AN INNOVATIVE PROJECT TO TRANSFORM THE ACQUISITION AND DISTRIBUTION OF INVENTORY SUPPLY IN AN EFFORT TO LOWER PROCUREMENT COSTS

by

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ABSTRACT

In Pima County government, the financial emphasis is on cost efficiency and fiscal operations to be within the financial budget. The objective of the organization’s strategic plan for Posada Del Sol Long Term Care facility in Tucson, Arizona, is to provide quality care in a cost-effective manner. The challenge was to assess the organization’s purchasing and utilization practices of medical supplies and over-the-counter medication for cost-efficiency and improved revenue.

An in-depth investigation of the current procurement and inventory system for cost-effectiveness and for management controls over acquisition and distribution of inventory at Posada Del Sol Long Term Care facility was performed. Development of a system to improve tracking of inventory usage and appropriate charging of supplies to residents was implemented. Data were collected to analyze and make recommendations for procedure and system changes. The Systems Research Organizing Model was used as a guide to define the system’s constructs and the Deming FOCUS-PDCA cycle was used for process improvement.

Comparisons of financial variance reports of prior month and prior year-to-date expenditures to current month and current year to date expenditures were completed. Findings of inconsistent purchasing, storage and utilization practices have caused variances in monthly actual expenses with budgeted year-to-date expenses. The fixed costs of medical supplies cannot be changed, but the practice of establishing procurement practices can make a financial difference.

The evaluation results of this project utilizing the cost-identification analysis to
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compare costs prior to implementation to costs after implementation of the project interventions follow. There was a potential savings of 34% in costs from fiscal quarter July-September 2003 to fiscal quarter July-September 2004 for over the counter medications. The cost-identification analysis of medical supply costs from fiscal quarter January-March 2004 to fiscal quarter July-September 2004 demonstrated only a 2% variance.

The significance of the practice innovative process using the Systems Research Model with the PDCA cycle provides a way to integrate organizational interrelationships to explain problem and improvement the processes.
INTRODUCTION

Finding innovative ways to better manage the health care system without jeopardizing the quality of patient care is an ongoing and complex challenge facing the government, long-term care facilities and health care providers. It has always been the function of the health care manager to assure the delivery of quality patient care. It is now also the function of the health care manager to assure the delivery of this quality care in a cost-effective manner (McConnell, 2001, p78). In the last several years, health care systems have focused on cost cutting, but we can no longer cost cut our way to profitability. Nurse Managers must focus on ways to increase activity in the profitable service lines (Contino, D. p12).

These challenges, along with growing concerns around increasing customer service from nursing and community, prompted senior management at Posada del Sol to recognize that it was time to radically change the way the material management processes were handled. Surviving in a financially strained health care industry requires constant work to improve efficiencies and lower the ‘break even point’ (Contino, D. p14). Nurses and other disciplinary staff are working incredibly hard to ensure that they offer the very best care to residents, despite the increased demands and pressures of monitoring supply usage. Enhancement initiatives, consistent practices and maximizing efficiency can impact revenue.
PROBLEM IDENTIFICATION

The all too common problem seen in many healthcare organizations was found at Posada del Sol; the nurses and clinical staff were required to do tedious work associated with supply requisition and management. This resulted in inconsistent practices across disciplines, varying patient care and increased the overall cost to the patient and community (Cooper, M., Strieby, J., 2002, p2). These practices took away valuable time from patient care, varying the time spent giving patient care and increased the frustration among the clinical staff. It perpetuated stocking levels of supplies (such as respiratory supplies) that were in excess of that which was necessary for patient care. Many items that were no longer used by clinical areas remained stocked on shelves in areas and were not available for other clinical areas that could use them. At the same time there were identical items being purchased and stocked by more than one department with low utilization.

The Purchasing Department of the facility is responsible for keeping all supplies in stock and distributed to every clinical area of Posada del Sol facility. Because of the building design and limited storage space, supplies were not stored directly on the clinical units. Instead they were stored in storage areas off the unit; some items were stored in the PYXIS STATION Central Console. The PYXIS STATION Central Console System is an advanced point-of-use system that automates the distribution, management and control of supplies. By having supplies in storage areas off the unit, nurses could not quickly and easily access supplies for patient care.

Addressing the problem of inconsistent practices in supply requisition and
management will be particularly useful for system managers wanting to increase the efficiency or effectiveness of current procurement and inventory system by improving the process. Doing so will improve the quality of these services, or enhance their financial sustainability, as well as compare results within the facility, so that they can identify effective organizational and operational strategies that they might apply.

This paper explains the practice innovation process to develop a strategic plan to transform the supply chain to a single integrated model to improve patient care, customer service, while lowering procurement costs and improving cash flow. This practice innovation project of analyzing costs and revenue, and planning service improvements to improve Posada del Sol’s health care facility performance and make decisions about resource allocation within the current procurement and inventory system will attempt to achieve the goals listed in table 1.

TABLE 1. Strategic Goals of the Practice Innovation Project

<table>
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<th>Goal</th>
<th>Description</th>
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<td>Replenish supplies to clinical areas with minimal intervention by clinical staff</td>
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<td>Reduce inventory levels across the entire system</td>
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<td>Reduce overall Over-the-counter (OTC) medication and medical supply costs</td>
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<td>Implement an infrastructure that will sustain the operation</td>
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ORGANIZATIONAL THEORY OF THE CLINICAL SYSTEM

Posada del Sol Healthcare facility is an open system organization. The organizational structure of Posada del Sol is classical or traditional or otherwise known as a bureaucratic organization (Owens 2001, p62). Posada del Sol is a long-term care
facility with skilled nursing, secured behavioral and respiratory specialty units that interact and adapt with the environment to survive. Within the facility there is interaction between associates, residents, families and departments. The facility depends on the county government for financial resources. The management of the organization has a clearly defined hierarchy of authority and responsibility. There are clearly written rules and procedures with uniform application of county merit system rules to set standards to guide the actions of employees within the organization. Posada del Sol maintains a firm hierarchical control of authority and supervision of employees.

Stakeholders are individuals or groups who have an interest in the results of the project. Results of a successful project can be dependent on working with the identified stakeholders. To add value to the project, it is important to identify the needs of each stakeholder. Stakeholders need to be involved in the project planning, development and implementation. The stakeholders are defined in one of two ways, depending on whether the stakeholders are involved in defining or responding to the problem. The stakeholders involved in problem identification become active collaborators.

The stakeholders identified for this project within the immediate organizational facility were (1) the employees of Posada del Sol health care facility, (2) the customer or resident living at Posada del Sol and their family, (3) the Posada del Sol Administrator and the Senior Management Team. The stakeholders outside the facility but within the organizational system were 1) the Pima Health System and Services Administrator, Chief Executive Officer, and Chief Financial Officer and (2) Pima County Government including the Pima County Board of Supervisors and the Pima County Manager. The
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The project attempted to keep stockholders informed throughout the project, through
distribution of meeting minutes and consultation.

The project’s strategic goal, to impact cost savings, by focusing on the internal
process and streamlining the approach of purchasing and utilizing supplies had several
challenges. Yet efforts were focused on the continuity of providing quality care while
processes changed and interventions were implemented.

CONCEPTUAL FRAMEWORK

Although a lot of theories on creativity and innovation have been written, nurse
managers still meet difficulties in applying these nursing theories to the innovation for
systems research. It is the belief of the system that individual parts should all work
together to accomplish a task or goal. This project looked at the parts of the
organization’s system for purchasing and utilization practices of medical supplies system
and their interactions together to accomplish the goal of cost effectiveness and improved
revenue. This strategic goal was to offer the organization alternative solutions to
maximizing efficiency at minimal cost within the organization.

It is not easy to apply a nursing theory to this or any other system project.
Because of this, the Systems Research Organizing Model (Brewer, B., Greenberg, M.E.,
McEwen, M., Doyle, M., Lamb, G., Effken, J., and Verran, J.) was used as a guide for
identifying constructs in this project. In addition to the Systems Research Organizing
Model for the organizing model, the Deming FOCUS-PDCA Cycle for process
improvement was utilized to direct the course of the assessment and change.

The Systems Research Organizing Model
The Systems Research Organizing Model (SRO) Model (Figure 1), still in its formative stages of development, is comprised of four interacting constructs: client, context, intervention and outcomes. It is grounded in system theory and consistent with nursing philosophy and could be applied to this project that involves a system problem.

Using knowledge gained from all parts of the system to make decisions and recommend change within the project can be accomplished using the SRO model. All parts of a system from procurement to inventory management are interrelated and interdependent. Looking at the whole system allows one to understand a great deal more, because one is able to make connections. Senge says one needs to be aware of two major concepts (Senge, 1990 p73); one must see interrelationships rather than linear cause and effect chain and see processes of change rather than snapshots. The difference is the typical Deming FOCUS-PDCA Cycle is a loop and understanding cause is necessary for improvement. The simple cause and effect strategies to solve complex problems do not always take into account all the parts of the system. The SRO model was used as a guide to define the system and address the four constructs.

The four interacting constructs of the SRO model are client, context, intervention and outcome. The client was the Posada del Sol facility or organization. The client includes the nurses and residents of the facility. It was the facility and nurses that drove the intervention. The context was the environment of Posada del Sol’s procurement and material management system. The PYXIS STATION Central Console system as a context must also be considered, as well as the system components within it, so that one understands interventions and outcomes. How the nursing staff interacts with
procurement and management of supplies as well as acquisition of supplies utilizing the PYXIS STATION Central Console system produce the outcomes. Intervention in the SRO model was associated with the project innovation process (Figure 2). The Deming FOCUS-PDCA cycle was used to guide the improvement plan. The purpose of the innovation project was to improve access to supplies for patient care, improve nursing efficiency, while lowering procurement costs and improving cash flow. Intervention variables include processes of management controls over acquisition and distribution of inventory, development of a significant system to improve tracking of inventory usage and appropriate charging of supplies to residents. The manipulated variables influenced and contributed to the outcomes through the interventions. Outcomes, considered a
Innovative performance measure, may be defined as the result of actions taken interventions, or changes that occurred within the system. In the SRO Model, outcomes are not the end result of care but can interact with other system variables (Brewer, B., Greenberg, M.E., McEwen, M., Doyle, M., Lamb, G., Effken, J., and Verran, J. p12).

The SRO model utilized as a conceptual framework guided the quality improvements in the innovative project. The SRO model illustrates concepts and identifies interventions and outcomes. The SRO model demonstrates the financial variance reports (outcomes) of prior month and prior year expenditures to current month and current year to date expenditures are interrelated to the other three constructs. In addition, the SRO model shows relationships among the constructs within the project. Change is a process of transition; the SRO model can illustrate the relationships between

Figure 2. Projects constructs for Posada del Sol with four interacting constructs.
constructs, both the change process (intervention) and its outcome. To determine whether an outcome is related to an intervention, it is necessary to study the process of change linking the intervention and the outcome.

**Intervention: Quality Improvement: FOCUS-PDCA**

A quality improvement approach was used in the clinical project. The Deming FOCUS-PDCA model of Quality Improvement was put into practice to strengthen imagination and creativity so that the team could produce innovative ideas and concepts. The Deming PDCA-FOCUS-model used was based on the "Plan-Do-Check-Act" or Deming Cycle first developed in the 1920's by Walter Shewhart and later popularized by W. Edwards Deming. This quality improvement approach is widely used for process improvement. In clinical practice it is known as the clinical PDCA model (Figure 3).

A paper by Clancy (2003) cites the results of four process improvement studies by the following researchers; Berlowitz and colleagues (2003), Miranda and her colleagues (2003), Ginsburg (2003) Gustafson and colleagues (2003). A review of these four articles each with a study based on different conceptual models, settings, and specific clinical challenges, emphasized the importance of organizational culture and leadership as determinants of quality improvement. Organizational culture and leadership fit conceptually in the SRO model as a context construct. Berlowitz and colleagues examined quality improvement (QI) implementation in Veterans Affairs nursing homes. They surveyed 1,065 nursing home staff about QI implementation, organizational culture, employee satisfaction, and perceived adoption of guidelines (Berowitz, et al. 2003). Miranda and her colleagues found that practice-initiated QI interventions for depressed
Figure 3. The PDCA Cycle is a checklist of the four stages you must go through to get from 'problem-faced' to 'problem solved'. The four stages are Plan-Do-Check-Act, and they are carried out in the cycle illustrated above.

primary care patients appeared to improve care across ethnic groups and, more importantly, provided some evidence that QI can reduce some outcome disparities. The Miranda study found that when managed care practices implemented a feasible quality improvement program following their own practical goals and largely within their existing resources, they were able to improve by 8 to 20 percentage points the rate of appropriate care for depression (Miranda, 2003). The Ginsburg study found that QI implementation was greater in those nursing homes with an organizational culture that supports innovation and teamwork. Employees in QI-supportive nursing homes were more satisfied with their jobs and were more likely to report adoption of relevant practice guidelines (Ginsburg 2003). The Gustafson and colleagues article reports promising findings that their model can predict which improvement activities are likely to succeed. The goal of this research was to test the effectiveness of a Bayesian model employing subjective probability estimates for predicting success and failure of health care improvement projects. A subjective Bayesian model was effective in predicting the outcome of actual improvement projects. Gustafson described the development of a short survey instrument and the creation of a companion Bayesian model that uses the survey data to predict the potential for successful implementation of a health system change and to explain (identify) the factors that mitigate for and against success in that particular change. The goal of the instrument and model was to help change agents (persons responsible for bringing about a process improvement) detect potential obstacles to and improve chances for successful implementation (Gustafson 2003).
These four studies utilized CQI process as an intervention to improve clinical outcomes. Their results suggest that practice-initiated quality improvement programs may offer an approach to improve quality of care. Translating the results of these four studies into effective improvement strategies should reinforce the process improvement activity of nurse managers. Implementation of quality improvement interventions can be complicated if the PDCA dynamic cycle is not utilized. Quality improvement projects utilizing the PDCA in long-term care setting offers knowledge gained from these projects and may help increase the understanding of implementing effective change.

PRACTICE INNOVATION DESCRIPTION AND IMPLEMENTATION

The method of project innovation was composed of stages. The first stage included organizing a multi-disciplinary team. An inventory control committee (ICC) was established to participate in this quality improvement project. This multi-disciplinary ICC team was established so that all disciplines could represent the various departments and bring forth their expertise. The ICC team included managers, department heads, and accounting and finance staff to meet and review the problem identified. ICC team held meetings with administrative management leadership to review specific issues and implement plans for addressing and monitoring these issues was completed. The meetings were important because the long-term success of the facility’s budget management efforts hinge on getting medical/surgical supply usage down to budgeted levels.
The ICC team was asked to examine how continuous quality improvement can be used to promote improvements in supply cost containment. The ICC team began in the fall of 2003 and brought together expertise in clinical services and in purchasing. Focus groups were helpful in bringing the ICC teams perspectives into the PDCA process. The ICC team met six times between November 2003 and February 2004. Information of the program objective was disseminated from the onset of the project via committee minutes and face-to-face conversations with Posada del Sol and Pima Health System and Services. The ICC team meeting minutes were distributed to share and exchange information of the program findings, conclusions, expectations and action plan. Electronic e-mail was a further source of communication for arranging committee meeting, dates and times and requesting information.

The PDCA is a dynamic cycle that can be used for practice innovation. It is associated with the planning, implementation, control and continual improvement of system processes. Because maintaining and continually improving the process capability can be achieved by applying the PDCA concept, it was used at Posada del Sol. Steps in the PDCA process are described in the following discussion.

Plan

The ‘plan stage’ of the PDCA cycle identified the problems of supplies distribution, storage and utilization. The ICC team identified the problems to be analyzed. Issues such as difficulty in accessing supplies in the PYXIS STATION Central Console system were examined and identified as localizing recurring problems. The ICC team found the problem of items (medical supplies and OTC medications) missing from the
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stock rooms. Wound care items and supplies were overstocked with many items that had not been used for a long period. The facility was frequently ordering over-the-counter (OTC) medications and it appeared that the OTC medications needed to be ordered frequently to keep a supply on stock.

The ICC team established a process for coordinating with and gaining approval of administrative management by asking leadership for support in proceeding with the project and communicating the project with meeting minutes. Implementation of the program required negotiating the politics bound to the economics and politics of the beauracratic organization. The systems manager was the person responsible for strategically negotiating the politics needed to gain support for the program proposal within the targeted setting.

The ICC team set a measurable goal for the problem solving effort established the objectives and strategic goals were to (1) replenish supplies to clinical areas and decrease staff time in locating supplies, (2) reduce overall cost of supplies and OTC medications, (3) reduce inventory levels and (4) implement an infrastructure that would sustain the minimized cost of supplies and OTC medications within the organization.

The ICC team analyzed the problems and identified the processes that impacted the problems and selected to (1) evaluate the inventory management practices including a review of processes of acquisition, distribution, usage, clinical and operational replenishment processes and charging mechanisms, including review of the usage of the PYXIS STATION Central Console system and (2) evaluate OTC medication ordering practices and the vendor relationships and contract agreements associated with OTC
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medication purchasing. Decisions were made as to whom was to be involved in directly carrying out the first process to inspect and inventory all supply stock areas, review the practice usage of the PYXIS STATION Central Console system, and assess the ordering and storage practices of the OTC medications.

The ICC team obtained, organized and analyzed the purchasing, acquisition, distribution, storage and utilization data and charging practices of medical supplies and OTCs. The storage areas were inspected for their contents, including quantity and usage of the items stored. Storage areas were found to contain expired nourishment (Novasource Renal, Vivonex and Ariginaid). Vivonex and Ariginaid nourishment had been ordered for previous residents of the facility who were either no longer residing at the facility or no longer using this particular nourishment.

The ICC team identified a potential cause of the problems of supply control could be related to the PYXIS STATION Central Console system. The PYXIS STATION Central Console system device stores supplies and allows for the removal of such items with shortcuts. Bin drawers and shelves with the PYXIS STATION Central Console system allow the user to remove stock from the same drawer or shelf without recording those items. The ICC team listed the steps in the process for the PYXIS STATION Central Console as it currently existed. The ICC team included the review of procedure and usage compliance by nursing staff of the PYXIS STATION Central Console system. The ICC team validated the process and identified a potential cause of the problem was that this particular PYXIS STATION Central Console system was not an efficient management supply system for our long term care facility. The ICC team gathered
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additional data to localize and identify root causes of the PYXIS STATION Central Console problem.

The PYXIS STATION Central Console system was studied in detail for current items stocked and the quantity of such items, the usage of items as well as the original configuration or set up of contents. There were incidents of same product in two side-by-side PYXIS systems. The ICC team identified root causes of the user error problem when staff was observed utilizing the PYXIS STATION Central Console system to access supplies needed quickly with inaccuracy.

The ICC team collected and analyzed the data related to the ordering and storage practices of the OTC medications. The ICC team studied the process of ordering OTC’s on each clinical unit.

Do

The next PDCA step ‘Do’ was to develop solutions and establish criteria for selecting a solution. Attention was given to the staff involved, their understanding and their buy-in with the proposed changes. The ICC took in all factors into account to increase the likelihood of success of the innovative project by getting the approval and support of the chosen solution of the staff. The next step was to implement the chosen solutions on a trial or pilot basis. It was decided to carry out the change on a limited scale by beginning with two clinical units; the 600 unit and the 700 unit, before expanding it widespread through out the facility.

Information gained from the flow charts and the initial audit results helped the ICC team to identify those areas where they could introduce changes that would have the
most impact and to identify the measures they would use to evaluate the change process. Inspection of all stock areas including remote stock areas for storage contents, and security of supplies revealed that these areas did not have access control. The ICC team selected a proposed solution that more security of supply storage and acquisition of supply and OTC storage were needed. Changes were made that included replacing door handles, applying locks and changing and limiting key distribution, so that access was limited to these storage areas.

The expired nourishment was inventoried, removed from storage area and discarded. The expired nourishment totaled a financial loss of $1,557.11. There were further findings that the nourishment Novasource Renal was not currently used by any residents in the facility. Vivonex and Ariginaid nourishment had been ordered for previous residents of the facility who were either no longer residing at the facility or no longer using this particular nourishment. Findings indicated that a support staff person ordered nourishment weekly and there was no procedure for the nourishment order to be reviewed by the dietician for appropriateness. Standard and Procedures for Storage of Nutritional Supplements were written by the ICC team and implemented.

Storage of equipment such as the feeding pumps were moved from various areas throughout the facility and placed into the PYXIS STATION Central Console system so their whereabouts were known and the equipment was accounted for when removed for patient use. Unused items such as donated incontinence pads were removed from storage areas. Resident belongings stored in the supply rooms were removed and relocated to another area more appropriate for such items.
A site visit to Handmaker long-term care facility was completed for inspection of their PYXIS STATION Central Console system. Ideas for improvement were recorded, reviewed for functionally and proposed for incorporation into the Posada del Sol’s PYXIS STATION Central Console system.

Recommendations were made for inventory management of items and reduction of par (the level or standard considered to be average) levels. Changes were made immediately in par levels of medical supplies by decreasing quantities, eliminating or removing items that were not used or outdated and consolidating items stored in the PYXIS STATION Central Console system. Recommendations were made for correct utilization and enhancement of the PYXIS STATION Central Console system to manage supplies. Staff was encouraged to accurately remove and charge each item from the PYXIS STATION Central Console system with precise detail.

Similar or like items in a nearby PYXIS STATION Central Console system were combined into one PYXIS STATION Central Console system. Par levels of supplies were decreased to minimize loses. Adjusted by downsizing of supplies minimized the inaccuracy of inventory discrepancy reports from the PYXIS STATION Central Console system units.

Contents of individual items behind the PYXIS STATION Central Console systems doors and in the drawers were emptied and restocking of the PYXIS STATION Central Console system was completed. An improvement of bundling the items into quantities of five for easier inventory counting was implemented. Each PYXIS STATION Central Console system on each unit was set up with consistent location of
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contents of items in each drawer and door for user friendliness. Dressing and wound care items with a history of little or no use were removed from the PYXIS STATION Central Console system. Expensive special wound care supplies were changed to limited stock par levels in the PYXIS STATION Central Console system to control financial loss due to inaccuracy or not charging these expensive supplies.

Ordering over-the-counter medications (OTCs) processes were reviewed and revised with implementation of ordering changes. The current OTC medication order forms were distributed on a Monday to each of the nursing units. The OTC medication orders were completed by nursing and submitted the following Tuesday morning to the non-direct care manager for review and approval. Changes were made to the OTC medication order as needed by the non-direct care manager and then a final approval was given before the OTC medication order was faxed. Weekly inspection of the nursing medication rooms for OTC medication was done and compared with the OTC medication order submitted. The inspection included checking for ‘over stock’ and hoarding of OTC medications. All OTC medications are now ordered as generic, not brand name, to decrease costs.

Check

‘Check’ was the next step to evaluate the results. This step included checking the results of what the ICC team did to see if the objectives were achieved. The ICC team needed to determine what things should be measured, and how often they should be measured. Ordering of the OTC medications is now consistently done on a weekly basis. A manager streamlined the ordering process for OTC medications to avoid excessive
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There was no accountability procedure in place for reviewing the PYXIS STATION Central Console system exception reports and validating or making corrections. The ICC committee received negative feedback from the users of the PYXIS STATION Central Console system, suggesting an underlying problem of opposition to the PYXIS STATION Central Console system. Although this particular system is not an efficient management supply system for our long term care facility, the organization was unable to change (removing the PYXIS STATION Central Console system) because outside factors influenced maintaining the system.

Staff can remove items from the PYXIS STATION Central Console system and charge them to any resident or not charge them at all. Because of this the PYXIS STATION Central Console system discrepancy report had an actual count of items differing from the amount the system has on record. The PYXIS STATION Central Console system does not fit the environment at Posada del Sol and the PYXIS STATION Central Console system cannot be changed to adapt to the environment because of the majority of the clients (residents) financial insurance plan does not pay for medical supplies. Many items in the PYXIS STATION Central Console system are non-chargeable and are already included in the daily room charge. Obtaining supplies was cumbersome when the PYXIS STATION Central Console system technology required that employees had to master the time consuming user process required and thereby increased work demands on those employees.

Data analyzed on the ‘check’ revealed findings that the PYXIS STATION Central
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Console system does not (1) capture revenue for supplies removed from the system, (2) the reports generated are not an accurate reflection of supply utilization activity and (3) staff does not use the PYXIS STATION Central Console system correctly. Measurement error can be a problem with the challenge of staff inaccuracy while using of the PYXIS STATION Central Console system.

**Act**

The ICC team monitored the OTC medication solution and continued to look for incremental improvements to refine the OTC medication solution. OTC medications once delivered to the clinical units are now planned to be placed in the PYXIS STATION Central Console system. This additional improvement will track the OTC medication removal from the PYXIS STATION Central Console system is being considered to prevent inventory loss.

This ‘Act’ step included the ICC team taking actions to continually improve process performance. Because Posada del Sol has 2 years remaining on the 5-year contracted agreement to lease the PYXIS STATION Central Console system there was a review of the entire system for stock summary, activity transactions, utilization and discrepancy reports. Staff’s incorrect utilization of the PYXIS STATION Central Console system suggested the need for staff continuing education on proper operations of removing items from the PYXIS STATION Central Console system. The ICC team identified systemic changes and educational training needs for the staff. An orientation program for newly hired staff was implemented to instruct in proper PYXIS STATION Central Console system procedures.
The next stage involved maintaining the successful project changes and monitoring the assessment of the effectiveness of the program interventions, policy and procedure implementation and the integration of interventions. PYXIS STATION Central Console system reports were obtained and analyzed. The project assessed the congruence between the goals of the project and the actual outcomes. Performance management and measurement techniques to quantify the financial results of the process were performed. The financial trend over the time of one year of similar fiscal quarters was analyzed to see if there were any net impacts. The use of more than one data collection point, before and after implementation of project design was reviewed in an attempt to do a cost-benefit analysis.

Methods for maintaining a successful innovation involve many factors that influence the impact of change, including time. Time itself restricts the depth of knowledge or understanding about the system. Time frames for change following interventions vary among clinical units. Some interventions produced observable results within months; others may follow a latency period before changes are noted. Staff frequently resists change and change can both arise from and contribute to conflict and tension. Although uncomfortable, conflict and tension may be necessary prerequisites for change. The tensions here were meeting health care need verses managing health care costs.

Specific plans to ensure continuation of the innovation include strong leadership to develop the project momentum and maintain the program. Tension between controlling costs and improving health complicates change in all dimensions. The fixed costs of
medical supplies cannot be changed, but the practice of ordering and establishing revenue-producing practices can make a difference. Staff need to be involved in product evaluation. A committee to continue the innovation needs to be an integral component of the organization's operations. Staff should be encouraged to participate in committees to review and evaluate products that are more efficient or cost-effective for the organization.

Continuation of the innovation requires experience in the area of materials management including inventory control, procurement, warehousing, budget and supply forecasting. The following areas are fundamental for continuance with this project. Continuation to direct the materials management program for the facility by developing policies, procedures and standards for procurement, warehousing, and commodity specifications is essential. Monitored performance of the materials management systems by reviewing reports of purchasing, warehousing, and inventory activity and recommended corrective action, to ensure cost effective materials management is also essential. Directing the preparation of the supplies budget for all service units in the facility, and analyzing the expenditure patterns and usage trends to ensure the materials management system is administered efficiently. Directing a staff responsible for the development of commodity standards and specifications, the preparation of vendor agreements, the determination of the efficient utilization of storage space pertaining to medical supplies, and the coordination of the automated materials management system.

The continuation committee will serve as the facility liaison to the department of purchasing concerning purchasing agreements and vendor relations as well as monitor the Group Purchasing Organization (GPO) compliance.
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A continuation of this project will include implementing changes in practices for enabling the application of charging the cost of supply to a specific patient. Once the project processes are in place, one key to profitability in a county long-term care facility is to review the payer mix and include residents with a non-county 3rd party pay source.

Because a significant percentage of the facility's admissions are reimbursed on a fixed rate per case, Posada del Sol does not get paid for "extra", even though the facility continues to incur staffing, supply and other costs. Also, reimbursed on a fixed rate per case bed occupied for longer than anticipated may prevent another non-fixed rate admission to the facility, with its associated revenue. This particular program is challenging; while money may be lost on supplies for the Arizona Health Care Cost System plan residents (supplies are included in room and board), it may be that merely an increase in volume of 3rd party payors is needed to make it a revenue-producing program.

The ability to track usage and charge the 3rd party payor is necessary. Some high revenue patients have high variable costs, so perhaps attracting lower revenue residents with lower variable costs may be more financially attractive. Variable costs include medical supplies that will vary month to month based on usage and ordering practices.

The feasibility of implementing the proposed innovation is not without barriers. Barriers include difficulty identifying interested individuals and the commitment in time and energy that is required. Theft of supplies and OTC medications is yet another obstacle. Staff reluctance to participate in process and staff resistance to making recommended changes suggests inadequate staff buy-in.

The innovative project evaluated the effect of a system change that once
developed was implemented in January 2004. An evaluation of the fiscal outcomes comparing like financial quarters for cost reduction was completed in the fall of 2004. The desired outcome was to implement changes in systems to improve the cost savings by decreasing expenditures, control loss and shrinkage and increase revenue.

COST-IDENTIFICATION ANALYSIS

‘Cost–identification analysis addresses the question of how much something costs’ (Chang, p.391). This project was evaluated using cost–identification analysis, also referred to cost-minimization analysis. Cost–identification analysis as developed by economists, can be used to evaluate interventions or procedures. The costs of OTC medications and medical supplies are expressed in the money units, the dollar.

Cost identification analysis was measured utilizing the monthly statements of revenue and expense reports. Totals for line items pharmacy & drugs and medical supplies were reviewed, measured in dollars and compared by quarterly total amounts as shown in Table 2.

Fiscal quarters were selected to best represent the cost-identification analysis of the innovative project that lead to improved operational and financial performance. This method included internal monitoring to determine the effects of the implementation on improved efficiency. The financial trend over time of one year of similar fiscal quarters will be analyzed to see if there were any net impacts for OTC medications.

After a thorough job of data collection, data entry and analysis of results, the comparison for medical supply costs for quarters July–September 2003 quarter and the following two quarters, October–December 2003 and January-March 2004 showed a
reduction in costs of medical supplies, that variance in savings was not contributed by the project. The financial quarters, January-March of 2004 to July-September 2004, depicted a 2% variance. The 2% variance in savings of medical supplies was not of significance in this project but serves as a more accurate cost–identification analysis as the project interventions began during the January-March of 2004 quarter.

A comparison of the July-September 2003 quarter with the July-September 2004 quarter shows a variance of 34% in total cost savings of pharmacy and drugs. This variance is of significance to the project interventions.

Table 2. Cost-Identification Analysis Over Time (Outcome Measurement in Dollars)

<table>
<thead>
<tr>
<th></th>
<th>July-Aug-Sept 03</th>
<th>Oct-Nov-Dec 03</th>
<th>Jan-Feb-Mar 04</th>
<th>Apr-May-Jun 04</th>
<th>Jul-Aug-Sep 04</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pharmacy &amp; Drugs</td>
<td>21,881</td>
<td>35,935</td>
<td>53,254</td>
<td>38,203</td>
<td>14,354</td>
</tr>
<tr>
<td>Medical Supplies</td>
<td>142,525</td>
<td>111,195</td>
<td>116,064</td>
<td>109,731</td>
<td>113,892</td>
</tr>
<tr>
<td>TOTAL</td>
<td>164,406</td>
<td>147,130</td>
<td>169,318</td>
<td>147,934</td>
<td>128,246</td>
</tr>
</tbody>
</table>

Source: Posada del Sol 2003-2004 Statement of Revenue and Expense, Monthly comparison reports

DISCUSSION

There were many variables that were not controlled during the implementation of the process improvements. One in particular was in July 2004 Kino Hospital transferred of all their unusable medical, surgical and dental supplies to Posada del Sol health care facility. Unfortunately the majority of the transferred supplies were specialty items and was not able to be utilized at Posada del Sol. Since there was no adjustment of the figures to account for the minimal amount of supplies that were utilized from Kino Hospital’s warehouse, this variable of supply transfer may have influenced to a small
degree the accuracy of the Posada del Sol monthly cost for medical supplies. Although the cost analysis took this variable into consideration, no adjustments were made for the medical supplies transferred to Posada del Sol from the closing Kino Community Hospital.

Another variable was the administrative management team restructure within Posada del Sol with a change in managers overseeing the OTC medication ordering and procurement process. The procedure for ordering OTC medications remained consistent with only minimal changes made in the storage process of OTC medications. During the analysis, these variables were not separated out to reflect the difference in levels of costs and utilization. These variables were not viewed as a unit apart or by itself, instead the comparison was made using the financial reports available for analysis.

A factor that may have affected the outcome included the complete change in charging items removed from the PYXIS STATION Central Console system. Prior to the project intervention, users accessing medical supplies once charged the item(s) removed from the PYXIS STATION Central Console system to each respective resident regardless of their healthcare coverage. In October an improvement was implemented, users charged non-Medicare items removed from the PYXIS STATION Central Console system to the respective unit. Only if the resident was insured with Medicare, would the user need to charge the items removed from the PYXIS STATION Central Console system to the resident and not the clinical unit. This variable may have contributed to not only different practices in accurately charging items removed from the PYXIS STATION Central Console system but may also be a contributing factor which might affect the cost
analysis outcome of the project.

The cost analysis did not examine separately fixed and variable costs, such as variable costs that will rise with increased utilization and increased resident admissions. This was due to the process of examining such costs would have required a greater degree of analysis to collect the fixed and variable costs. A detailed monthly analysis of census may have offered information to benefit future planning for admission variances. The cost analysis did not examine the additional costs of medical equipment purchases that may have occurred during this project innovation.

To minimize the cost of medical supplies and OTC medications, Posada del Sol must require a demand for strict attention to rules and procedures for storage, accurate accessing and charging of OTC medications and medical supplies to each cost center. Allocation of supply costs to each cost center demonstrating more precise information will place the facility in a better position to operate more cost-effectively giving a more through understanding of the facility’s operations and the impact of medical supply utilization. It is important to use an allocation basis which accurately reflects the facilities resource expenditure patterns. For example, it would be inappropriate to allocate the costs of medical supplies equally by unit because the use of various medical supplies differs significantly among units.

Only with accurate cost information, can Posada del Sol assess the financial viability of their managed care arrangements, negotiate favorable managed care resident admissions as well as better manage the overall financial and business operations of the facility. Posada del Sol employees need to know how to use resources efficiently and
effectively. This will not be possible with the continued use of the elaborate PYXIS STATION Central Console system at Posada del Sol. The PYXIS STATION Central Console system had a high initial cost for installation and training for use. Posada del Sol continues to have a monthly expense for use of the PYXIS STATION Central console system. In this situation it is important to note the monetary investment and continued monthly expense of the PYXIS STATION Central Console system has to be examined relative to cost of supply usage. Determining this information requires additional observation and improvement of the process and education of staff.

The process improvement interventions; reduction of inventory levels; eliminating items; securing supplies from loss; bundling items for accuracy have been shown to be clinically effective by staff satisfaction. The interventions that appeared sensible and workable in the settings where they were applied yet were not successful included staff non-compliance utilizing the PYXIS STATION Central console system. The current standard practice with utilizing the PYXIS STATION Central console system may be to do nothing, until the contract expires, should almost certainly be one of the alternatives compared.

It is concluded that educating Posada del Sol staff to become more aware of practices that negatively affect the direct costs of medical supplies and OTC medications to provide healthcare services needs to improve. As health care providers we must view cost and quality as one parallel entity rather than as two opposing entities Chang, et al, p 376). A cost-accounting analysis can assist Posada del Sol in assessing its costs of doing business and determining the profitability to develop budgets and financial benchmarks.
Once performed, a cost analysis can be revised to accommodate changes or be used in strategic planning.

The systems manager has the ability to collect data to analyze and initiate appropriate action, measure progress, and support the importance of change as financial issues. Although the evaluation measures are valid, the data is not always reliable, since reports generated are based on proper and improper operations of the PYXIS STATION Central Console system. Monthly variance reports determine total costs and average unit costs by cost center; it does not provide information on specific costs per procedure.

Within the financial perspective, the major consideration in performance improvement involves the selection and use of performance measures such as supply expenditures to revenue ratios.

A review of the financial data opens exploration of different options for improving service quality, controlling costs, and using resources wisely. The options include (1) allocate resource costs to individual departments; (2) measure the performance of different clinical units and departments; (3) analyze costs of over-the-counter drugs, equipment and supplies; (4) compare revenue with costs overall and at the department level; (5) compare unit costs among the facility; and (6) identify high-performing clinical units and set standards for other clinical units.

INNOVATION EVALUATION

Introducing a program change in a long-term care facility for Pima County health care within the county system is a challenge. One needs access to data to study and analyze the current economic and reimbursement structure. Posada del Sol is only one
department in the Pima County organizational structure that is confronted with justifying costs associated with current as well as new, innovative programs each fiscal year.

The systems manager nurse needs to understand the philosophy of the organization and the facilities objectives. As a systems manager nurse, one must interact with all departments focusing on communication channels. The quality of cooperation among the ICC team is important. Strategically gaining support of the program proposal begins with knowledge of the barriers to change. Because of fragmentation from lack of coordination due to unavailability of management information systems a multi-departmental approach is required.

Another role of the systems manager nurse is to understand the element of time. The rate of adaptation is measured by the length of time it takes for the system to adopt the innovation (Robinson & Kish p.435). The time span to introduce the innovation and await a decision within the county social system is at times lengthy, due to the number of people within the county health care system that need to give approval for such program changes.

The systems manager nurse needs to understand the county administration’s financial budgetary position that affects the implementation of programs. It is the economic environment of reimbursement as well as shrinking budgets which impact acceptance of change. The organization has made budget and operational decisions based on cost, expenditures and projected revenue of such projects.

Interviewing the employees or users of the system was a very informative process; knowledge was gained of multiple practices that needed to be addressed and
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One insight was awareness of short-cut procedures for obtaining medical supplies had existed for a long time among staff utilizing the PYXIS STATION Central Console system.

Embarking on an initiative to re-invent how to secure and replenishing supplies to clinical areas with minimal intervention, reducing overall medical supply costs, and implementing an infrastructure that will sustain the operation and reducing inventory par levels was not without its rewards. Significant benefits were recognized as possible through efficient management of the health care supply chain of medical supplies and OTC medication.

Success for the purchasing and utilization practices of medical supplies program should be measured by how effectively and efficiently it meets the needs of the nursing staff to access supplies for the resident care, as well as cost effectiveness for Posada del Sol. Performance measures or indicators are the measurable characteristics of services and operations. The process used to evaluate the innovation included the following tools; data collected to analyze and make recommendations for procedure and system changes utilizing fiscal analysis reports, data collected by personal interviews, and observation of processes were identified and defined. Data from the OTC medication form that was designed and developed for tracking quantities of over the counter medications ordered throughout the clinical units in the facility was reviewed. Comparisons of financial variance reports of prior month and prior year expenditures to current month and current year to date expenditures were completed. Findings of inconsistent purchasing, storage and utilization practices have caused variances in monthly actual with budgeted year to
date. Feasibility of the evaluation plan was noted by strong organizational support from senior management to carry out an effective analysis. Data analysis procedures were incorporated with reports from materials management and the business office.

SUMMARY AND CONCLUSION

This project was a response for studying the fiscal losses on supplies as measured by the revenue margins. There is growing concern about facilities with chronic financial losses. The basic economic principle is that no ordinary enterprise can continue to operate indefinitely with losses. They either close, merge or make changes to become more profitable. Kino Community Hospital in Tucson, Arizona is an example of a county owned and operated facility that had to make drastic changes to survive. When the aforementioned does not happen, it is conceivable that the organization is surviving in equilibrium with reported losses because of ‘sponsorships’ such as the relationship with Posada del Sol healthcare facility and Pima Health System and Services. Financed by a parent organization such as local government, organizations like Posada del Sol healthcare facility tend to be smaller, costlier and have lower occupancy rates and treat more under-insured patients than do financially sound facilities.

In initiating this project, the committee had several assumptions. One central assumption was that it is necessary to use resources efficiently, that is, accomplish tasks with a minimum of waste. The second assumption was that the project was expected to facilitate efficient approaches to improving the quality of care of the residents.

The plan to extend this accomplished innovation is required for success. Centralized purchasing has helped keep overall costs down, and improved efficiency
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throughout the facility. The changes that are upon us in health care mean that we must look constantly at the way we work and then make decisions about how we best manage day-to-day operations to preserve the organization. The innovative changes were made to impede the financial losses in Fiscal Year 2003-2004. In preparation for the times ahead, which are expected to see flat or declining revenues, decreased funds for medical supplies and other challenges related to cutbacks in Medicare funding, efforts must continue to hold down the expenses and identify creative ways to deal with the fiscal situation.

Procurement and supply management planning and implementation are in a continuous improvement process. The opportunity costs to improve efficiency are enormous. With limited budgets and supply chain inefficiencies, financial direct and non-direct costs at Posada del Sol Healthcare facility from July 2003 through June 2004 over budget. As a result, the facility is taking steps to bring expenses and revenues back into line. A budget management plan announced this year 2004-2005 involved both cost reduction and revenue enhancement efforts that will enable the facility to correct this unfavorable first-quarter fiscal year 2004 performance and move forward toward fiscal year 2005 in a preferred financial position.

The cost reduction part of the plan, which is expected to result in savings, includes paring down certain programs, particularly those that have been established during the past five years. Efforts to improve medical/surgical supply utilization, which have been significantly over budget, also are under way. To achieve additional savings, departments throughout the institution have been realigning work, redesigning activities
and finding a variety of program-specific ways to reduce expenses.

Information from the Posada Del Sol project incorporates the facilities program vision into clear measurable outcomes that once achieved will define success. These outcomes are shared throughout the facility through the department managers and Pima Health System and Services.
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