three times over five weeks. Data sources were participant observation and document review.

Procedures, Analysis and Findings. The CEPM and a PEM drafted criteria that were e-mailed to the members prior to the initial meeting. Members reviewed the criteria and refined terms that became the final criteria and led to the draft of the patient education and consumer education evaluation forms. Again, the committee received these forms via e-mail and revised them at the next meeting. Forms then became the basis for evaluating resources based on a Likert Scale. Once these steps were complete, the CEPM and EPM drafted a process for reviewing resources, filling in resource gaps, and editing resource materials. The criteria, evaluation forms, and process are known as the “Resource System and Resource Review Criteria”. Simultaneously, another EPM collaborated with marketing and wrote the “Graphic Standards for Information Sheets” policy and procedure that was reviewed and finalized by the HRC and RF Marketing Directors.

Findings show that once the “Resource System and Criteria” were developed, the HRC staff began the next cycle of building a resource collection and website.

Figure 1

Table 1: PDSA Cycle One

Plan	Do	Study	Act
1. Develop Resource System & Criteria.	1A. Review literature. 1B. Draft, revise, approve & finalize criteria, evaluation forms, & process for selecting patient education & consumer health resources. 1C. Convene an ad-hoc committee of 12 members that met three times to develop Resource System Process Guide. 1D. EPM consults with marketing to finalize & approve by Directors of HRC & marketing.	1A&B. Document completed. 1C. Committee convened & completed task. 1D. Document completed.	1A, B & C. Adopted criteria policy & procedures for HRC to select resources. 1C. Committee disband. 1D. Adopted policy & procedures for Graphic Standards.
	1A, B, C, & D. Disseminate policies to program administrators who to inform their respective staff	1A, B, C, & D. Staff use review policies & procedures when submitting a resource	1B & D. Disseminated policies & procedures.

PDSA Cycle Two: Building the Collection and Website. By fall 2001, HRC staff began the step of identifying and selecting resources. (Note: This process is on-going.) Resources are physical documents, e.g., books, audios, videos, journals, pamphlets, and information sheets; virtual documents, e.g., applications information downloads; events, e.g., support groups and education sessions; or external resources, e.g., condition specific societies. During this step, the director collaborated with and hired a web consultant team to develop a relational database, content management system, and knowledge based website. By the end of Cycle Two, the CEPM and director developed a policy & procedure for “Cataloging and Procurement.” Based on several renditions, it was finalized in September 2004. Procedures, analyses and reviewing former patient education binders, purging and merging the LRC, and testing and launching the website are as follows. Refer to Table 3.

Procedures, Analysis, Findings: Reviewing Patient Education Binders. A logical starting point was for HRC staff to first review the patient education binders for Stroke, SCI, and Brain Injury through a crosswalk procedure. To conduct a crosswalk procedure, the EPM listed every document in the binders in an Excel spreadsheet for total N=285. Documents were coded as follows: “general” (information was general and could fit any condition), “specific” (information was specific to the condition), and “general with some condition specifics”. Findings revealed that N=104 (63%) were not duplicative or coded as general and could be revised to fit any condition. Of these remaining 104, 72 final documents were placed in our database. Thirty-eight were patient education documents.

Procedures, Analysis, Findings: Purging and Merging LRC. Upper management decided that the LRC collection should merge with the HRC. The HRC would provide resources for patients and their families, consumers, and professional staff. This decision required HRC staff to analyze LRC's materials using the criteria developed in PDSA Cycle One. Professional RF staff assisted in this review process that took place over a one-week period in winter 2002. Findings were: N=1,496 books were reviewed, n=489 were kept, n=297 were stored at an affiliated medical library and n=498 were withdrawn from the collection. All of the retained items were catalogued into the HRC database ⁷⁷ and electronically coded to coincide with the National Library of Medicine's classification system. In August 2003, the LRC merged with the HRC.

Procedures, Analysis, Findings: Testing and Launching the Website. It is beyond the scope of this paper to provide the full depth of the laborious process involved in developing the database and website. However, the primary author reports on milestones and survey results of testing the website. The director of the HRC and marketing collaborated to hire a web consultant and finalized a contract in June 2001. Thus, the process to develop a relational content management system, database and website began. By late fall 2001; HRC staff began cataloguing the resources into the database which would drive the navigational structure of the HRC website.

“Resource and Reflection Sessions” were held in the RF's computer training room to test the website. Staff from all service areas were notified via e-mail and asked to volunteer to attend one of 14 30-minute testing sessions. Upon attending the session, they voluntarily completed a five-question ordinal and confidential survey and had the option of offering written comments.

A convenience sample of N=81 comprised the cohort. Data were analyzed using descriptive technique and content analysis. Results shown in Table 2. indicate that almost 100% had a good overall impression of the website, thought the information was of good quality, that the website was easy to use, the information was helpful, and that they would recommend it to a colleague. Surprisingly, about 20 percent did not fully complete the survey. The author suspects that they either did not understand the statement or they did not have experience with using the Internet. Content analysis was used to analyze qualitative data (comments) fell into two categories: suggesting new resources and identifying editing needs on resource descriptions. Findings led to

refining the web navigational controls and general layout of the resource information.

The website was officially launched in late August 2002 and staff training began in September 2002 through December 2002. A total of 126 staff received training. Currently, all existing staff can place a shortcut to the website on their personal computer desktops. All new employees will have a shortcut installed via information systems.

Figure 2

Table 2: Results of Resource Reflection Survey (N=81)

Question	Excellent	Good	Fair	Poor	Total
Overall impression (look and feel) of this website. (N=66)	N=58 88%	N=7 11%	N=1 1%	0	N=66 100%
Overall quality of information provided. (N=66)	N=57 86%	N=9 14%	0	0	N=66 100%
Easy to use/find information. (N=64)	N=50 78%	N=13 20%	N=1 1%	0	N=64 99%
Helpfulness to assist you with working with patients and families. (N=63)	N=54 86%	N=9 14%	N=0	0	N=63 100%
Would you recommend this website to a colleague? (81)	Yes N=65 80%	No N=16 20%			N=81 100%

a Due to rounding total may not add to 100.

Figure 3

Table 3: PDSA Cycle Two

Plan	Do	Study	Act
2. Building the Collection & Website	2A. Develop & implement Catalog & Procurement Procedure. 2B. HRC staff conduct crosswalk analysis of patient education binders.	2A. Completed 8/04. 2B. Crosswalk indicates: N=286 reviewed, n=104 were not duplicative. n=72 were entered into collection n=39 coded as patient education documents	2A. Adopted and revised based on new information. 2B. Created sub-topic areas based on original patient education binders.
	2C. HRC staff use criteria to select resources to coincide with topic areas & consult with experts.	2C. To date, N= 3,000 resources consisting of videos, books, journals, documents, community organizations, events and support groups available on-line.	2C. Activity to identify resources is on-going.
	2D. Purge & merge the LRC materials via eliciting 36 RF experts to assist in review process.	2D. Reviewed N=1,495 books n=499 kept n=297 stored at affiliated medical library n=499 withdrawn from collection.	2D. Moved LRC to HRC 8/03.
	2E1. Director collaborates with marketing director & hires web consultant to develop relational database & knowledge-based website. Catalogue books to be kept in HRC. 2E2. Test website with 81 staff HRC input resources & edited descriptions based on comments. 2E3. Develop software feature for electronic classification according NLM. 2E4. Apply for 508 Bobby Approval. 2E5. Install accessible computers & equipment in HRC. 2E6. HRC trains staff to use website.	2E1. Database & Website developed through a series of meetings & iterations. 2E2. Survey Results shown in Table 2. 2E3. Feature developed & installed tested classification system. 2E4. Approval Received 12/03. 2E5. Installed: 1 Dragon Speaking, 1 Zoom, 1 trackball, 5 moveable desks with computers, & 1 portable keyboard protector. 2E6. Trained 126 staff in 15 service areas (8/03-12/03).	2E1,2,3&4. Activated Website 8/02. On-going. Requires continual monitoring for quality control. 2E4 Bobby Approval logo on website. 2E.5 Continue on-going assessment of patient needs with regard to accessibility. 2E6. Train staff PRN.

PDSA Cycle Three: Selecting a comprehensive drug and medical information database. In June 2001, the Chief Nursing Officer (CNO) convened a meeting with the director of the HRC, the CEPM/author, and two members of nursing

leadership. The purpose of this meeting was to charge the HRC with facilitating a process of standardizing patient medication teaching. Historically, nursing developed homegrown medication teaching sheets through its practice council. Nursing discovered that the upkeep and process was inefficient and not uniform. In response to the need for efficient access to up-to-date and standardized medication information, the HRC was charged with integrating this function with the design of a new patient education system. As an initial step, the CEPM took the role of facilitating an ad-hoc committee to research and review medication databases. To be efficient, it made most sense to identify the database systems that were most widely used within the affiliate sites rather than reinventing the wheel!

Procedures, Analyses, and Findings. With this in mind, the CEPM's invited key members of the RF to be on an ad-hoc committee. Members included the: director of pharmacy, two nurse information systems specialists, a nursing manager, and the director of the nursing practice council. The purpose of this committee was to select a database and act as liaisons to other hospital units in order to get feedback. Prior to the meeting, the CEPM researched and identified the two most common medication databases, Micromedex® and Clinical Pharmacology®, that hospitals in the area use. In fact, all but one of RF's affiliates, have Micromedex. The CEPM contacted the database representatives and requested demonstrations. Refer to Table 4. for PDSA cycle.

Consequently, the committee members used the Resource Review Criteria and patient education evaluation to assess both databases and selected Mircomedex®. Micromedex® is a comprehensive drug, medical, and patient education database that is updated on a quarterly basis. The reasons for selecting Mircomedex® were based on the following: affiliates use it, it is user-friendly and easy to navigate, it coincides with the current Medispan® information system, it has a patient education condition and treatment section, CareNotes, and for an additional cost it could be placed on the HRC's Intranet. Once the committee made this decision, it was presented to the CNO who supported the decision to move ahead upon approval of the RF's Practice Councils.

Over an eight-month period, the Micromedex representative attended four meetings to present the database to the Practice Councils. Councils saw the similar strengths, but the allied health Practice Councils had concerns that the patient education information was not robust enough to meet their needs. The committee channeled this information back to the CNO. The committee decided to support the purchase of

Micromedex® and that the information for allied health would be reviewed in the specific practice councils. Due to legalities and other externalities, the contract was not signed until spring 2003.

The final task of the committee was to develop an implementation plan. Pharmacy would ensure that medical staff had the formulary on their palm pilots and information systems would ensure it was on the RF computer network; the clinical nurse leaders and the CEPM would train the nurses; and HRC director would send a formal announcement of the database and ensure that a personal computer shortcut could be added and available for all clinical staff. The plan included two phases of training. The first phase was held throughout the month of December 2003 for nurses (total N=23) and focused on the medication-teaching portion of Micromedex®. The second phase of training was held in October for all allied health and nursing staff (N=27) and focused on the condition and treatment components.

The CEPM developed a survey tool to monitor staff's satisfaction with the database. Nurse managers asked their staff to voluntarily complete the confidential survey in April and October 2004. Respondents were asked to rate their level of agreement (strongly agree=5; agree=4; neither agree/disagree=3; disagree=2; and strongly disagree=1) on the following statements and then offer comments:

- I have easy access to Micromedex®.
- Micromedex® is user-friendly.
- Micromedex® is helpful for patient medication teaching.
- Patient medication teaching has improved since Micromedex®.
- I use Micromedex® for teaching throughout the patient's stay.
- I use Micromedex® for medication teaching at discharge only.

Both samples were selected through convenience. Quantitative data were analyzed using a descriptive and qualitative data were analyzed through connect analysis. Findings shown in Graph 1. indicate an overall satisfaction with the database that improved over time and that teaching at discharge only decreased (desired direction). Open-ended

comments were in the positive direction with the exception that several respondents said that the medication teaching sheets “gave too much information on side effects...and potentially scared or confused patients and families.” This comment may reflect staff's comfort level with patient teaching or the process of teaching. Nevertheless, the implementation of Micromedex® led to the PDSA Cycle four of developing a method to organize and customize patient education.

Figure 4
Graph 1



Figure 5
Table 4: PDSA Cycle Three

Plan	Do	Study	Act
3. Selecting a professional & patient education database for medication & condition information.	3A. Develop Ad-hoc Committee 3B. Review databases, obtained feedback from all service areas, selected & recommended Micromedex® 3C. Train staff in 2 phases. 3D. Survey staff satisfaction.	3A. Committee completed assignment. 3B. CNO approved recommendation & purchase of Micromedex. 3C. Trained staff N=60 3D. Survey Results (See Graph 1.)	3A. Ad-hoc committee disband. 3B. Contract signed, launched database 12/03. 3C. Train staff PRN 3D. Continue to evaluate staff satisfaction.

PDSA Cycle Four: Developing a method to organize and customize patient education. In January 2004, members of the SCI team (the administrative director, program specialist, case manager, and program specialist on the general unit which also houses SCI patients) met with the HRC director and CEPM because they wanted to move forward with refining their patient education binder. Their interest and motivation coincided with the HRC goal to develop a method for organizing and customizing patient education.

At this time, the HCR staff revised, updated, and cataloged 166 patient education documents in the HRC database; 47 are RIC authored patient education information, 51 are RIC

authored consumer health information; and 57 are documents authored by other reputable sources available via Internet download, e.g. application for disabled parking. An ad-hoc committee was formed to review this content and develop a method to organize and provide material specific to patient / family need. The committee met informally through the next several weeks and agreed to develop a system that would provide quick and easy access to patient education handouts through the HRC website so that information could be customized according to treatment focus. The committee agreed that the handouts be placed into a standard "Patient and Family Resource Guide (binder)" with the primary sources for patient education information being the HRC website and Micromedex's CareNotes® feature. A four step process ensures that patient education is standardized across all RF sites of care:

PROCEDURES, ANALYSIS, AND FINDINGS.

1. Search and print materials from the HRC website. If additional information is needed, then go to Micromedex.
2. Search and print materials from Micromedex CareNotes. If information is not available OR does not provide the information you need, then contact your team or discipline's patient education contact person.
3. Patient Education contact person connects with a HRC liaison to discuss resource needs and / or gaps in information.
4. HRC liaison advises for next steps, i.e. team develops new resource material using criteria.

With that being said, HRC staff trained the SCI team on how to search for patient materials on the website and in Micromedex® and the SCI team developed an implementation process. A summary of this process is: 1) each staff assesses the patient's needs and decides which resources he/she needs respective to the topic areas; 2) the appropriate staff prints the resource and reviews it with the patient prior to placing it in the guide; 3) this process is done throughout the patient's stay in order to address his/her changing needs; 4) SCI patients store the guide in their backpack that is kept on their wheelchair; and 5) the care manager conducts quality control checks and obtains feedback at discharge from the patient and family on their satisfaction with patient education. Once these steps were

defined, the SCI team began to pilot the NPES in February 2004. In July 2004, the General Condition Unit joined the pilot.

Adding a second pilot was a precursor to establishing an on-going Patient Education Advisory Committee (PEAC) facilitated by the CEPM and HRC director. Members include 30 representing all service areas and levels of care including members from the initial ad-hoc committee. The purpose of this committee is for members to act as patient education liaisons to their respective areas of care, advise the HRC on patient education issues and assist with decision-making policies as it relates to implementing the NPES. The first meeting was held in 8/2004 and thereafter on a monthly basis.

Simultaneously, nurse managers and/or program specialists on the pilot units asked their staff to voluntarily complete a confidential survey in August 2004. Respondents were asked to rate their level of agreement (strongly agree=5; agree=4; neither agree/disagree=3; disagree=2; and strongly disagree=1) on the following statements and then offer comments:

- I have easy access to patient education materials.
- The New Patient Education System is user-friendly.
- [The]Patient education materials are helpful for teaching.
- Patient education materials are thorough.
- Patient teaching has improved since using the New Patient education System.
- Patient education materials coincide with RF's clinical practice.
- My patient education teaching responsibilities coincide with my clinical practice.
- I use the patient education materials for teaching throughout the patient's stay.
- I use the patient education materials for teaching at discharge only.

Quantitative data were analyzed using descriptive technique and qualitative data were analyzed using content analysis. The sample size was N=11. Graph 2. reveals that in August

2004 the majority of respondents strongly agreed/agreed that the system was easy to access, helpful, and coincided with their expertise. About 50 percent of the respondents agreed that it coincided with RF's practice and that they use material throughout the patient's hospital stay. However, less than half of the respondents agreed that system was thorough and user-friendly. Qualitative data and anecdotal feedback from pilots and survey results of staff's satisfaction with the NPES indicated that the utility of patient education feature on the website was inefficient. For example, staff said that it was too time consuming to have to search website for their specific program information. They suggested that information for each program be packaged in a way that staff could click on a patient education feature to retrieve resources for their respective program.

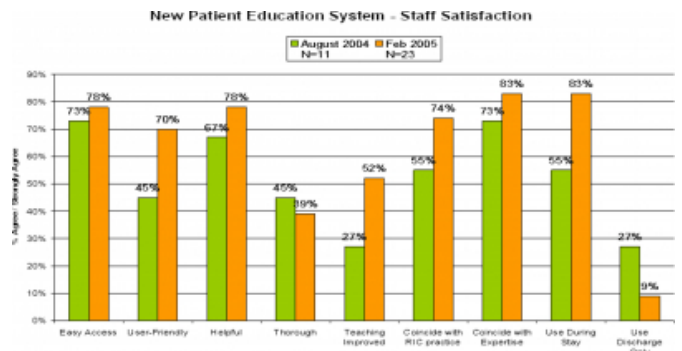
As a result, the committee suggested that each program have a Core Packet of information that would apply to all patients in that program. This meant that the program specialist works with their respective team and HRC liaison to select items for this Core packet. The CEPM and HRC Director would re-code information into the database and collaborate with the web consultant to revise the patient education feature. This process was completed by November 18, 2004.

Subsequently, the PEAC tested the revised website and pilots confirmed that it was much more efficient and user-friendly. As a result, in January 2005 the PEAC recommended an overall implementation plan that included HRC staff training staff during February with the aim of implementing the NPES house-wide in April. Because each unit has a different system and norms, the PEAC decided that each unit would develop its respective implementation process and timetable within these target dates. The CEPM and director developed the process for procuring and assembling the resource guides to ensure that physical documentation and product would adhere to the RF's branding and communication standards.

Concurrently, pilot staff completed a second round of the staff satisfaction survey in February 2005 (N=23). Quantitative data show that the percentage of respondents either strongly agreed or agreed with the following: easy access, user-friendly, helpful, coincide with practice and expertise, use during stay increased and that the percentage of respondents who said that teaching occurred only at discharge dramatically decreased. However, a decrease in the percentage of respondents who agree that the system was thorough decreased. This may be revealed in the qualitative data that respondents stated that they did not have enough

diabetic teaching information. (Refer to Graph 2.)

Figure 6
Graph 2



Other monitoring systems will be developed over time. The CEPM in conjunction with the program specialist will monitor staff satisfaction quarterly starting in June 2005 and the PEAC will develop a monitoring system across all units. (Note: One survey will measure staff satisfaction for the entire NPES.) Refer to Table 5. for PDSA Cycle Four which illustrates the realization of house-wide implementation.

Figure 7

Table 5.: PDSA Cycle Four

Plan	Do	Study	Act
4. Developing a method to organize and customize patient education.	4A. Catalogue remainder of pt. ed. documents.	4A. Results: N=166 n=47 pure pt. ed. n=57 available as downloads from other sites n=51 consumer health	4A. Continue to catalogue resources for pt. ed.
	4B. Establish HRC liaisons with each in-pat. unit.	4B. Each unit has an HRC liaison.	4B. HRC unit liaisons to continue.
	4C. Work with Ad-hoc committee to develop organization system.	4C. Organization system developed per HRC/Life Topics.	4C. Define source for NPES as Micromedex & Pt. Education on the HRC website. Organization system is "Patient and Family Resource Guide" that can be customized. Pilot the NPES.
	4D1. Pilot on SCI Unit 02/04 & General Unit 7/04. 4D2. Train Staff. 4D3. Develop implementation plans for each unit.	4D1. Pilots in process. 4D2. Trained approximately 27 staff on both units. 4D3. Implementation plans completed and in progress.	4D1. Pilots to continue till implementation house-wide. Survey pilots. 4D2. Train staff PRN. 4D3. Continue to follow and revise as unit sees necessary.
	4E1. Convene on-going PEAC 8/04 & facilitated by CEPM & HRC director. 4E2. Establish a communication process for PEAC.	4E1. Committee has 30 members with at least 50% attendance at each meeting. It meets 3 rd Thursday of the month 1-2PM in the HRC. 4E2. Facilitator distributes agenda & minutes.	4E1. Continue on-going committee & add members as necessary. 4E2. Continue communication via agenda & minutes.
	4F. Survey pilots.	4F. Survey results in Graphs 2&3.	4F. Revise system & evaluate quarterly to coincide with house-wide implementation.
	4G1. Select Core Packets. 4G2. Revise website based on Core Packets. 4G3. Pilots & PEAC test revisions.	4G1. Committee recommends to package patient education information by condition. 4G2&3. Revised & tested new pt. ed. feature.	4G1. Created Core Packet for all programs. Core packet materials revised & updated PRN. G2.&3. NPES finalized & approved.

Figure 8

(Table 5. Continued)	DO	STUDY	ACT
	4H1. Committee decides to implement house-wide. 4H2. HRC develops training guide & trains staff. 4H3. Each unit to establishes implementation plan. 4H4. HRC establishes procedure to procure guide.	4H2. N=166 staff trained 4H3. Each unit establishes implementation plan. 4H4. Procedure to procure guides established.	4H1,2,3&4. Implement house wide 4/15/05. 4H1,2,3&4. Evaluate staff satisfaction with the NPES on a quarterly basis. 4H1,2,3&4. Evaluate OSMA data. 4H1,2,3&4. Develop a monitoring system for all units to use.

LIMITATIONS

Limitations exist with any research study. The particular limitations of this study are the:

- Missed opportunities for refining data collection;
- Difficulty in generalizing from findings from a case study;
- Biases experienced through participant observation; and
- Small N for survey data.

SUMMARY AND RECOMMENDATIONS FOR FUTURE RESEARCH

Fiscally sound and responsible health policy and planning provide justification for the time and cost spent on program development (78 ; 79). Thus, the author presents a case review that centers on using a Rapid Cycle Improvement Model that focuses on the activities that relate to the development of the patient education system and excludes minute details. In this case, designing a new patient education system requires an improvement model that promotes change based on incremental and associated steps, creates collaborative structures, such as committees, whose membership changes depending on the goals, seizes the opportunity to respond, uses environmental turbulence as an opportunity to change, and believes that knowledge is a powerful tool. The following five points summarize this case review.

- Design/Redesign: Plan, Study, Do, and Act. The Rapid Cycle Improvement Model is based on incremental and sufficient steps to accelerate project development and improvement. In this case, the model provided the framework to review the processes and outcomes that led to the development of the NPES. The case review

demonstrates planning processes, examining results, and responding to what was learned in order to move a project along rather than getting distracted or sidetracked by every detail.

- Respond: No time like the present--Just Do It! Capitalize on the fact that the spinal cord injury team was enthusiastic and ready to try a new system that sped up the design and implementation of the NPES. Oftentimes, project pilots do not precede until every possibility is thoroughly examined and ostensibly is an inefficient use of time. In this case, the HRC embraced the SCI Team's desire to precede and pilot the system rather than delay because of too many unknowns.
- Capitalize: Environmental turbulence: Seize the moment! The selection of Micromedex was a result of inefficient and inconsistent medication information and teaching system that had the potential to contribute to critical events. There was a shift from using "home-grown medication teaching sheets" to using a standardized database. Use the opportunity for problem solving and as one for growth.
- Educate: Knowledge is power! Training for staff and educating patients and families was an inherent standard throughout the design. There is an inherent belief involved that knowledge gives one the tool to make choices about their care and destiny. In order for staff to educate patients and families, they need tools. Ultimately, an educated patient is a partner in providing safe care.
- Collaborate: Two heads are better than one! Bringing together people to achieve a common goal requires interdisciplinary teams, committees, whose membership changes as the goals change. In this case review, there were four key ad-hoc committees that achieved their goals and then disband. Members from all the committees were then brought together to form the on-going PEAC.

Recommendations for future research are to evaluate the improvement of patient satisfaction over time using data from the RF's Outcomes Management Department, to test the utility of the "Patient and Family Resource Guide" post discharge, or/and evaluate the impact that the NPES has on lowering the incidence of critical events.

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