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# Patient Satisfaction Related to Noise in the Coronary Care Unit

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# UNIVERSITY OF SAN FRANCISCO

## CNL ONLINE PROGRAM

### PROSPECTUS

#### PATIENT SATISFACTION RELATED TO NOISE IN THE CORONARY CARE UNIT

##### **Specific Aim:**

We aim to improve patient satisfaction regarding noise level in the CCU to 100% by November 21, 2014.

##### **Background:**

The Coronary Care Unit at the Houston Veterans Affairs Medical Center is a nine bed inpatient unit that cares for acutely ill cardiac patients requiring close hemodynamic monitoring, ECG interpretation, titration of powerful infusions, and use of supportive technologies. The CCU staff recognized a department trend for low patient-satisfaction score related to environmental noise levels. Based on the Press Ganey score, the patient-satisfaction score plummeted in relation to noise level beginning in March 2014 (see Table 1 for Press Ganey Inpatient Report). On the basis of this information, the CCU staff embarked on a unit-wide-noise-reduction project to improve the environment for patients and families. Since the increase in noise level has overwhelming effects on healing, poor patient satisfaction, delirium, and decrease perception of pain, I decided to pursue a process improvement project in the Coronary Care Unit.

##### **Supportive Data:**

In the CCU, nurses perform different interventions, have many responsibilities, and make critical decisions. The noise level in the CCU involves not only the people who are causing the noise but also noises occurring in the physical environment. A fishbone diagram (see Appendix A) reveals the key relationship among various variables that cause noise in the CCU and provides insight into process improvement for decreasing multiple issues that cause increased noise in the CCU.

##### **Microsystem Status Relative to the project:**

Team work sets the stage for this improvement project. The staff is highly competent and willing to focus on improving quality of care at the bedside. In order to present this project to the manager of CCU, a decision-making tool is needed to set the stage for this improvement project. The SWOT analysis (See Appendix B) provides the backbone for this project and identified the possible threats to the success of the project. These threats are training gaps, resistance to change, and limited resources. Barriers can impede the progress of this project when the staff does not properly communicate with each other which disrupt the continuity of patient care. The staff can also resist change and choose not to participate. This fragmentation can impede opportunity for change and result in patient dissatisfaction.

##### **Search Strategies:**

The peer-reviewed articles supported the project of reducing noise in the CCU. The terms used to search for evidence-based articles are “noise,” “critical care,” and “sleep promotion.” The dates of the articles range from 2009 to 2014 and are timely relevant to the issue.

##### **Databases Used**

Searches were done through CINHALL and Fusion.

## **Summary of Evidence:**

Allison & Ortiz's (2009) article, "Staff Solutions for Noise Reduction in the Workplace," asserts that intervention to reduce noise or to promote patient relaxation enhances physiological measures of recovery and patient perceptions of well-being.

Cicek et al's (2014) article, "Sleep quality of patients hospitalized in the Coronary Care Unit and the Affecting Factors," emphasizes that a sufficient and quality sleep will improve the recovery of CICU (Coronary Intensive Care Unit) patients.

Eliassen & Hopstock's (2011) article, "Sleep promotion in the intensive care unit- A survey of nurses' interventions," defines the overall interest and increased awareness in sleep-promoting interventions amongst ICU nurses.

Johansson et al (2012) in the article "The sound environment in an ICU patient room – A content analysis of sound levels and patient experiences" explains the variety and complexity of the various sounds in an ICU patient room and describes the patient's positive and negative experiences of the sound environment.

Jones & Dawson (2012) in the article "Eye masks and ear plugs improve patients' perception of sleep" declares that simple interventions such as eye masks and earplugs may be a valuable addition to patients attempting to sleep in a critical care unit.

Li et al (2011) in the article "Efficacy of controlling night-time noise and activities to improve patient's sleep quality in a surgical intensive care unit" states that poor sleep quality places critically ill patients at greater risk for infection and complications.

## **Theoretical Direction:**

Senior & Fleming's Hard System Model of Change (Bold, 2011) helps explain and support the aim of this project. This method provides a series of options for action through a set of explicit criteria. This process involves three overlapping phases: descriptive phase, options phase, and implementation phase. The descriptive phase involves setting the objectives and performance measures for change. Also, it comprises describing and diagnosing the situation and understanding what is involved in the change. The options phase is the thinking phase where we generate options for change, select the most appropriate options, and think about what should be done. The last phase is the implementation phase where we select the most appropriate option, put feasible plans into practice, and monitor the results (see Appendix C for Hard System Model of Change [HSMC]).

The Hard System Model of Change (HSMC) provides a practical approach to change that has been designed to apply in many complex situations. In improving noise reduction in the CCU, HSMC provides an effective method to begin to diagnose a change situation before categorizing it into a simple or complex change. The overlapping phase signifies that a change is all interrelated and that we can only anticipate meeting the challenges of each phase of development (see Appendix D for HSMC- Model for CCU).

## **Stakeholders:**

The stakeholders involved in this project are the CCU manager, the CCU staff, and the Director of Medical Care Line.

### **Apply the Evidence:**

The evidence supports the importance of environment, sleep disturbances, quality of sleep, and sleep promoting interventions in coordinating nursing care to reduce noise and promote sleep. The use of earplugs and staff education are both useful adjuncts in promoting sleep. The need to address noise and sleep are important in the recovery and patient outcome. Allison & Ortiz (2009) asserts that intervention to reduce noise or to promote patient relaxation enhances physiological measures of recovery and patient perceptions of well-being. Thus, current knowledge in promoting sleep in the CCU should not become an afterthought but instead, it should be a priority.

### **Business Case:**

The environment of the Coronary Care Unit is frequently ignored as a key factor in patient well-being. Staff members usually block out the noises they hear or may not recognize the significant disruption caused by noise at night and the disrupted light patterns of turning the light switch on and off. Since it is too costly to appropriately insulate every sound that goes on in the CCU, simple and low-cost patient interventions, such as the use of earplugs, may be a pragmatic solution.

I will be utilizing the use of disposable foam ear plugs for the study. The central supply carries the "Classic" disposable foam ear plugs at a cost of about \$0.20/pair. However, the CCU manager has purchased a different brand of disposable foam ear plugs by Safety Works which costs only \$0.13/pair. Since the patient populations are generally all veterans, they are not charged for any specific item they use. The cost of using ear plugs does not affect the patient's expenses but it does affect the overall spending account of CCU. A patient will use only one pair of disposable foam ear plugs each day. If the cost of this ear plug was calculated for one year, the cost comparison can be significant. Safety Works disposable foam ear plugs will cost the CCU less money and better savings compare to the "Classic" one provided in the central supply department(see Table 2 for Cost of ear plugs/year).

I devoted 220 hours to this project. At 45 dollars per hour, the cost of this project equals to \$9,900. \$9,900 in time resulted in improvement in Press Ganey score related to noise level in CCU and improved nurse awareness of staff noise level resulting in normal quiet/restful setting.

The qualitative benefits for this project resulted in improved patient satisfaction through increasing awareness of evidence-based data, applying measures to reduce the noise level in CCU, and enhance the CCU's reputation in VA community through increased scores on the Press Ganey.

### **Steps for implementation:**

During the third week of August, I observed different sources of noise in the CCU. I also conducted a pre- survey to the CCU nurses in order to gain their perspective on the most common types of noises. Based on my findings, the top five sources of noise in the CCU are ventilator and monitor alarms, infusion pump alarms, telephone/cell-phones, loud conversations in the hallways and nurse station, and equipment movement (see Figure 1 for Top 5 Sources of Noise). At the end of August, I had a meeting with the CCU staff and updated them about the results of the pre-survey and discuss the aim of the project. On the first week of September, the staff was educated about the project and I presented the tracking tool that will be implemented. The tracking tool will help guide if the interventions are being utilized by the CCU staff and determine any problems. The implementation started on the third week of September. I made rounds early morning, 2-3 times a week to monitor the tracking tool, receive feedback from the nurses, and update them on the project.

Besides educating the nurses about placing the “Quiet sign” outside the door, keeping the noise down and clustering care for patients, I continue to reinforce teaching and follow the use of earplugs to alert/oriented patients.

In the middle of October, the Press Ganey scores have revealed some improvements and at this time, I changed my rounds from 3 times per week to every morning to provide consistency in the process. By the first week of November, the staff had positive comments about their patients and vocalized the benefit of this project.

### **Evaluation Methods:**

The evaluation method involve in this project consist of the Press Ganey data. A pre-survey of the In-patient CCU report from August 2014 will be evaluated and used for comparison to determine improvement of patient satisfaction score from September to November 21, 2014. Based on the Inpatient pre-survey, CCU’s Press Ganey score was 75 and the magnet mean for like hospital was 79.8 (see Table 3 Inpatient CCU Report for August). The data suggests that the noise level in and around the patient’s room was below the mean compared to other magnet hospitals. Another evaluation method that will be utilized is the tracking tool for earplugs. Percentage of patients that used earplugs, patients who refused earplugs, and percentage of patients who were vented and not offered earplugs will be monitored to determine that this initiative help increase patient perception of reduced noise levels. The last evaluation method is the staff feedback inquiring about their overall experience in reducing noise level in CCU.

### **Supportive Theory:**

Senior & Fleming Hard System Model of Change (2011) asserts that the process of organizational change involves two types of forces, the driving and resisting forces. In order to decrease staff resistance and increase staff participation and involvement, I used proper communication skills and training methods. Since the staff was busy with nursing care, I provided short and clear-cut direction of what needs to be done. As I continued to come to the unit to observe and develop rapport with the nurses, I was able to move along and modify any interventions according to the complex, changing situation within the CCU environment. Together with the CCU team, we developed a Gantt chart to provide a road map for the improvement activities and help stay on track (see Table 4 for Gantt chart Timeline). The Gantt chart showed the progress of this project with some tasks completed (highlighted in blue) and some remained ongoing (highlighted in green). This chart will help monitor ongoing progress and make adjustments as necessary.

### **Results/Outcomes:**

From September to November 2014, earplugs were offered to all alert/oriented patients entering the CCU. During this period, 32% of the patients were on the ventilator and not offered earplugs. Also during this period, 33% of the alert/oriented patients utilized earplugs for sleep while 35% declined the use of earplugs (see Table 5 for tracking tool for earplugs and Figure 5A for bar graph results). Patients declined use of the earplug for various reasons with the most common being hearing loss, visual loss, and anxiety. Some patients also stated that their sleeping medications were sufficient enough for sleep.

Prior to September 22, the Press Ganey score on noise level in and around the CCU was below the magnet mean. A direct result of staff education, staff/patient awareness, and the availability of ear plugs resulted in a dramatic increase in patient perception of reduced noises on the Unit. CCU’s Press Ganey score increased to 93.8 compared to magnet mean for like hospitals of 79.4 (see Table 6 for CCU Press Ganey Results and Figure 6A for bar graph results).

While approximately a third of the alert/oriented patient populations in the CCU elected to use earplugs for sleep, patient perception of reduced noise levels increased. Patients who elected not to utilize earplugs for sleep reported they were pleased that such an option existed and perceived the nursing staff as being interested in their overall wellbeing. Also, nursing staff reported increased recognition of elevated noise (talking at nursing station) and worked to decrease loud talking amongst themselves.

**Recommendations:**

From the data collected, there appears to be an improvement in the patient perception related to noise levels in the CCU. While more data is required to verify sustained improvement, CCU staff will continue to track and improve on the noise reduction project initiated in the CCU. Recommendations are:

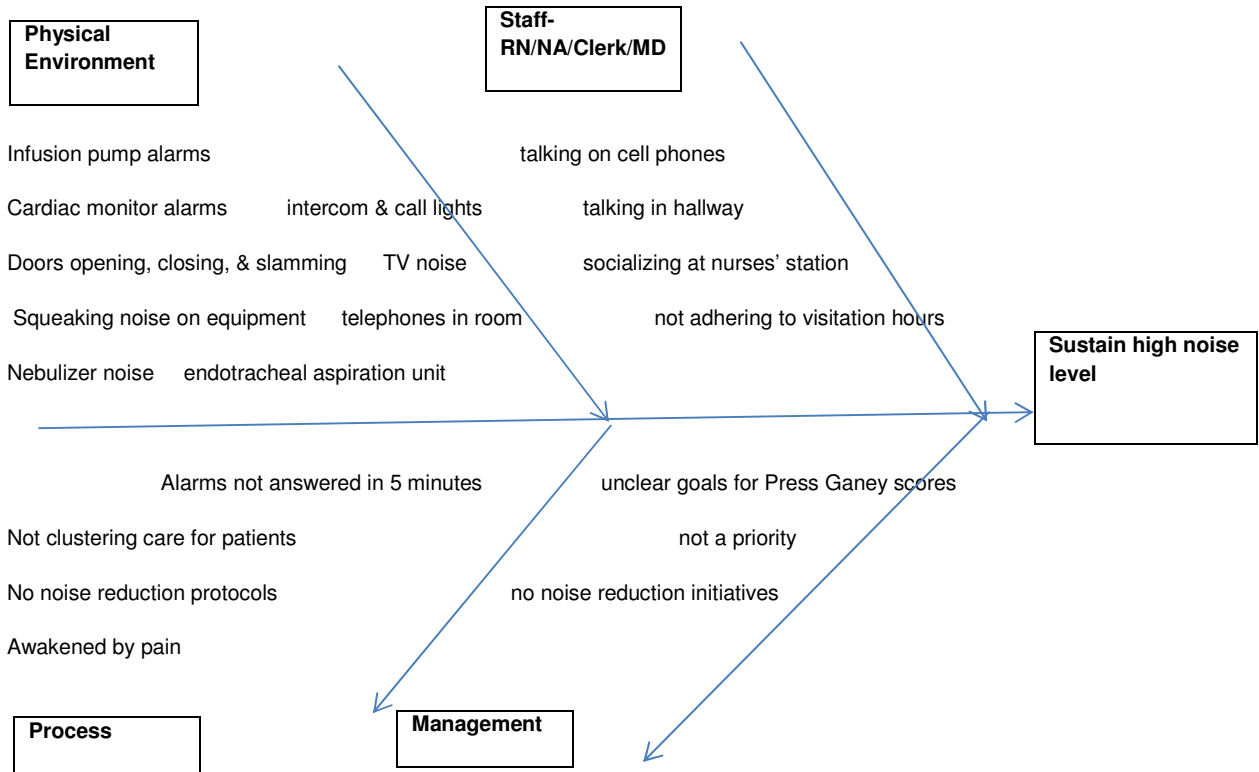
- Continue providing earplugs to patients and tracking usage by patients until February 2015
- Evaluate the project monthly and review Press Ganey Scores.
- Have weekly staff meetings where nursing feedback is received concerning project.
- In February, based on project outcome data, evaluate and recommend for continued practice and implementation into other ICUs in the facility as appropriate.

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- Richardson, A., Allsop, M., Coghill, E., & Turnock, C. (2007). Earplugs and eye masks: do they improve critical care patients' sleep? *Nursing in Critical Care*, 12(6): 278-286.
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## Appendices

### Appendix A Fishbone Diagram: Causes of Noise Level in CCU

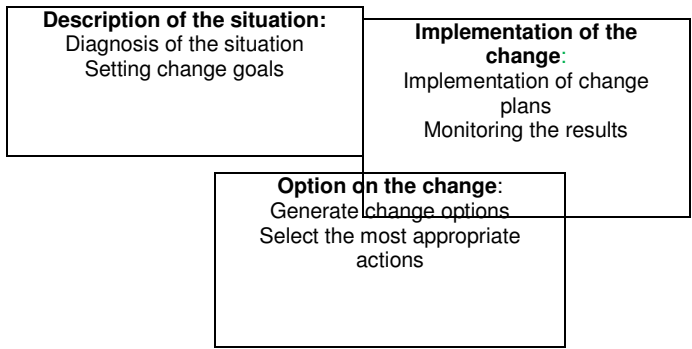


### Appendix B SWOT Analysis: Improve noise reduction in CCU

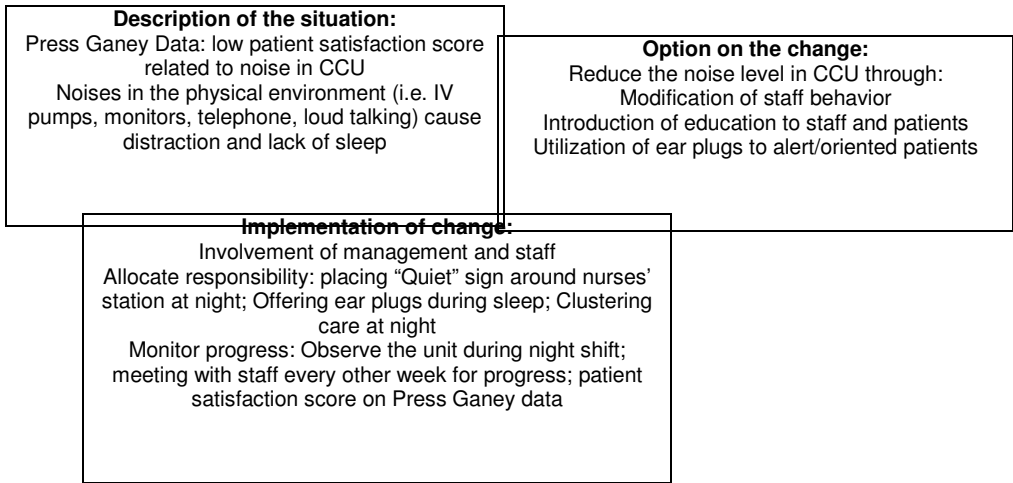
<p><b>STRENGTHS</b></p> <ul style="list-style-type: none"> <li>➤ Patient satisfaction</li> <li>➤ Promote patient safety</li> <li>➤ Shorten length of stay</li> <li>➤ Improved healing with proper rest</li> <li>➤ Decreased in the perception of pain</li> </ul>	<p><b>WEAKNESSES</b></p> <ul style="list-style-type: none"> <li>➤ <i>Nurses' lack of time</i></li> <li>➤ <i>New interventions to implement = ear plugs</i></li> <li>➤ <i>No initiatives for improvement</i></li> </ul>
<p><b>OPPORTUNITIES</b></p> <ul style="list-style-type: none"> <li>➤ Opportunity for better patient satisfaction score on Press Ganey</li> <li>➤ Provide better educational programs for staff</li> <li>➤ Awareness of noise reduction</li> </ul>	<p><b>THREATS</b></p> <ul style="list-style-type: none"> <li>➤ Training gaps</li> <li>➤ Resistance to practice change</li> <li>➤ Limited resources with earplugs</li> </ul>

### Appendix C Senior & Fleming's HSMC- Model





**Appendix D HSMC-Model for CCU**



**Tables and Figures**

**Table 1. Press Ganey Inpatient Report CCU for March**

**All Respondents**

Question	Mean	300-449 Bed Grp		Magnet Peer Grp	
		Mean	Rank	Mean	Rank
Noise level in and around room	76.7	77.6	43	79.3	31

**Table 2.** Cost of Classic disposable foam ear plugs/year Compare to Cost of Safety Work disposable foam ear plugs/year

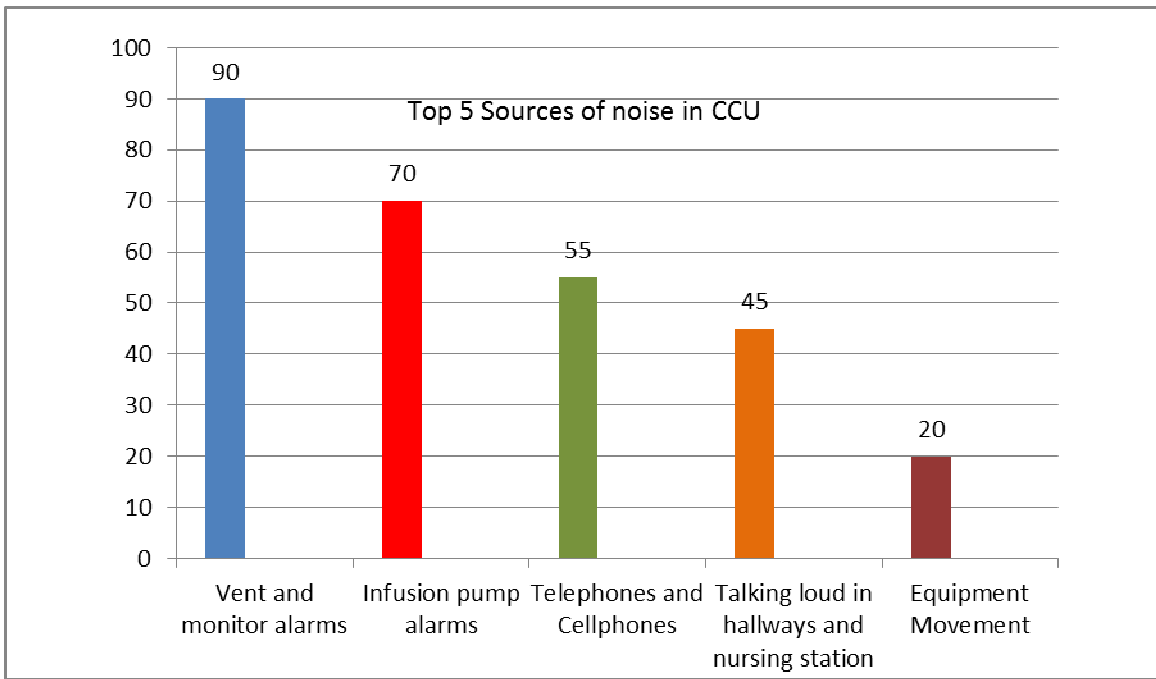
Patients	Cost/Day	Total Costs Classic Ear Plugs
1	\$0.20	\$73.00/year
25	\$5.00	\$1,825/year
50	\$10.00	\$3,650/year
100	\$20.00	\$7,300/year
Patients	Cost/Day	Total Cost Safety Works Ear Plugs
1	\$0.13	\$47.45/year
25	\$3.25	\$1,186.25/year
50	\$6.50	\$2,372.50/year
100	\$13.0	\$4,745/year

**Table 3. Press Ganey Inpatient Report CCU for August**  
Michael E. DeBakey VA Medical Center

**All Respondents**

Question Mean		300-449 Bed Grp		Magnet Peer Grp	
		Mean	Rank	Mean	Rank
Noise level in and around room	75	78.4	93	79.8	91

**Figure 1. Top five common sources of noise in CCU**



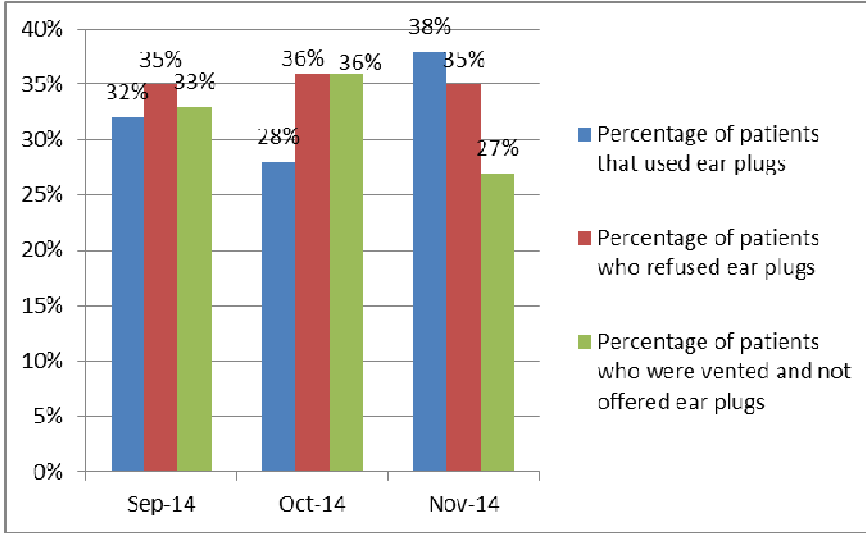
**Table 4. Gantt chart for the CCU's Three-Month Improvement Strategy**

Action item	Responsible	Month															
		August 2014		September 2014				October 2014				November 2014					
	Week		3	4	1	2	3	4	1	2	3	4	1	2	3	4	
<b>Gather all sources of noise in CCU</b>	Project leader																
<b>Organize a meeting with staff</b>	Project leader and manager																
<b>Allocate responsibility: utilize use of ear plugs</b>	CCU Staff																
<b>Education of staff and patients</b>	Project leader and CCU staff																
<b>Place "Quiet sign"</b>	CCU staff																
<b>Monitor progress: Interview staff overall experience</b>	Project leader																
<b>Monitor Progress: Press Ganey data</b>	Project leader and CCU manager																
<b>Presentation of project to staff</b>	Project leader																

**Table 5. Tracking tool for utilization of earplugs**

Tracking Tool for Ear Plugs	Sep-14	Oct-14	Nov-14
Percentage of patients that used earplugs	32%	28%	38%
Percentage of patients who refused earplugs	35%	36%	35%
Percentage of patients who were vented and not offered earplugs	33%	36%	27%

**Figure 5A. Bar graph results for utilization of earplugs**



**Table 6. CCU Press Ganey Results**

CCU Press Ganey Results	Apr/May 2014	Magnet Mean	Jun/Jul 2014	Magnet Mean	Aug/Sep 2014	Magnet Mean	Oct/Nov 2014	Magnet Mean
Noise level in and around room	77.3	79.2	80.6	79.6	78.9	79.6	93.8	79.4

**Figure 6A. Bar graph results for CCU Press Ganey**

