

# Stress reduction by using Art in an Intensive Care Unit

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## **General background on Uppsala County Council, Uppsala University Hospital and the 1% Rule**

Uppsala is the fourth largest city in Sweden, situated 70 km north-west of Stockholm. In Sweden, County Councils (CC) are a middle level of government, in between the national and the local level. The CC has its own political organization and its own tax funding. Its major objective is health care but the CC is also responsible for regional development, public dental care, public transport and cultural development.

The Uppsala University Hospital has 1, 100 beds and a staff of 8, 000. It serves the county and, in several specialities, also the regional and national needs. It's also a hospital for training and education, in cooperation with Uppsala University.

Most Swedish public builders have adopted the 1%-rule, earmarking 1% of building costs for artistic enhancement. Artists are involved in the planning process to develop artistic solutions and embellishments in architectural settings. In hospitals, these are often executed as commissions, due to the complexity of ward premises. Uppsala CC, being a major operator, has an annual budget of 3 MSEK (270 000 €) for art.

## **THE NEONATAL ICU AT UPPSALA UNIVERSITY HOSPITAL**

### **Background**

The neonatal ICU is a total rebuilding of older premises with an area of 1, 900 sq m (19, 000 sq f). It includes twelve incubator-places in three ICU rooms, two rooms with six places for intermediate care, nine separate family rooms and two isolation rooms. There is also an operating room and sufficient space for administration, supervision and the usual staff and family needs. The neonatal ICU was planned to meet new standards for neonatal intensive care (see <http://www.nd.edu/~kkolberg/DesignStandards.htm>) These standards specify physical requirements (space, light, sound, equipment, communication etc) but also stresses the emotional needs of the infant, the parents and the whole family. An important objective was, therefore, to empower



Figure 1 Floor plan

parents to active participation in care giving, both beside the incubator and by using the Kangaroo method (maximum skin contact between infant and parents). This objective was met by planning extra space for parents beside the incubators and as the infants recover offering rooming-in and of course extra consideration of the parents' needs from staff.

However, what is a normal working place for staff is perceived as a strange and frightening high technology milieu for parents – especially with a sick infant. An equally important objective was therefore to reduce environmental stress factors and to create a positive setting. Stress reduction was a touchstone in several aspects; in planning and choosing lighting, choice of materials to reduce sound, the desire to lead day-light as far as possible into the building, to use discreetly designed or concealed fixtures and fittings etc.

But there was also an ambition to add “positive stress”, that is to stimulate parents and staff with artistic means, thus making the whole setting a more positive experience.

### Artistic Cooperation

The change in focus from medical functions to parents' (and infants') experience of the milieu demanded new views and new competencies in the planning process.

To get new ideas, a project was formed together with the University College for Arts, Crafts and Design in Stockholm. 10 graduate students in the Department of Textiles worked on the theme “How does it feel – how do we make it feel better?” They held seminars on health care design, visited other wards and interviewed staff and parents on positive and negative aspects of the ward setting, especially on the effects of interior design, coloring, technical appliances etc.

The students worked with separate room functions. They decided to work within the theme “Nature”. Partly because they thought that under these special circumstances, nature might offer a soothing effect in contrast to the technical side. Partly because the theme still allowed large variation in techniques, motives, expressions, etc.

### **New Proposals**

After a month, ten models and proposals for different rooms were presented, along with inspiration and background material, technical solutions and requirements for the execution. The proposal’s impact and feasibility were discussed at a joint meeting with the art group, architects, technical consultants and staff. They were evaluated according to the dual objectives of stress reduction and added values/stimulation. Six

proposals were chosen and further developed in cooperation with the architects. Several adjustments and alterations were made due to practical considerations and program changes. In cooperation with interior designers the proposals were used as a basis for coloring, furnishings and textiles through the whole setting – thus creating harmony in the usually fragmented impression of a modern hospital ward. The proposals were then integrated in the building plan, handing over parts of the execution to the contractor.

### **Five Examples**

These are different approaches to artistic cooperation, they might be called Integration, Redesigning architecture, Redefining functions, Developing materials and Art as unifier.



**Figure 2** *ICU int*

### ICU Rooms – integration

An important objective in the ICU rooms was to put parents at ease in spite of the high-tech environment. It was necessary to handle the “overall unit design” - the visual impact of the ICU - as well as addressing the sometimes conflicting needs of parents and infants vis-à-vis staff.

The artist proposed to divide the room into a lighter middle zone for staff’s needs and darker zones along the walls for the infants. The walls are white in the middle and have dark blue hues in the periphery.



**Figure 3** ICU Floor screen

The floor is patterned with big squares, lighter in the middle and lined with blue. Low screens with colour-matched fabrics are used for temporary seclusion.



**Figure 4** ICU Wall

To emphasize the walls, an enlarged foliage pattern was designed, painted blue on blue. It is abstract at a close range but more clearly nature-like at a distance.



**Figure 5** Bench milieu

The central work bench is designed with rounded forms and a white Corian top, which is easy to clean but foremost – due to its thickness – reduces sound. The dividing cabinetry has the same top material but a dark zebano laminate.



**Figure 6** ICU incub. divider

A variety of light fittings are used, with subdued and indirect armatures over the incubators and more normal lighting over the work zone. The milieu is developed as a totality in close cooperation between the artist, the architect, the interior designer and other consultants. It is impossible to conceal so much equipment but the elaborate handling of details, colouring



**Figure 7** *Silent Room*

and materials creates a setting that counterbalances “technology-stress” and gives a positive impression. (A major setback might be noted: parent participation and care in the Kangaroo method demands furniture that can serve both as a chair and a recliner. It should also have adjustable height. No such furniture was found on the market, and this limits parent participation to some extent.)

### **Silent Room – Re Designing Architecture**

Sorrow and mourning is an everyday experience in this ward, both for parents and staff. The only available area for mourning and leave taking was a windowless room in the middle of the building. Instead of making mock windows or elaborate paintings to compensate for the lack of view, the artists decided to work with the architecture and materials.

A hallway was created by using a partition wall. The wall has opaque glass panels with integrated lighting, the floor has blue and grey tiles and the walls are painted a darker green grey colour. The inner room has a different expression. Walls are painted white; the floor is dark tinted oak instead of ordinary plastic flooring.

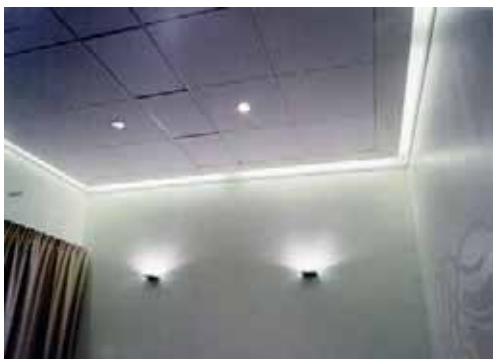
A painting directly on the wall picks up the colours in the room and introduces an organic or vegetative pattern.

The furnishing is adapted to the colouring and expression of the room. The lighting is treated with great care. Tube fittings placed above the ceiling give an indirect light through the slits, a couple of wall luminaries activate the back scene and a few recessed ordinary bulbs illuminate the centre.



**Figure 8** Silent room entry

*By dividing up the area the artists made an “emotional passageway” to difficult experiences. By playing down decoration but enhancing materials, lighting, colouring etc they created a calm setting for conversations and leave taking. It is also neutral vis-à-vis different tastes and religious creeds.*



**Figure 9** Silent room ceiling

### **Children's Waiting Area - Re defining functions**

The waiting area for children was planned in a long and narrow room with a standard set of small furniture. This solution was judged as “meagre” and neither welcoming nor stimulating for children. The artist redefined the functions. To guide the viewers’ interest along the wall she made a cut-out forest silhouette in many layers. For activation she made a big soft sculpture that children can climb on, rest on the soft top and hide in the holes. Instead of the play table, a long sofa was designed. Children can cuddle with siblings and parents and use toys and books, stored in the holds below.



**Figure 10** Kid entry wall

*This room is so articulated that it's perceived as a secluded oasis in the ward. It is also a room where kids can be physically active as well as rest, mourn and be comforted – and these are important functions in a ward that welcomes the whole family.*

### Staff Rooms – Developing materials

The two rooms for supervision, charting, etc are located between the ICU rooms and the corridors. Staff wanted openness for visibility and light transmission into the corridor but also seclusion. These needs were met with sand-blasted windows. The artist used a nature motif – a branch – and varied the motif in size and positioning.

*Sandblasting permits both light transmission and a limited view through the windows. The blasted areas also vary in lightness according to angle of view. The motif thereby gives a varied rhythm and impression of sunbathed foliage through the corridor. This was judged as a great improvement compared to the usual solution with blinds. The same motif was used to screen off the reception room, which has similar needs for both seclusion and openness.*

### Isolation Rooms – a motif as unifying factor

The isolation rooms are fairly small, especially the adjoining room for parents. This was considered a problem, since parents and infants often stay in isolation for a long time. The artist decided to use a cloud pattern as a general motif. The pattern is painted on the walls in the parent's room, printed on curtains, and sand blasted on dividing glass doors.

*The use of a single motif creates unity through the cluttered rooms. The cloud pattern is appreciated, both as a “wall-opener” and in the dual function of abstract design and a play with figural interpretations. The glass doors are especially appreciated since they, besides light, provide seclusion without use of unhygienic drapes.*



Figure 11 Isolation family room



Figure 12 Staff Room



Figure 13 Glass detail

## Family Rooms

The family rooms are not artistically decorated, though parents can choose a print to hang in their room during the stay.. However, the objectives of stress reduction and creating a positive setting had a strong impact on the design.

The rooms are furnished in a hotel fashion with a bed-settee, easy chair, desk etc. Each room has a different colouring. Necessary medical equipment is collected in a ward panel, though outlets are concealed with flaps. Other fittings are equally treated/hidden to make the milieu more like home than a hospital ward.



Figure 14 Family room

## Sum Up

Artists working with commissions take the whole milieu into consideration, thus making an extra check of the visual and practical devices. They have competencies in colors, spatial conception, design, etc from which the staff can benefit. A major consequence of this project was that the artists' involvement improved staffs' knowledge of how the milieu is perceived as a totality, and especially by someone who does not work there everyday. In these aspects, artists can reduce negative stress in the ward settings. The family rooms are but one of many examples of how the artist's proposals and suggestions strengthened staff's commitment to a better and more articulated ward setting.

In the aspect of positive stress – or stimulation - artistic involvement is perceived on three levels:

- 1 Physical: architectural features like floors; walls; windows; glass sections etc can be further developed and articulated, thus creating a better milieu
- 2 Expressive: Artistic articulation – whether figurative or non-representational - adds cultural stimulus, i.e. feelings, opinions, experiences, memories etc
- 3 Experience: Cultural stimuli engage the beholder in other and wider experiences than the actual situation of the affliction. This increases well-being and is a positive stimulus for parents, staff and visitors.

Artists can articulate the staff's general intentions, values and views in a visual form, thus embedding these views in the architectural setting of the ward and creating a uniform statement of the premises. This also leads to the staff's greater involvement and continued commitment to creating and maintaining a positive milieu. The theme of this conference session is Improving healing performance through "Aesthetics", "Art" and "Culture". I would advocate that, in the general trend towards a more humanistic, salutogenic hospital design, these factors are already an established means to better healing performance. I hope to have shown some of the benefits of taking these factors seriously – without quotation marks - and in using artistic cooperation in health care design on a regular basis.

# The Effect of Music on Inpatient Children

Susan B. Wesley



**Susan B. Wesley, Ph.D.**

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## Preface

The term “Integral” Architecture may be new for the attendees of this congress, however, Integral is the fundamental concept at the heart of the mission of the academy. This paper intends to provide two levels from which to view Integral insight and practice in a specific built environment. The first level uses Integral as a conceptual basis for the research and project rationale of this particular study. The second level uses Integral as a conceptual basis for implementation of an action plan for a specific hospital.

The basis of Integral practice is found in the work of contemporary philosopher and researcher Ken Wilber. Simply put, “Integral

means comprehensive, inclusive, balanced, not leaving anything out. When it comes to human beings, integral means maps, models, and practices that include the full spectrum of human potentials, often summarized as “exercising body, mind, and spirit in self, culture, and nature.” The template for Integral is four quadrants: Individual-Interior, Individual-Exterior, Collective-Interior, and Collective-Exterior. Another way to label the quadrants is Spiritual, Psycho-social, Cognitive, and Physical. Each quadrant includes all states and stages of experience and development, in other words, opportunities for growth. This is often referenced as AQAL – All Quadrants All Lines (states, stages, types and traits.)

For nearly a decade, the work of IADH has demonstrated that, if health is a priority, a variety of perspectives must be held and valued by those who design, build and work in community environments. The Integral model can assist in further clarifying and deepening such values. Introduction of such philosophical issues may feel out of place, however, it is timely. To that end this paper continues the discussion related to the use of passive music interventions on the children’s inpatient unit at the Acadia Hospital with the ongoing study of Acoustic Considerations and Recorded Music Interventions Within a Psychiatric Hospital.

## Introduction

A night of peace and quiet, after getting the kids to bed at a reasonable hour, is what most parents look forward to. For most staff, who work on many an inpatient psychiatric children’s unit, it generally is an illusive dream. But, it is the

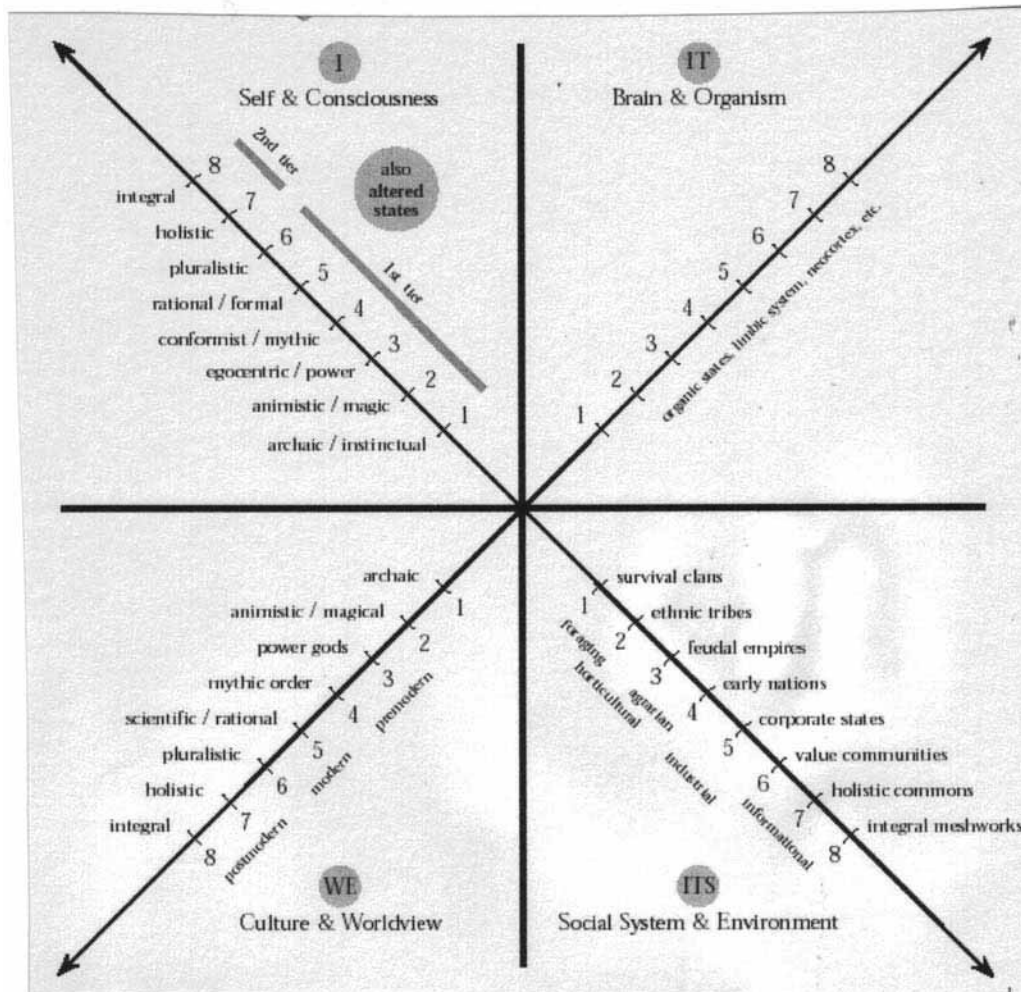


Table 1 AQAL Template (Wilber 2003)

constant and persistent goal of all providers of 3 North at The Acadia Hospital. Literature sources about discussing quality of life related to patient care. There are also more and more studies examining specific sensory aspects of hospitalization and how these impact patients' perception of and satisfaction with care. The impact of sound on children during bedtime routines on an inpatient psychiatric unit is a question about specific sensory input and perceptions.

### Trauma as a Primary Diagnosis – The State of Patients on 3N -

An essential reason to ask about sensory perceptions of these children at bedtime is because many children have experienced physical and sexual trauma with many of these assaults occurring at bedtime or naptime. So getting a good night's rest is not their concern – being in control is. Reasons for hospitalization of the children on 3 North include suicidal tendencies, fire-set-

ting, assaultive behavior, inappropriate sexual contact, over sexualized behavior and aggression. Such behaviors are typical of traumatized persons. PTSD is the diagnosis given for many of these cases. Additional symptoms include depression, anxiety and attachment disorder. Random reviews of most of the case histories for these children generally reveals overt reports of or implication of trauma. No trauma can be experienced without the body holding the memory due to the frequencies absorbed by the senses particularly auditory, visual and olfactory.

In the ongoing work on the topic of trauma, major researchers such as Bessel VanderKolk (1994) and Bruce Perry (1997) increasingly reference the body's "memory" of traumatic events as having an impact on the "development" of the individual specifically delayed development. The term delay is applicable to all dimensions of growth of a person, not only physical. Robert Scar (2001) and Peter Levine (1997) have also added literature to the increasing resources lists on trauma by also examining adult physical symptomology and linking such illnesses as chronic fatigue and lower back and neck pain to early life traumas including surgeries. The body does remember and carries the burden of traumatic events as easily as the memory of petting the family cat.

One might ask "How is it that the sensory or perceptual system of the human body can "see, hear or smell, taste and touch" and not remember?" What is small is huge and, in this case, what is small is vibration and frequency. In fact the age old question "If a tree falls in the forest, does it make a sound?" is relevant here as well. Energy can be neither created nor destroyed. It can be captured for a time but does not stop moving. It is a flow of life force that is present in all things seen and unseen by humans and technology and it is the basis of the universe. When energy is captured in a way that confines it "unnaturally" it does not dissipate but continues to move even in constricted spaces until it can find

a path of less resistance and flow again freely. Virtually all sensory input is frequency based and that moves us to re-think how the human system is stimulated and soothed. The terms allostasis and allostatic load will help to further refine the understanding of how particular frequencies and vibrations impact the Autonomic Nervous System and not only affect behaviors but physical health as well.

### **Trauma, Homeostasis, Allostasis and the Environment – States of Biology**

In the very recent publication *Allostasis, Homeostasis, and the Costs of Physiological Adaptation*, (2004), 14 authors present varied perceptions of the body's attempt to adjust to change. Although the term homeostasis has been accepted as the natural inclination of an organism to adapt, there is new and refined insight as to what lengths the organism must stretch in order to adapt. Homeostasis has mostly been referenced as "stability through constancy" (Sterling, 2004) and emphasizes the role of the central nervous system in the regulation of the internal milieu (Schulkin, 2004). Allostatic regulation, however, reflects neural involvement in systemic physiological and behavioral adaptation (Schulkin). The originators of the term allostasis put it this way "allostasis . . . involves whole brain and body rather than simply local feedback," and this is "a far more complex form of regulation than homeostasis (Sterling and Eyer, 1988). Now back to the children and how it is that they become "hospitalized".

When the spark of life occurs, that very instant has provided a container for energy to move in some way. The path of energy's flow is formed by the container including how the container was formed, including the force, light, sound, texture, smell and, ultimately, the "gut" reaction to the event of the spark. Basically, the complete environment and ambiance of the moment of conception is in the body's memory. The newborn cannot "talk" of the experience and neither can the infant, toddler, child, adolescent or

adult, but the behavior of an individual at any age will reveal that for which words may not be available. This is especially noticeable in the emotion of fear. In order to understand the thread of: (1) the emotion of fear; (2) to resulting behaviors; (3) then to hospitalization; it is essential for a closer look at the mechanics of allostasis.

Allostasis means maintaining viability through change of state or bodily variation. It appears that the physical body should be flexible and develop additional physiological and behavioral baselines depending upon the environmental demands. Indeed, the repertoire of responses to environmental demands may be developed but if demands arise too often or quickly, the system may not have sufficient time to “recover” and reset therefore being “stuck” in a full-steam ahead physical adjustment. Basically this means a state of hypervigilance and hyperextension of biological processes. This results in what is now called allostatic load. “In other words, allostatic overload via several mechanisms of overactive or inefficient responding can cause systems to breakdown.” (McEwen, 1998). “For anxiety and depression, overactivity or prolonged responding of feed-forward processes that function normally during adaptive fear, change thresholds for future encounters by sensitizing fear systems so that they respond with exaggeration or at inappropriate times.” (Rosen and Schulkin, 2004).

### **The Body as a Recording Mechanism – State of Body Determines Recording**

Basic to the understanding about what biological, more precisely, neurological mechanisms are pressed into service when a body is required to adjust, is knowledge of the ANS or Autonomic Nervous System. The research of Bruce McEwen, Stephen Porges and John Chitty, relating to the 10th cranial nerve also known as the vagus is very useful. Vagus means to wander and so it does. The nerve is hard wired into the brainstem and then meanders its way in a loop from right

side to left through the body finding a path into every major organ. There are characteristics of the vagal nerve, specifically in its myelination, that help to explain something of its outstanding ability to send information to the brain. Interestingly enough, however, is that many resources discuss the 20% efferent nature of the vagus as of greater importance than the 80% afferent assignment of this happy or not so happy “wanderer”.

So what does the vagus, myelination, and music have to do with traumatized kids at bedtime in a hospital? Understanding the body memory is essential in answering this question. As humans we share the vagal system with anatomical systems from the most primitive states to the Einsteins of the world. The unmyelinated dorsal vagal is essentially at the “gut” level and perceives, especially well, air driven sounds and surface vibrations. These are in the 0-50 Hz range and can often be more “felt” than essentially “heard”. For the untraumatized person generally this has no particular behavioral response except for a sense that something’s up – like someone is looking at you from behind or a person just came into the room – not an “auditory”/ear response simply a “gut” hunch. For an individual who has had strong emotional (as fearful) encounters, the gut hunch is more behaviorally evoking and can result in a range of responses from immediate scanning of the space to bolting; shouting; punching or in other words a “meltdown”.

In the specific environment of hospitals, sounds as vibrations and frequencies, if not absorbed by wall, floor or ceiling surfaces travel and resound easily. Contributing sources for such sounds are HVAC units, turbo carpet fans, lighting and technology in use on the unit. Some of these frequencies may be physically picked up as surface vibrations when children sit or lie on the floor for any myriad of activities. Not all encounters with low frequency vibrations/sound terminate in assaultive behaviors. Many other

factors come into the mix especially time of day. Since many instances of abuse occur around the bedtime or naptime for children, the anatomy of these children, in a sense has a biological clock that sets an alertness based on their prior experiences. This is a learned adaptation called allostasis and it has been learned as a coping and/or preventative alerting measure.

**Program Development Music Based Interventions – AQAL**

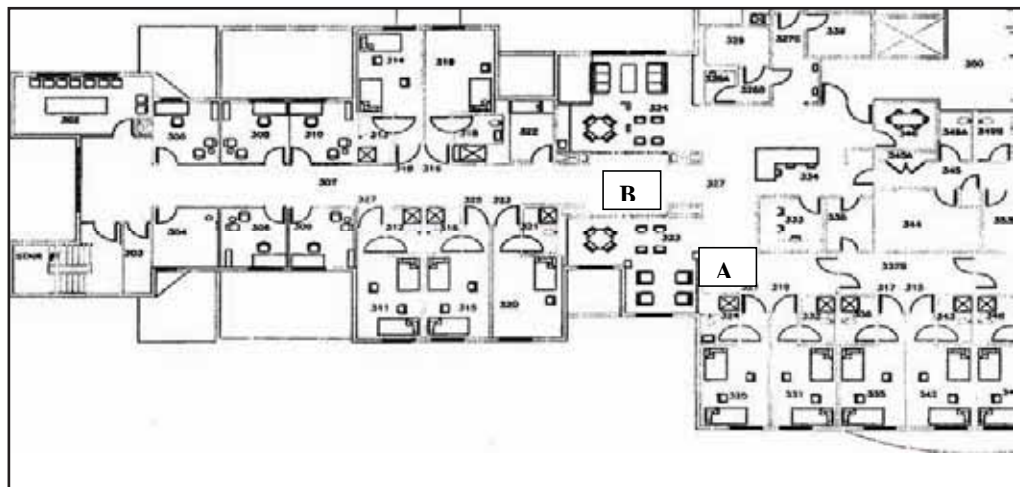
Since the autumn of 1998, music based interventions have provided increased insight and useful results in both understanding and meeting particular needs of the anxious 3 to 12 year old population of inpatients at this hospital. Over these past years such interventions as music and relaxation exercises; music and imagery activities; live lullaby evenings; live classical chamber music evenings; and recorded new age

ambient and classical music have been provided. From these, a number of important questions have been answered and in turn, provoked even more important questions. In other words, some techniques have been identified as: often useful; occasionally useful; and not a good choice. As well, more sophisticated issues have percolated to the surface such as how sounds travel on this unit; at what intensity are sounds perceived on the unit; what frequencies and vibrations instigate and which sooth; and when is less more?

The components of the music based intervention program continue to evolve as information is gathered not only through data collection of documented aggressive behaviors but from some of the observed behaviors and comments of patients, staff, and visitors. Results have determined such action as moving or relocating music delivery sources based on floor plan of

categories		categories	
I	Resistive Bx	IV	Physical aggress-self
.i	extreme disruption	.i	self-injury gestures
.ii	refuses verb.dir.	.ii	ingests nonfood
.iii	ref to walk/req escort	.iii	bangs head/throws self
.iv	runs/hides	.iv	pulls/picks, digs self
.v	blks door	.v	bruise/burn/cut/etc
.vi	attempts elope	.vi	attempts strange/suff/hang
.vii	off unit-bolts		
		V	physical aggress-others
II	verbal aggression	.i	swings/grabs/projects>others
		.ii	hits w/obj>others
III	Physical aggress-obj	.iii	strikes/hits/kicks w/o injury
.i	slams/pushes door	.iv	strikes/hits/kicks w/injury
.ii	punch/kick obj	.v	none given
.iii	climbs/jumps>furniture	.vi	charges @staff
.iv	throws/kicks/tips>funr		
.v	breaks obj/destructive		

**Table 2** Aggressive Behavior Log Codes by Category and Type



**Table 3** North Floor Plan

the unit, and consultations with acoustic and sound professionals. Additional information has been gathered such as: patient ages and genders; unit census; staffing patterns; evening activity patterns; holiday and seasonal influences; HVAC cycles and “re-admissions” in order to bring greater understanding to the effort to provide a comforting and safe feeling to the unit at bedtime. Analysis of unscheduled events such as staff orientation and number and scheduling of pool staff along with significant scheduling changes for all staff from 8 to 12 hour shifts are additional areas for gathering data that should also provide greater insight into milieu response at the bedtime hour.

Keeping in mind the AQAL lines, states and stages, staff awareness of unit flow and their behavioral response can also play an important role impacting value of programming. When a staff person is new to the unit or returning to unfamiliar programming, such as phases of the music intervention studies, there is generally a period of assimilation to evening activities. The trust building, for what might be viewed as unconventional activity, is essential and must be timely. Children, particularly hypervigilant children, “read” adult curiosity and skepticism extremely well. If staff person is doubtful or in-

decisive about an activity, children can translate staff response as “this is an activity not to be valued or trusted.” So another dimension for examination is staff education. But at this point, it would be helpful for the reader to examine Tables 2 and 3. Table 2 provides the Aggressive Behavior Log Categories and Codes. Table 3 shows the Unit floor plan for 3 North.

A review of the Phase interventions follows beginning with a simple overview of Phase I; followed by a concise presentation of Phase II and a more detailed presentation of Phase III.

### **Phase I – Overview – State and Stage and Integral Information**

Three styles of recorded music were studied during this phase in order to determine potential approaches to reducing aggressive behaviors among an inpatient population of children (ages 3-12) in an acute care psychiatric hospital during the bedtime and overnight hours (1830-0630.) The music styles included recorded classical, new age electronic, and vocal lullaby. The data provided by Phase I showed that recorded classical music was more useful than the other two styles. However, the single live music evening for the unit continued with lullaby style music. The Lullaby evenings continued to demonstrate

usefulness for quieting the milieu parallel to the results of classical recorded style. Specific problems identified in Phase I were: (1) the delivery system (five boomboxes); (2) lack of rhythmic structure and imbalance (toward low end) in the frequency ranges in the recorded new age electronic music; and (3) out of phases boomboxes with recorded lullaby music (which depends on word dissemination through the music.) The question of live verses recorded music loomed large and the next phase focused on live music using both acoustic instrumental duets and vocal with guitar.

**Phase II – Spiraling up to next State and Stage: Applying Integral Information**

The scheduled music intervention included two nights of lullaby music (vocal with guitar accompaniment) and four nights of live instrumental classical music (instrumental duets). The music selection criteria was based upon tempo, dynamic level, instrumental groupings and sensitivity to timbre, tonality and complexity of composition. The lullaby repertoire was selected from traditional and contemporary children’s music literature. The instrumental ensembles included flute duets two evenings, clarinet and flute one evening, and classical guitar and flute one evening. Repertoire for these groups came

from collections of traditional Baroque, Classical and Romantic compositions. The intervention was for six evenings weekly (no music was available Monday nights) for six weeks. (The evening time frame of 1830-2000 remained a constant as in Phase I.)

The design for the six weeks of the live music intervention intended that the instrumentation, musicians, assigned to specific nights of the week would remain constant. The schedule did adhere to vocal and instrumental music maintaining the same evenings, however, there were alterations in individual musician participation for four of the 36 evenings primarily due to weather related problems.

Data was again gathered by counting occurrences of incidents from the Aggressive Bx Log from a period two weeks pre and post intervention and the intervention term of six weeks. The music delivery again was 18:30-2000, with data gathered for the hours of 1830-0630. Between Phase I and II, hospital revision of Aggressive Behavior categories and codes occurred and significantly changed how incidents would be documented. The revised categories and codes indicated more specifically the type of aggressive behavior, escalated or decreased aggression

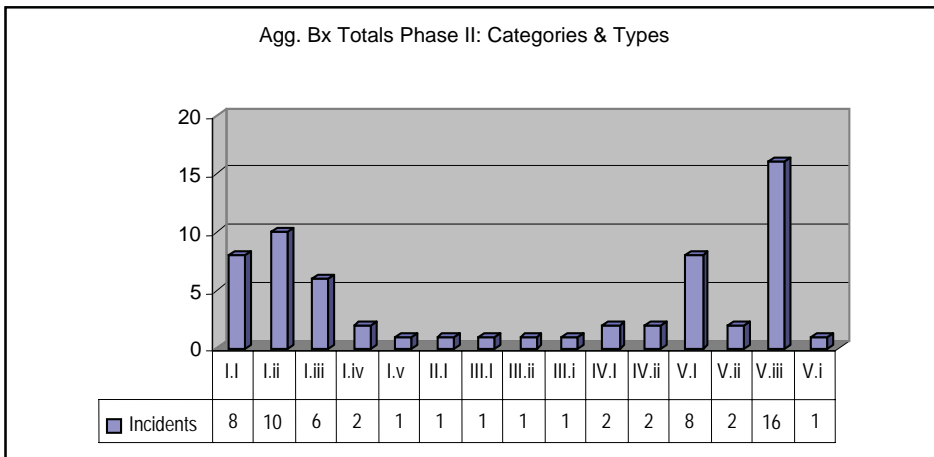


Table 4 Agg. Bx Totals - Phase II

and all the interventions used during the incident period. In other words, the Aggressive Bx log not only provides a count of incidents (each incident is logged only once) it also documents the codes as determined by the intensity of the aggression. Therefore, the number of logged incidents is NOT equal to the number of codes which is often much greater. Table 4 provides ONLY the Categories and Codes for logged incidents for the entire 10 weeks. The average weekly unit census was 118 across the 10 week period of Phase II. There was a total 43 different patients during this time. The data also revealed that all 18 logged incidents for the 10 week period can be attributed to eight male patients. Table 5 show by categories and codes the logged incidents during the intervention evenings.

**Insights and Competing Events Impacting State of the Unit: Integral Information**

Week one of the intervention began with two corridor locations per evening based on the design of the unit. Music was played for 45 minutes first on the short corridor then 45 minutes on the long one. Both locations were chosen

from two the five placements used for boom boxes and the two locations used for the live lullaby music as per Phase I. By the end of the second evening, it was clear that live instrumental music on the shorter corridor (A) was problematic. This was due in great part to the wall and ceiling configurations, the amount of glass, and angles of the unit structure. The location of musicians on the long corridor (B) was appropriate. The sound projected sufficiently from that area into the shorter corridor. Beginning the third evening, and for the remainder of the intervention, all music originated from the long corridor location.

A Code Red or “fire drill” interrupted the intervention on the third Sunday of the study. The milieu spent approximately 20 minutes at the end of the hallway awaiting the “all clear”. During this period vocal/acc music was used at the request of staff, in order to focus and calm the children. Such types of drills, as well as, major changes (e.g., holidays, seasonal weather alerts, etc.) in unit routine can also influence patient behavior. The traditional February “school break” which occurred February 17-21 meant a return

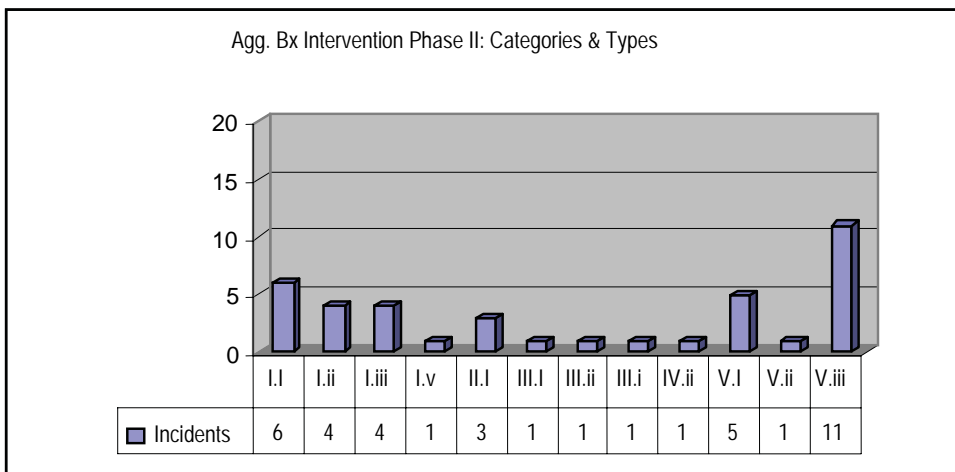
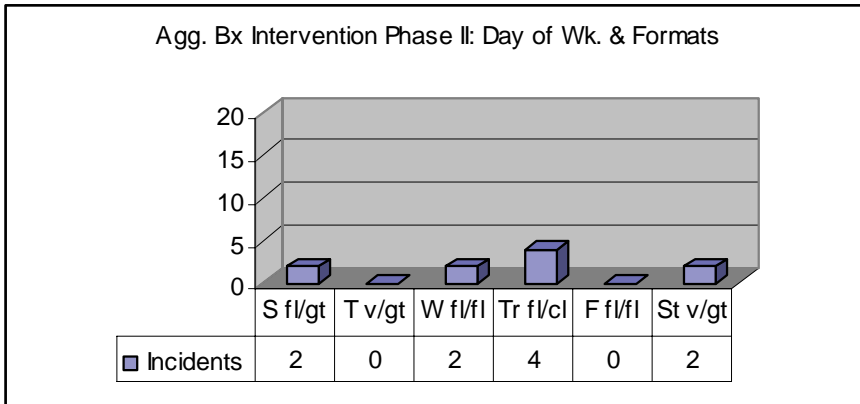


Table 5 Agg. Bx Intervention - Phase II



**Table 6** *Bx Log during Intervention by format*

to unit routine at the start of week four (live music). The only incident logged for weeks three and four occurred on this particular Sunday evening. Table 6 follows with the number of incidents logged during particular nights, providing more information about what impact particular formats of live music appeared to have.

Review of the instrumentation used on particular nights, suggests that the flute and clarinet duo could be considered less than useful for music intended to be a behavioral intervention. The impact of music delivered by the flute duos appears useful on Friday but Wednesdays not so. Flute and guitar duos also offer limited insight initially. A look at “day-of-the-week” and change of routine influence might be useful.

The two incidents logged on the evenings of the music played by the flute duos show logged incidents occurred one the first week during the two corridor approach and the last week of the intervention when a weather event forced an adjustment to personnel scheduling that evening. The two incidents logged on the evenings of the music played by the flute and guitar duo resulted one from the first week acoustical problems and the second from the evening of the Code Red. Tuesdays and Saturdays were the vocal with guitar or “lullaby” nights. The two

documented incidents for this instrumentation were both logged on the second Saturday of the intervention. Again it appears unclear what in particular may be attributed to the music and “day-of-the-week” issues might be useful to examine.

While it is true that the type of rhythmicity, found within the melodic and harmonic structure of classical music, can provide an entrainment and an unconscious sense of predictability, there remain frequencies that upset hypervigilant systems. Phase I findings suggested that nature sounds, or electronic unmetered music cannot provide the necessary sense of beat for the entrainment useful to feed and calm an anxious auditory system. Further, scanning for low frequencies is one of the responsibilities of the dorsal component of the vagal system for survival, thus, in the most alert of states, auditory filtering goes on for survival’s sake. The frequency organization of selected classical music may absorb intrusive low-frequencies of the ambient environment, in a sense transforming them.

There were identifiable problems with live music appearing to be related to the acoustical environment of this particular inpatient unit. Location of duos provided dissemination point for the music and determined, to a large extent the

dynamic levels and kind and amount of distortion particularly as overtones from specific instruments interacted with various surfaces and angles of the built environment. When location changes were made, changes in behavior patterns appeared to follow.

The question now seemed to be how to maximize the lessons learned from both Phase I & II. The next step was to design a study to investigate if both recorded classical and live vocal with guitar could be useful as interventions on particularly difficult nights of the week.

### **Phase III - Spiraling up to next State and Stage: Applying Integral Information**

This phase of the study was designed to incorporate the particular information gleaned from phases I & II. Information such as the relocation of sound sources, limitations of battery operated boomboxes and types or styles of music live and recorded informed the focus for investigation. This time there were two goals. One was to determine if both classical recorded and live vocal might be equally useful as an intervention for disruptive behaviors in the milieu around the bedtime hour. The second goal was to select a high incident night according to the Aggressive Bx Log and maintain the Tuesday night changing only the styles used both nights. The design time frame this time was six weeks of each intervention - live vocal with acoustic guitar accompaniment then six weeks of recorded classical. Data from the Aggressive Behavior Log was collected for a total of 16 weeks. The music during the 12 week intervention was provided only two nights: (1) the traditional Tuesday night; and (2) Friday night, since this evening historically shows more aggressive behavior incidents. The delivery of all music during was from the B location which was identified as optimal during Phase II.

The source for recorded classical music was the SAMONAS (Spectrally Activated Music of Optimal Natural Structure) library of CQ (concert

quality) CDs. These recordings are specifically engineered to be acoustically loyal to the environment in which they were recorded so as to retain the “live” integrity of the performance to the highest standard currently available in the industry. The recommended speaker system for playing this level of sound (two MSP5 Yamaha Monitor Speakers) was used throughout this Phase. Four Curtis Mathes portable CD programmable players (one for each disc CQ124, 104, 102 & 101) were employed in order to minimize transition time between discs and programming. The music therapist/project director operated and monitored the equipment for the entire study. CD tracks were chosen for the quieting potential and musical potential to “temporarily” downshift the motion of the unit during the 18:30-20:00 time frame.

Only instrumental recorded music was used. The music program was chosen through careful attention to the melodic, harmonic, rhythmic, and structural components of the selections as well as the instrumentation. Using such guidelines meant that the music was chosen to provide a dynamically quieting ambience with tempi relative to focused but calm heart rates shifting over the course of the evening to more resting heart rate selections. This was done, in order to alter the pace from a faster and louder environment to a quieter, calmer state. This is called entrainment which is a concept employed for influencing pace of movement or attending skills within an environment. The use of entrainment is at the heart of many well known psychological therapies including EMDR and DBT both of which have shown positive results with patients diagnosed with PTSD. Entrainment is a consistent underlying consideration for the music interventions used in all phases of this project.

The collection of data from the aggressive Behavior Log continued as the objective measure for Phase III. Tables 7 & 8 provide the graphic interpretation of the information from the Aggressive Bx Log collected from the pre, post

and two interventions periods of the study. The range of the census for the 16 week data gathering was 69-119 with an average of 114 patients per week. Incidents for entire phase can be attributed to 10 patients. The range of patient ages was from five to twelve years. Patient population by gender was 42 males and 15 females.

There were 17 logged incidents which included a total of 74 codes for the data collection period. During the evenings of the 12 week intervention there were five logged incidents with a total of 24 codes. Two incidents were recorded on the live music schedule one on each of the in-

tervention days (1 female & 1 male). These occurred during the sixth week of the vocal music intervention. The following week recorded music was introduced as the intervention and the first incident was logged on the start up night for recorded music. The next recorded incident was logged the following Tuesday and the third was not logged for the next 2.5 weeks (3 different male patients.) The project then continued for an additional two weeks with no incidents logged for either of the recorded music intervention evenings. The five logged incidents were attributed to five different patients, one female and four males ages seven to eleven.

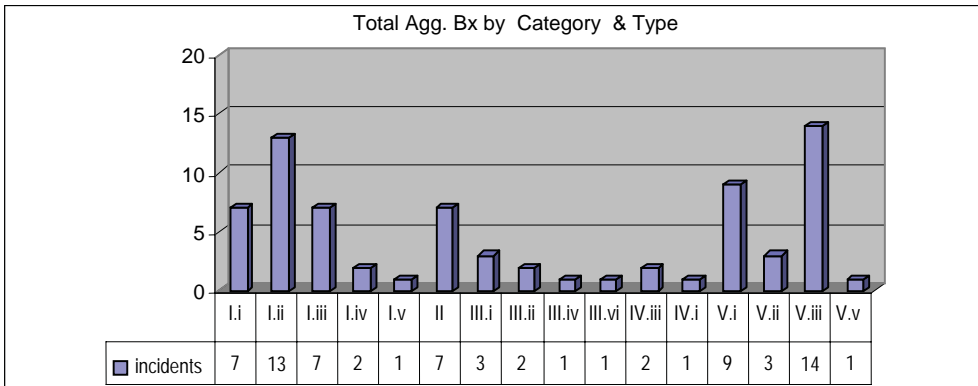


Table 7 Bx Log totals for Phase III

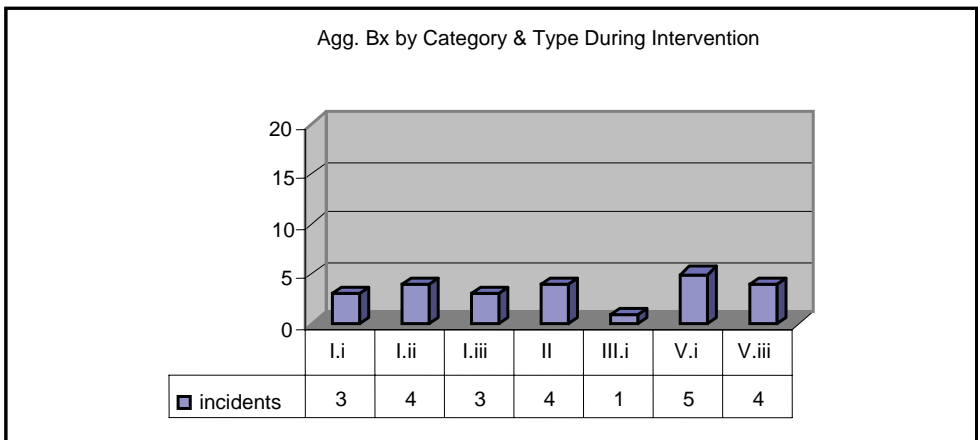


Table 8 Bx Log during Intervention

An interesting sidebar is that the Tuesday evening following the close of the interventions, the lullaby schedule was resumed as per unit program. There were two logged incidents on that particular evening. A serious consideration may have to be taken related to consistency in programming. The fact that, during the study, when the intervention changed from live to recorded music logged incidents rose, then settled then rose again when the recorded music was stopped and live resumed. The six week length of inter-

vention perhaps provided a stable enough pattern in on those particular evenings and when a changed occurred it was enough to be perceived as instability in the general environment.

Traffic patterns were also observed during this phase as per recommendations from Phase II. There appeared to be peaks and lulls in aggressive behaviors during the 18:30-20:00 period appearing as dependent upon the flow of scheduled activity on the unit. Some noticeable

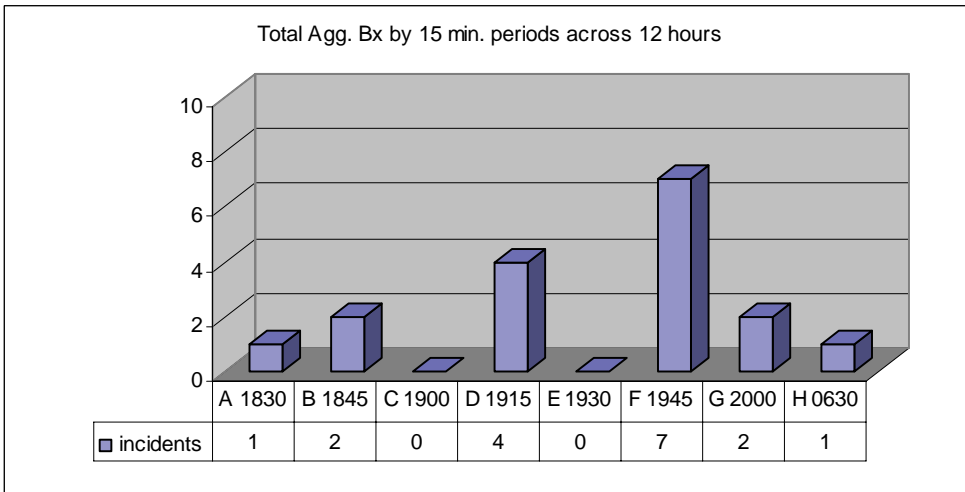


Table 9 Total Bx logged across 12 hours @ 15 min. intervals

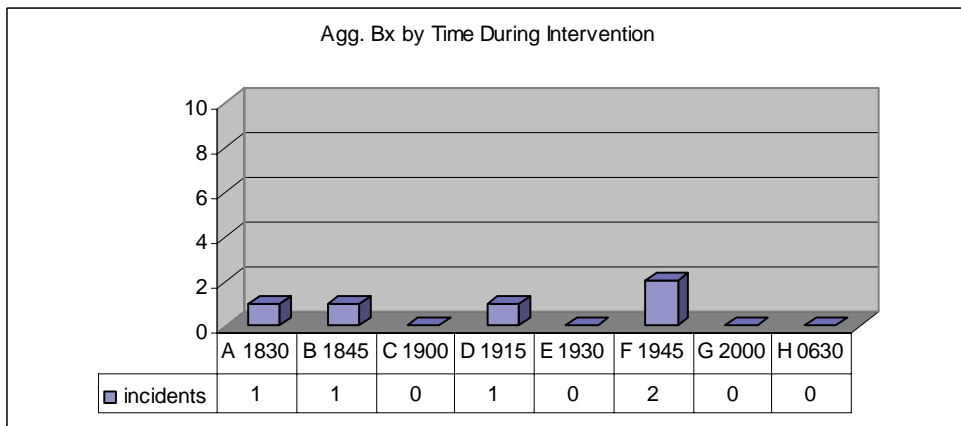


Table 10 Intervention Bx logged across 12 hours @ 15 min. intervals

examples of spikes in aggressive behavior were around the end of visiting time, snack time, “store” (behavioral reward time), ventilation fans kicking in, and med rounds. Tables 9 & 10 provide a view of the data by 15 minute intervals. Multiple transitions in a confined time period may be problematic within the milieu when one or two patients struggle.

### **Additional Insights & How this is Integral**

Over stimulation of the human auditory system can negatively impact treatment in health care settings. Given the anatomical, biological, psychological, emotional, historical and social network of the vagal nerve, the human auditory system is defined as the entire body. And this system has a definitive memory that includes but is not exclusive to the brain. Keeping in mind that the whole is greater than the sum of the parts, this further implies a field beyond the individual body and that includes the immediate environment both built and natural. Field can be defined as the inclusion of all components internal and external, immediate and past, subjective and objective animate and inanimate – and now the discussion approaches the spiritual dimension. For ultimately the principals of Allostasis, Homeostasis, wellness, illness all rest upon perception.

The hospitalized individual perceives levels of treatment, including peripheral enhancements and annoyances, at both conscious and unconscious levels. Providers do the same. Further, when enhancements or annoyances are identified these are often obvious components such as meal quality, lighting, temperature, and of course specific pain and/or injury resulting in hospitalization in the first place. Treatment success for acute care facilities often means “get them in and get them stabilized and move them out.” If time is money and money drives the industry then an Integral platform is likely a cost benefit. For over the decades greater numbers of healthcare environments have demonstrated

increased patient satisfaction leading to shorter hospital stays and decreased drain on resources. These facilities, however, are not the mainstream nor are they as fully functional as possible.

Health and well being are perceptions. Perceptions are individual and can only be so. That being the case no perception is invalid. This is a significant understanding when working from an Integral perspective. Whether physician, patient, nurse, dietician, psych tech, administrator, family member, maintenance, visitor, taxpayer, clergy, passerby, and potential “others” all perceive progress of treatment, based on their personal experience. But the patient’s perception of his/her own treatment is a major responsibility both to him/herself as well as those attending. The conscious awareness of the self and it’s presence in the process is both a philosophical position and a practical position. Empowering all persons involved, in order to maximizing treatment, requires two particular efforts. The first effort is acknowledging the best of what each person can bring to the treatment; and the second is trusting that acknowledgement. Both efforts involve trust or surrender as well as presence in the moment, with each event and person throughout the treatment process.

Iatrogenesis is an old word receiving increasing renewed interest. It is defined as: Iatrogenic—an adverse effect caused by a physician’s actions, including reactions from prescribed drugs or from medical procedures: A state of ill health caused by treatment, usually due to mistakes made in treatment. The word literally means “caused by a doctor”, though such conditions can be the fault of therapists, pharmacists, staff, nurses, clinicians and others as well. In his provocative book of essays, *The Iatrogenics Handbook*, (1983) Robert F. Morgan, MD, provided a forum for a critical look at research and practice in the “Helping Professions.” He defined his theme for this anthology this way: “. . . iatrogenic behavior refers to those incidents where the cure is worse than the disease, where

(often) well intentioned helpers create substantial problems for themselves or others through helping.”

Interest is increasing for recognizing a patient’s role in healing and contributing roles for health-care in supportive environments for healing. All players - patients and providers and all settings dimensions – physical structure to sensory experiences within it, ought to assist decreasing stressful or traumatic experiences in the health-care setting and thus thwart contributions to individual allostatic load. Holistic examination of healthcare environments are on the increase particularly related to life supportive or life diminishing aspects. But sooner or later someone asks if all this “noticing” and philosophizing will decrease costs or increase them – their ultimate question is “Does this leads to a black or red “bottom line?” A reframe of this question is “Who will step forward and be responsible for the examination of a patient’s care then provide a cost analysis in terms of that particular human’s life?” This is an Integral Question pushing against Iatrogenic behavior.

In terms of the studies presented in this paper and the ongoing work at Acadia Hospital, there is evidence of integrated/Integral thinking and action. For most people, the effect of auditory stimulation is an unconscious experience, but on 3 North it continues to evolve as conscious choice and option for treatment individually and collectively; for patients, providers, and for families and visitors as well., both The project phases have raised consciousness awareness of auditory over stimulation and impact of ambient sound on patient behaviors. In this one particular hospital setting, for one small population and their staff, the musics and the availability of music is providing positive moments of respite, diversion and focused activity as the use of the evening music programming continues. Even though the information in this paper may appear inconclusive or illusive, it is part of a larger “whole environment” proposing to pro-

vide a safe and environment for stabilizing and re-orienting patients in need of acute psychiatric care.

This paper began with an image of getting children to bed – the tucking in, reading stories, singing a lullaby and turning out the lights. Certainly a romantic notion of sleepy children snuggling under the covers and moving on to dream land. Staff on 3 North often do read stories at bedside and sometimes kids will ask to be tucked in. But on that “certain” night often kids and even staff will ask for specific songs or recordings and then at 8 PM, when the lights are turned down for the night, and phones are put on call light, the children one by one close their eyes and surrender to the stillness – their stillness.

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