

AMERICAN UNIVERSITY OF BEIRUT

A PROPOSAL TO RESTRUCTURE 6 NORTH PEDIATRIC UNIT TO
IMPROVE BED MANAGEMENT

by
SUKAINA HIJAZI

A project
Submitted in partial fulfillment of the requirements
for the degree of Master in Nursing Administration
to the Hariri School of Nursing
at the American University of Beirut

Beirut, Lebanon
April, 2015

AMERICAN UNIVERSITY OF BEIRUT

A PROPOSAL TO RESTRUCTURE 6 NORTH PEDIATRIC UNIT TO
IMPROVE BED MANAGEMENT


by
SUKAINA HIJAZI

Approved by:



Dr. Younan, Sabbagh, Lina, RN,DNP, Clinical Assistant Professor
Hariri School of Nursing

First Reader



Dr. Clinton, Michael, Edward, RN,PhD, Professor
Hariri School of Nursing

Second Reader

Date of project presentation: April 20, 2015

AMERICAN UNIVERSITY OF BEIRUT

THESIS, DISSERTATION, PROJECT RELEASE FORM

Student Name: _____

Last

First

Middle

Master's Thesis

Master's Project

Doctoral Dissertation

I authorize the American University of Beirut to: (a) reproduce hard or electronic copies of my thesis, dissertation, or project; (b) include such copies in the archives and digital repositories of the University; and (c) make freely available such copies to third parties for research or educational purposes.

I authorize the American University of Beirut, **three years after the date of submitting my thesis, dissertation, or project**, to: (a) reproduce hard or electronic copies of it; (b) include such copies in the archives and digital repositories of the University; and (c) make freely available such copies to third parties for research or educational purposes.

Signature

Date

ACKNOWLEDGMENTS

I would like to express my sincere gratitude to Dr. Michel Clinton for his tutoring, guidance, support, and great tolerance. And I would also like to extend my deepest appreciation to Dr. Lina Younan whose sweet nature, knowledge and her feedback as a coach has guided me through this project till the end.

I would also like to acknowledge my teachers at the HSON whom I learned a lot from and my dear advisor Dr. Samar Nouredine for all their care.

Last but not least, I would also like to thank my family- every one of them- who has firmly and lovingly supported me through the challenge of juggling family, work and school all at the same time way. I am profoundly grateful to my loving husband, my cherished sons, and to my special, wonderful and exceptional daughter- Fatima- God's gift to our household.

AN ABSTRACT OF THE PROJECT OF

Sukaina Adel Hijazi for Master in Nursing
Major: Nursing Administration

Title: A Proposal To Restructure 6 North Pediatric Unit To Improve Bed Management

Abstract

Aim: 6 North is the only pediatric medical/surgical unit at AUB-MC. Many times it is impossible to admit patients because rooms are blocked for isolating children with infectious diseases. The aim of this project is to assess the bed management problem in 6 North and to propose a feasible short-term solution pending new buildings coming on stream.

Methods: In depth examination of the bed management problem in 6 North and selected literature review to identify effective strategies for overcoming the problem in the short-term.

Results: It is proposed to convert three rooms in 6 South (occupancy rate 50%) for the isolation of 6 North patients, and to reorganize patient care in 6 North.

Conclusion: Converting three rooms in 6 South for the isolation of 6 North patients will ease the admission pressures on 6 North at reasonable costs, thereby facilitating better utilization of beds in 6 North and 6 South. The effect will be to reduce the number of pediatric patients staying unnecessarily in the Pediatric Intensive Care Unit (PICU) and reduce loss of revenue by diverting patients who should be admitted to 6 North to other hospitals.

CONTENTS

ACKNOWLEDGMENTS	v
ABSTRACT	vi

Chapter

I. INTRODUCTION	1
A. Description of the problem	1
B. Current Solutions	3
C. Significance and need for change	4
D. Purpose and methodology	6
E. E. Results	6
II. LITERATURE REVIEW	9
III. ADDITIONAL SINGLE-BED ROOMS FOR 6 NORTH	13
A. Setting and Services	13
B. Solution Proposal	14
IV. COST OF CHANGE	17
V. FEASIBILITY AND IMPLEMENTATION	19
A. Forces against change	19
B. Forces for Change	20
VI. REFERENCES	22

Appendixes

CHAPTER I

INTRODUCTION

6 North (6N) is the only medical-surgical pediatric ward available at AUB-MC. This unit provides service to population of pediatric patients whose ages range from newborns till adolescents reaching 18 years of age. The current unit's full census capacity is 27 patients. The influx of patients into 6N is either from the main admitting office, the Emergency Department (ED) or as transfers from other pediatric units: Pediatric Intensive Care Unit (PICU), Stepdown Unit (SDU), or patients in need for isolation from the St. Jude Unit.

Yet it is noted that throughout the year, many times patients could not be admitted/transferred to the 6N not because of 100% bed occupancy but because of absence of bed availability. The causes are mainly related to two factors: 1) structural: due to the low number of single-bed rooms in parallel to the demand for isolation beds due to seasonal fluctuation in respiratory and gastro-intestinal infections frequently affecting children, 2) service related: due to the increased number of cardiac patients after an enhancement in the services provided by the Pediatric Cardiology Department.

A. Description of the problem

During the autumn and winter seasons the unit is usually busy with patients inflicted with upper respiratory tract viral or bacterial infections like bronchiolitis, influenza or pneumonia. First, these patients have a high length of stay due the course of sickness itself and second and most important, the majority of them need isolation as per infection control policy

requirements to break the chain of transmission to others. Similarly, during the spring and summer seasons, gastro-intestinal viral and bacterial infectious cases prevail on the unit like viral *Rota* infections and *Clostridium Difficile* bacterial infections. Such cases require isolation too.

Consequently care givers are obliged, in order to maintain isolation status, to block beds on the unit. This is done by either placing isolated patients who are second or third class in a single bed first class room thus preventing first class admission to such rooms; or keeping them in a double-bed second or third class rooms and blocking the adjacent bed thus preventing another possible admission to the adjacent bed. This situation has its toll on other patients who require admission/transfer to the unit; either from the ED, transfers from PICU/SDU or regular admissions.

In addition to the above challenges facing availability of bed on 6N; the Pediatric Cardiology Department at AUB-MC has currently undertaken an updated and expanded business strategy for its department. This strategy can be summarized as follows; 1) adding to its medical team an experienced surgeon for complex cases, 2) boosting the 'Brave Heart Fund' thus attracting more donors and therefore more cardiac patients, 3) contracting with the Iraqi Ministry Of Health to accommodate Iraqi cardiac patients who need open heart surgery, 4) Maintaining the cardiology fellowship program which increases the capacity to deliver services and 5) renovating the cardiology department clinics making it more attractive to families and their children.

All of the above steps have successfully helped the department to expand their patient services nationally and internationally. These cardiac patients are given priority for admission due to the nature of their disease and related medical/surgical interventions required, and because of the new contract with the Iraqi Ministry of Health. Of course, that modification led to an increase in the census of cardiac patients on 6N resulting in occupying more beds that are

deemed valuable for admitting other pediatric patient cases. An average of 4-9 patients / week divided between cardiac catheterization patients and open heart surgery ones.

In addition to the above issues, many post open heart surgery patients develop complications that require an increase in length of stay and in turn intensifying the problem of pediatric bed availability. Furthermore as more patients are admitted to have cardiac surgeries; these patients have to be admitted to the PICU post operatively. Yet the PICU has four functioning beds and due this weekly cycle of cardiac admissions and operations, more patients are required to be transferred from PICU to 6N.Hence affecting bed availability in both units.

B. Current Solutions

The hospital has been currently addressing this problem at three different levels. They can be listed as follows:

First, suspension in ED: Pediatric patients in need of admission are kept waiting in the ED till a bed is available on the unit which might take from hours to a day or more. The consequences include jeopardizing the susceptible pediatric patients to the risk of acquiring infections, a delay in service for these patients, thus patient/ family dissatisfaction and frustration.

Second, admission to other units: Another temporary solution the hospital adopted was admitting very light cases of pre-operative/ pre- cardiac catheterization pediatric patients aged more than 6 years to the adjacent 6 South (6S) unit which is an adult medical surgical unit. Yet the two rooms assigned to pediatric admissions- rooms 623 and 624- have been recently occupied by chronic adult patients for the last 3 months. And before that the number of pediatric admissions to 6S was 3-5 patients per month only due to age and the complexity of patient cases that did not fit admission criteria to 6S. Yet if the planned admission could not wait and the

patient is above 13 years, then the admitting officer tries to admit them to other adult medical surgical units in the hospital like 5 South or 9 South.

As for planned admissions from the main admitting office that could wait, they are postponed leading to further customer frustration and dissatisfaction because many are on interventional therapies that need to be admitted on timely basis.

Last, redirect the patients to other hospitals either from the ED or by the patient's physician directly.

It is important to point out here that there is a pilot study going on by the administration at AUBMC that is targeting early discharge process to improve patient throughput where the results are still in process. Yet from our knowledge of the actual problem on 6N this will not be a key solution to bed availability.

C. Significance and need for change

Such temporary solutions are not advantageous for the hospital administration and are not regarded as satisfactory by the pediatric patients and their families for reasons related to many factors.

First, delay of services: the pediatric medical team - located on 6N- find it hard to have some of their patients also placed on other units and view it as a challenge in terms of time and organization in keeping updated on these patients' clinical status and the provision of prompt care. The registered nurses (RN) on 6N due to their clinical expertise and experienced knowledge of patients and their family's needs are capable of detecting any red alerts on their patients, communicating and advising with the medical team and are empowered to initiate the appropriate clinical intervention needed on the patient with timely execution.

Second, the diversity of pediatric patients and competency of pediatric nurses: although the nurses on 6S underwent a brief orientation on basic competencies on taking care of stable pediatric patients, yet it has to be acknowledged that the pediatric population is a highly susceptible and challenging population in terms of its physiological, emotional, psychological, physical and educational needs that are diverse in relation the developmental milestones.

6N RNs are equipped with the necessary skills and competencies needed to provide this population and their families the proper care and service they require. This specialized clinical knowledge, communication skills and competencies are lacking from RNs on other units taking care of adults. In addition to the emotional interaction and connection that takes place between the pediatric nurses and their patients / families which is professionally oriented to their emotional and psychological needs; the 6N RNs are proactive in identifying patient/ family needs and thus catering to them efficiently and satisfactorily. This has over the time evolved into a close relationship. Thus the patients and their families have found that very dissatisfying and have reported many times to the unit management and the admitting officers that they would prefer to be admitted on 6N and not any other unit.

Third, loss of hospital revenues: Ultimately this situation is affecting the unit patient data on 6 North. The average bed occupancy is 67% and the average daily census is equal to 18 patients for the year 2014. That is because of the fact that there are a number of patients in need of admission/transfer but are finding it difficult to be placed in 6N due to the unavailability of beds whether first, second or third class ones. This state of affairs is affecting hospital revenues because the targeted bed occupancy is 100%.

D. Purpose and methodology

The purpose of this project of restructuring is to provide more 1st class/single rooms to solve the problem of patients in need of isolation, therefore vacating beds for patients of 2nd and 3rd class financial coverage to be admitted to the unit; thus targeting 100% occupancy through actually securing full patient census.

My extensive experience on 6N in my current job as care coordinator and as Assistant Nurse Manager (ANM) made me responsible for many unit operations including bed management, patient throughput and patient satisfaction. So based on my daily observations of unit operations; my approach was to collect all patient admission/transfer data over a period of one month to assess the number of patients who couldn't be admitted/transferred to 6N from the ED or other units and the reasons behind any inability to be admitted/transferred. Data collection was executed daily by me personally and with the reports from the evening and night charge nurses. Then I scrutinized the results in relation to the current problem of bed availability to come up with a proposed solution. I have prepared a data collection sheet identifying the data to be collected that is pertinent to the problem identified and being addressed in my project. My proposed solution should be appropriate to the unit in terms of feasibility and comparative cost to the problem.

E. E. Results

Upon studying the data collected over a period of one month starting from January 4th till 1st of February; it was noted that there have been 17 patients from the ED who could not be admitted to 6N. Six of these patients could not wait in ED for a bed to be provided and were discharged to other hospitals while the rest had to tolerate staying overnight and sometimes 2-3 days in the ED waiting for a bed. The reasons were that 12 patients in need of isolation were

occupying 1st and 2nd/3rd class rooms during that period and there were 8 cardiac patients on the unit had post-operative fever requiring 2-3 weeks intravenous antibiotics therapy. I have to highlight here that I did not include in my data collection sheet the direct requests from attending doctors addressed to me asking for vacant beds on the unit for their patients in the clinics and my response was negative. So, they decided to either postpone them to later dates or relocate urgent ones to other hospitals. The total number of these cases was eight patients. Accordingly, knowing that the average cost of a patient stay over 24 hours on 6N is \$500- \$1,500, if we multiply that average by the number of patients who were not admitted during the period of data collection then the sum is estimated to be \$3,000 - \$9,000 per day. By multiplying these numbers with the unit average length of stay (L.O.S) for December 2014 which is 2.88, the average of revenues lost will be estimated to range between an ample sum of \$8,640- \$25,920 and by approximation the estimated total sum of revenues lost over one month range between \$7,000- \$26,000 (Please refer to table 6).

Needless to point out that these numbers would increase and not decrease if the cases require specialized care and high-tech laboratory/radiology studies. Furthermore, one need not forget the actual loss of clients from the competitive market and their potential use as advertisers for the institution by word of mouth to their acquaintances.

As for the transfers during the period of our data collection, 11 patients had to stay in PICU/SDU without the need for these unit services because there were no available beds on 6N. Knowing that the average cost of stay over 24 hours in PICU/SDU ranges between \$1,250 - \$2,500, this increase in the hospital cost on these patients and their third party payers is leading to patient/family dissatisfaction. Second, these third-party payers are inspecting each patient case

and scrutinizing their hospital bills and many times refusing or negotiating coverage of preventable services- in their judgment- resulting in further loss of revenues.

CHAPTER II

LITERATURE REVIEW

The purpose of my literature review was to identify evidence that support the following points related to my project; 1- the effect of seasonal infections on occupancy and the importance of assigning isolation rooms on pediatric units as single-bed rooms; 2- bed unavailability and patient satisfaction; 3- effects of admission delays and long ED waiting time on pediatric patients and their families; 4- knowledge and competency of nursing staff and their effect on patient/family satisfaction and finally; 5- bed management and its effect on hospital revenues. Another purpose was to look into possible solutions to the problem listed in my project.

The search terms were: Bed availability, patient throughput, bed management, impact of isolation, nursing, competency advantages, pediatric patient isolation, restructuring units, hospital pediatric ward, admissions, discharges, patient flow, accessibility, health care delivery, cost of care, bed efficiency, change in unit structure, admission delays, and patient satisfaction. The database search I used was via AUB Saab Medical Library (SML) and their engine search through Google Scholar, Cinahl, Medline, and Medscape.

A study by Feildson et.al was done in 2012, in a university-affiliated, 218-bed pediatric hospital in Halifax, Nova Scotia, Canada. The design was a prospective repeated point prevalence survey was conducted during a 14 month period. A questionnaire was sent to other free-standing Canadian children's hospitals to determine isolation practice and perceived needs of all inpatients on surveyed wards during the study period, (n = 1634). The results showed that 13.5% of patients required isolation (range 5.6% to 31% per month). It was noted too that the

demand for isolation was seasonal, with 71% of isolation occurring from November to April. Demand exceeded supply by 2 to 22 beds (11% to 122%). Respiratory and enteric infections requiring contact isolation accounted for 80% of use. Children younger than 24 months comprised 28% of admissions and used 57% of isolation beds. The study established that pediatric isolation bed need varies with patient age, season of year, and category-specific isolation requirements. And most important, the surveyors concluded that an increasing need for single-bed rooms is identified as a need in pediatric hospitals and that isolation requirements must be considered during the design of new hospitals or renovation of existing ones. (Feildson et. al, 2012)

In Feildson's study, the surveyors recommended hospital administration that at least 10% of infant multi-bed rooms be converted to single-bed rooms. They identified several advantages of single-bed rooms including an increase in level of communication between the patient and the physician; elimination of the need for in-patient transfers; higher occupancy rates because patients no longer require to be separated for reasons of sex, age, or diagnosis (Feildson et. al, 2012).

Another study by Evans et. al on restructuring asthma care in a hospital setting noted the importance of providing specialized competent care to patients and reported that when they had to appoint asthma patients to other patient care units outside the asthma managed care unit there was logistical problem in the provision of specialized nursing care and education to those patients (Evans et. al, 1999) .

In a study by Gallefy et al (2011), addressing bed accessibility in a private psychiatric ward noted that a lack in available beds was a major problem where the delays in admission "can lead to adverse health outcomes, including fatalities."

Another study by Feildston, Verger, Ebberson, Li, Terwiesch et.al in 2012 acknowledged the negative effects of delays of patient transfers on patients' conditions, quality, satisfaction and safety in addition to the financial impact.

In their article on "Automated Bed Assignments in a Complex and Dynamic Hospital Environment"; Thomas et al (2013) discuss that bed management as being a vital function of any hospital with core impact on patient care, patient flow, patient and staff satisfaction, and eventually on the hospital's operating edge. Thomas et al.(2013) in their study also consider that delays lead to missed revenues, higher costs of care, and decreased patient and staff satisfaction.

In his study titled: "Public hospital bed crisis: too few or too misused?" Ian A.Scott (2010) argues that increasing demand on public hospital beds has led to what many see as a hospital bed crisis requiring substantial increases in bed numbers. And he continues saying that by 2050,if the current bed management trends persist, and as the numbers of fragile older patients rise exponentially, a 62% increase in hospital beds will be essential to meet this expected demand. Scott concludes in his study that all hospitals must consider implementing reforms to improve their productivity and reduce access block for those who really need acute hospital care.

Last a study by Maloney, Wolfe, Gestland, Hales and Nkoy in 2007 done in an academic children's hospital; identified that a delay in patient admission may lead to significant patient/family satisfaction, loss of hospital revenues and competitive edge. They tackled both system and process improvement as means to improve patient flow. An interdisciplinary team of clinicians, administrators and nurses tackled problems of bed availability and patient flow from admission to discharge. They identified that patient flow at their hospital faced a critical blockage due to the disorganized discharge of patients on the pediatric wards. Patient's transfer from PICU is subsequently delayed. The team identified that the hospital should increase its

capacity by efficiently managing existing beds in addition to daily routine for predicting and executing early discharges. Their findings highlighted the importance of developing a standard discharge process with clear discharge criteria that is communicated between the interdisciplinary team taking care of a specific patient. They also created a 'Patient Tracker' software design. This software system allowed clinicians and nurses to track and share knowledge about every patient demographics as a one-screen summary of vital information for each hospitalized patient divided in 12 dialog boxes. The dialog boxes were distributed as follows: patient demographics, assigned attending physician and medical team responsible, case manager, consultant services, consultant notes, physician assessment, nurse assessment, diagnosis, medication list, intern to-do list, resident to-do list and finally patient specific discharge criteria,. Maloney et.al concluded that to secure a competitive edge in health care delivery, hospitals need to increase bed capacity through efficient bed management and optimizing patient flow.

CHAPTER III

ADDITIONAL SINGLE-BED ROOMS FOR 6 NORTH

A. Setting and Services

6N is currently a medical-surgical pediatric unit located in building phase two on the 6th floor and which is composed of 18 patient rooms 8 of which are single bedded 1st class rooms, one suite room and 9 double bedded 2nd/3rd class rooms (see table 4). The institution's staffing plan for the unit adopts an FTE number that covers for unit's full census which is 27 patients. And the RN to patient ratio is 4RNs:1patient. The unit is staffed with one nurse manager and 38 full-time employees (FTE) divided into 25 registered nurses (RN), 9 practical nurses (PN), one nurse aide (NA) and 3 clerks. Nursing care delivery is modular in nature. The staff practices their care delivery within the scope already identified in their job description by the Human Resource Department. During the day and evening shifts, the skill mix ratio is 6RNs:2PNs where each RN is assigned to a module of 4 patients and is assisted by a PN. As for the night shift the skill ratio is 4RNs:2PNs. As for the NA, she is responsible for unit equipment cleaning, linen distribution to patients/family and unit organization.

The presence of only nine 1st class beds on the unit is a factor that aggravates to the problem of bed availability. This has been extensively explained at the beginning of this project. Currently, the administration is already amidst the task force of a process improvement of early patient discharge. This project is targeted to improve patient throughput in the hospital. Yet, as noted from our observation and daily operations, there is no significant delay in patient discharge on 6N.

B. Solution Proposal

Looking into what the literature has proposed; in Feildman's study, after verifying that there is an increasing need for single-bed rooms in pediatric hospitals and that isolation requirements must be considered during the design of new hospitals or renovation of existing ones. This study suggested that the ideal setting in pediatric hospitals is to have single-bed rooms on pediatric wards instead of multi-bed ones (Feildson et. al, 2012).

I have also pointed out previously that currently there is a pilot study going on by the administration at AUBMC that is targeting early discharge process to improve patient throughput where the results are still in process. This will surely help in bed availability as studies have shown but knowing the actual problem on 6N this will not be a key solution to bed availability.

After thorough scrutiny of the existing the problem, the administration is advised to consider having only single-bed rooms in the pediatric ward construction plans in the 20/20 vision. Another solution would be the construction of a pediatric cardiac unit which presently is a massive project and this need be tackled as a business project by itself. Yet, it would a profitable business plan to consider by the administration in parallel with the 20/20 vision.

Presently, my proposed solution restructuring the 6N is the most realizable. This solution is accomplished by adding more 1st class rooms in the unit that could be utilized by both 1st class clients and at the same time by patients in need for isolation. This proposal is attainable and cost effective and will leave space for more beds to be available for admitting other 2nd and 3rd class patients to 6N meaning better bed efficiency and eventually better revenues.

This proposal is to be accomplished in two concurrent phases.

First, 'adding rooms from 6S': Noting that the current occupancy rate on 6S being 50% and knowing that 6S doesn't have a problem of patients in need of isolation; adding these rooms

to 6N will mean better bed utilization by the institution and hence better revenues. Therefore; by taking two rooms from 6S- rooms 623 and 624- and adding them to 6N on permanent basis to be utilized as 2nd/3rd class 2 bedded rooms this will increase bed availability thus improving patient census on 6N and improving bed utilization, patient satisfaction and hospital revenues.

Second, 'Transforming rooms on 6N': from the current bed distribution on 6N (see Table.2); rooms 617, 619 and 620 will be transformed from 2/3rd class double bedded rooms to single bedded 1st class rooms while keeping rooms 613,615 and 616 s 2nd/3rd class rooms. This means an addition of three more 1st class/ isolation rooms on 6N. So the total number of first class rooms will be 11 rooms. In addition to that, room 611- which is a suite room (1S) –and when not in need, is sometimes utilized as 1st class. So we will be having a total of 12 1st class rooms with an increase of 3 rooms. It is needless to point out that any first class room on 6N can be utilized also as an isolation room. And the total number of 2nd/3rd beds will be 16 beds a decrease of 2 beds (see Table.4).

So, the total full occupancy patient census on 6N will be 28 patients with the addition of 1 patient to the previous census of 27 patients yet with an increase of three vital 1st class beds allowing for a better utilization of 2nd and 3rd class beds.

The restructured unit will continue to maintain the mission and vision of the present unit in alignment with AUB-MC's mission and will also aim at achieving optimal accommodation of all admissions/transfers of pediatric patients requiring its services. The goal of reconstructing this unit is to achieve 100% occupancy of a census of 28 patients. The proposed restructured unit will continue to maintain provision of the same medical and nursing care services it currently does. The current staffing for the medical/surgical teams will remain unchanged and will be providing the needed patient medical/surgical care.

With our proposed restructuring of the unit; sustaining one nurse manager is adequate to maintain the administrative requirement of the unit. Since the full census will be 28 patients and the RN to patient ratio is 1RN:4patients, then RN staffing during shift will be 7 RNs (day) / 7RNs (evening)/4RNs (night). The total RN number per day will be the sum of all shifts which is 18 RNs. If we multiply this number with the FTE ratio for RN staffing adopted by the Nursing Department which is 1.6 then the total RN FTE will be $18 \times 1.6 = 28.8$ RN needed i.e. approximately 29 RNs. This implies adding 3 RNs to current staff. Accordingly, the needed nursing skill mix ratio is 7RN:3PNs which implies recruiting 3 RNs and 4 PNs in addition to the current staff. The proposed unit staffing plan for the year 2015 has already requested for an addition for 4 PNs to accommodate having 3 PNs in the day and evening shift.

CHAPTER IV

COST OF CHANGE

During the restructuring and constructions the unit will stay open to admit its usual clients so, there will not be lost expenses. The total cost of reconstruction can be identified as the following:

1)Salaries: as discussed previously the reconstructed unit will only require hiring 3 RNs as FTE since there is a staffing proposal already sent to the Human resource department requesting for 4 PNs as FTEs. The basic salary listed in the Human Resource for an RN is \$930.646 .This salary already has Employee Related Expenses (ERE) including non-salary and wage costs, paid by the business owner, associated with each staff position, such as Social Security payments, health costs, and transportation allowance included by the Human Resource department. Thus the cost for hiring 4 RN's will be \$3,722.584/month which implies that the estimated annual salary cost over 12 months to be \$44,671. The Plant Engineering Department at AUB-MC will be responsible to execute this reconstruction and the staff required for reconstruction is already available as FTEs in the department itself. So no added staff is required.

2) Restructuring: the proposal requires the refurbishing of three rooms- rooms 617, 619 and 620- with a cost of \$4,000/room. This estimated cost was provided by the head of the Plant Engineering Department. So the total sum of refurbishing of theses rooms will be \$12,000.

3) Furniture: the same furniture of the present rooms will be used so there will not be any expenses in this category.

4) Equipment: since the unit is already equipped for a census of 27 patients, then there will only be a need to add to the unit two IV pump machines and two syringe pumps to cater to

the clinical needs of patient care required for the increase in census. The cost of each IV machine is \$3000 and the cost of each syringe pump is \$2000. Thus the total cost of machines will be \$10,000.

The total of cost of this project will be \$24,791.938 and by approximation the total cost will be estimated to be \$25,000. (Please refer to table 7).

CHAPTER V

FEASABILITY AND IMPLEMENTATION

Upon employing Force Field Analysis the following is noted:

A. Forces against change

These forces can be listed as follows:

First, 'clients': the unit will not be closed during the construction so noise will be bothersome to our inpatients/families. This might lead to client dissatisfaction and maybe client loss. This will be tackled in several ways 1) Admitting Office: a-exposing the clients in the early steps of the admission process by the admitting officers to the fact that there is reconstruction going on in the unit which is of short term and that is eventually aimed at improving client service through improving bed availability b- admitting the patients as much as possible with the coordination of the unit NM/care coordinator to rooms further away from the construction activity. 2) Plant Engineering Department: a-limiting the reconstructions to one room at a time to decrease noise levels, b- scheduling the time of reconstruction to coincide with the highest levels of noise on 6N during the day time in order to disperse the impact of the noise which will decrease its effect on the patient/family. 3) Nursing unit staff: the NM needs to meet with the unit staff discussing the construction plan that will be taking place and proactively teaching the staff strategies to help maintain proper communication in handling patient/family stress from the construction work that will take place.

Second, 'unit staff': the staff will be exposed early by the NM to the physical changes that will be going on in the unit and the noise expected with the proposed solutions to that. There

will also be reminded of the stress from the frustrations they are facing with bed management and the dissatisfaction addressed to them by families being assigned to other units that this reconstruction will help. They will also be involved in the staffing plan proposed.

B. Forces for Change

These forces can be listed as the following below.

First; 'administration': the administration is expected to be with change for several reasons; 1) Attainability: the expert resources are readily available since construction will be planned, executed and monitored by the Plant Engineering Department which is an entity that already belongs to the institution. The human and material resources required are already present in the department. 2) Cost: a- as discussed earlier the cost of losing clients far exceeds the cost of restructuring where it will be fixed asset for the institution later on. Whereas loss of client revenue is incremental, b- this project will not require the closure of the unit to refurbish the assigned rooms to 1st class ones but construction work will be executed by one room at a time keeping other rooms available for patients,c-staffing: only three RNs are needed to be added to 6N staff. By the time the construction is taking place recruitment by the Human Resource Department can be initiated so these new RNs will be ready to function independently.

Second, 'competitive edge': this restructuring will improve patient/family satisfaction by providing better bed management and availability, help in preventing dispersion of pediatric patients on other units and enhances RN satisfaction- on 6N and the other nursing units especially the ED- thus improving retention on the long run.

Strengths

This project has two strengths. First, the problem statement is supported by data driven evidence including the financial impact which make it a business case for the hospital

administration to support the proposed changes. Second, the change proposed was driven by the three aspects of an evidence-based solution: the literature recommendations, the context, and the stakeholders (patients, nurses and physicians) concerns.

Limitations

Several limitations are also recognized, the first of which is that data was collected over one month only which does not account for the seasonal fluctuations of patients' admissions. The second limitation refers to the lack of in-depth consideration of alternate solutions, such as providing space for pediatric cardiac patients in another unit, either in an existing building or one of the new buildings that is coming on stream. Moreover, having medical and surgical pediatric patients cared for in the same unit presents a high risk (for surgical patients) of acquiring nosocomial infections given the high incidence of infectious diseases in the medical cases admitted.

Implementation Phase

The implementation phase of this proposal will start after approval by the administration. An interdisciplinary meeting is to be collaborated by the administration with the different departments to be involved in the project: Medical Director of 6N, 6N NM, Patient Access Head, and the Plant Engineering Department Head. A schedule for the different phases of the construction will be created where each stakeholder will have their input on the execution process. Each department is responsible to follow up on its own share of work and staff. An estimated time for transferring each double-bed room to 1st class one provided by the Plant Engineering Department Head was approximately one month. Thus the whole project should take a period ranging from 3 months to 4 months during which the first reconstructed room can be utilized for admission after a month and so on.

CHAPTER VI

REFERENCES

- Bex George Thomas, Srinivas Bollapragada, Kunter Akbay, David Toledano, Peter Katlic, Onur Dulgeroglu, Dan Yang (2013) Automated Bed Assignments in a Complex and Dynamic Hospital Environment. *Interfaces* 43(5):435-448. doi:org/10.1287/inte.2013.0701
- Cherrie Galletly , Stacy Bell, Cassandra Burton , Carol Turnbull (2011) Bed Accessibility in a Private Psychiatric Hospital. *The Royal Australian and New Zealand College of Psychiatrists*. Vol 19, No 2. doi: 0.3109/10398562.2010.540246
- Evans, Richard, III; LeBailly, Susan; Gordon, Karyn K; Sawyer, Anne; et al (1999) Restructuring asthma care in a hospital setting to improve outcomes. *Chest*. 116, 4; ProQuest Central pg. S210.
- Fieldston.E.S., Li.J., Terwiesch.C., Helfaer.M.A., Verger.J., Pati.S., Surrey.D., Patel.K., Ebberson.J.L., Lin.R. et al (2012) Direct Observation of Bed Utilization in the Pediatric Intensive Care Unit. *Journal of Hospital Medicine*. 7(4), pp: 318- 324.
- Hodan, Margaret L (2000). How to expand a facility's reach through a dedicated pediatric unit. *Dimensions of Critical Care Nursing*; 19, 2; ProQuest Central pg. 32
- Ian A. Scott (2010). Public hospital bed crisis: too few or too misused? *Australian Health Review*, 34, 317–324
- Institute for Healthcare Innovation (IHI) (2003). Innovation Series 2003: Optimizing patient flow, moving patient smoothly through acute care settings. (White Paper) Website: www.ihl.org
- Langley, J. M; Hanakowski, M.; Bortolussi, Robert A. (1994) Demand for Isolation Beds in Pediatric Hospital. *American Journal of Infection Control*; Volume 22, Issue 4, pp. 207 – 211
- Maloney.C.G., Wolfe.D., Gesteland.P.H, MSi, Hales.J.W., Nkoy.F.I. (2007) A Tool for Improving Patient Discharge Process and Hospital Communication Practices: the Patient Tracker. *AMIA 2007 Symposium Proceedings*; p:493-497.
- Ogershok, Paul R; Li, Xiaoming; Palmer, Hugh C; Moore, Renee S; et al (2001). Restructuring an academic pediatric inpatient service using concepts developed by hospitalists. *Clinical Pediatrics*; 40, 12; ProQuest Central pg. 653

APPENDIXES

Table 1: Year 2014 including the month of January 2015 Patient Data on 6 North

Date	ALOS	Admission index	Total Admission	Total Discharge
01/'14	4.13	0.50	152	158
02/'14	3.43	0.60	144	154
03/'14	2.69	0.80	186	197
04/'14	3.07	0.70	149	162
05/'14	2.86	0.80	158	166
06/'14	2.55	0.90	213	208
07/'14	2.73	0.90	208	216
08/'14	2.30	1.00	221	224
09/'14	2.92	0.8	197	194
10/'14	3.08	0.7	193	203
11/'14	2.45	0.9	201	207
12/'14	2.28	1.00	220	232
01/'15	2.66	0.90	203	209

Table 2: Patient data averages on 6N

Average LOS Dec. 2014	2.88
Total admissions YTD 2014	1,290
Admission index Dec. 2014	0.8

Table 3: Data Collection Sheet

Month/Year : January-2015	Number of patients that could not be admitted	Reason	Number of patients who could not be transferred	Reason
<p><i>Week 1: Jan.5 → Jan.11</i></p>	<p>5 patients from Emergency Department of which 2 in need of isolation</p>	<p>>2 blocked two-bed rooms due to isolated patients >no first class bed availability</p>	<p>3 cardiac patients from PICU/SDU</p>	<p>>2 blocked 2 bedded rooms due to isolated patients >no first class bed availability >no bed availability as monitoring bed >6 cardiac patients already on unit(noting that the new group of Iraqi open heart patients are due to arrive in late February)</p>
<p><i>Week 2: Jan.12 → Jan.18</i></p>	<p>4 patients from Emergency Department</p>	<p>>4 blocked 2 bedded rooms due to isolated patients >no bed availability</p>	<p>2 cardiac transfers from PICU/SDU</p>	<p>>4 blocked 2 bedded rooms due to isolated patients >no bed availability >8 cardiac patients on unit</p>

Month/Year : January-2015	Number of patients that could not be admitted	Reason	Number of patients who could not be transferred	Reason
<i>Week3 Jan.19 → Jan.25</i>	2 patients 1 st class from Emergency Department	>3 first class rooms blocked for 3 2 nd and 3 rd class patients due to isolation. >no first class bed availability	2 transfers from PICU/SDU of which 1 is cardiac and 1 is neuro surgery	>3 first class rooms blocked for 3 2 nd and 3 rd class patients due to isolation. >no first class bed availability
<i>Week4 Jan.26 → Feb.1st</i>	6 patients from Emergency Department	>3 first class rooms blocked for 3 2 nd and 3 rd class patients due to isolation. >no first class bed availability	4 transfers from PICU/SDU of which 2 are cardiac patients	>3 first class rooms blocked for 3 2 nd and 3 rd class patients due to isolation. >no first class bed availability >7 cardiac patients on the unit.

Table 4: Current 6 North Bed Distribution.

Room Number	Financial status
604	1 st class
605	1 st class
606	1 st class
607	1 st class
608 (A+B)	2 nd /3 rd class
609 (A+B)	2 nd /3 rd class
610	1 st class
611	Suite/1 st class
612	1 st class
613 (A+B)	2 nd /3 rd class
614	1 st class
615 (A+B)	2 nd /3 rd class
616 (A+B)	2 nd /3 rd class
617 (A+B)	2 nd /3 rd class
618	1 st class
619 (A+B)	2 nd /3 rd class
620 (A+B)	2 nd /3 rd class
621 (A+B)	2 nd /3 rd class
Total number of beds	= 27 bed (9 beds 1 st class/ 18 bed 2 nd & 3 rd class)

Table 5: Proposed 6 North Bed Distributions.

Room Number	Financial status
604	1 st class
605	1 st class
606	1 st class
607	1 st class
608 (A+B)	2 nd /3 rd class
609 (A+B)	2 nd /3 rd class
610	1 st class
611	Suite/1 st class
612	1 st class
613 (A+B)	2 nd /3 rd class
614	1 st class
615 (A+B)	2 nd /3 rd class
616 (A+B)	2 nd /3 rd class
617	1 st class
618	1 st class
619	1 st class
620	1 st class
621 (A+B)	2 nd /3 rd class
623 (A+B)	2 nd /3 rd class
624 (A+B)	2 nd /3 rd class
Total number of beds	= 28 beds (12 beds 1 st class/ 16 bed 2 nd & 3 rd class)

Table 6: Estimated Average of Total Revenue Loss over the Month of data Collection

6 North	
<ul style="list-style-type: none"> ➤ Average cost of patient stay / day = \$500- \$ 1,500 ➤ Number of patients not admitted = 6 patients ➤ Estimated revenue loss of patients not admitted over a month= Average cost of patient stay/ day * number of patients not admitted/ month of data collection= \$500- \$1,500 * 6= \$ 3,000 - \$ 9,000 ➤ Average LOS (Dec. 2014)= 2.85 ➤ Estimated average patient revenue loss over a month = Estimated revenue loss of patients not admitted over a month* Average LOS (Dec. 2014) = \$ 3,000 - \$ 9,000 * 2.85 = \$ 8,550 - \$ 25,650 ~ \$ 9,000 - \$ 26,000 	
Estimated average patient revenue loss over a month:	= \$ 9,000 - \$ 26,000

Table 7: Estimated Set Up and Salary Costs – Initial Year Of Operation

Item	Number/Item	Ongoing Cost	Initiation Cost	Total Cost
▪ Direct cost				
Salaries per month (ERE included=17%)	4 RNs	\$930.646/4RNs/month	-	\$44,671/12 months
▪ Indirect costs				
Restructuring	3 rooms	\$4000/room		\$12,000
Furniture		\$0		\$0
Equipment: IVpump	2 pumps	\$3000/pump		\$6,000
Syringe pump	2 pumps	\$2000/pump		\$4000
Total Cost				\$66,671