QUIET PLEASE IT'S A HOSPITAL

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ABSTRACT: Traditionally one would expect a hospital to be a quiet place in which to work with no risk of noise induced hearing loss. This study examines common noise sources in 32 hospitals around NSW. The noise sources are grouped according to function and section to determine average noise levels, their range and standard deviation. Due to the newly introduced measure for peak noise, peak noise levels were also measured, even though the 140dB peak limit was not expected to be exceeded. Results show that a hospital is not necessarily quiet and that a significant number of noisy jobs exist, particularly in the carpentry, engineering and gardening sections.

1. INTRODUCTION

Over recent years many claims for noise induced hearing loss have been made against the workers compensation system. In 1997 WorkCover NSW paid out $70,682,000. Persons whose occupation was not traditionally considered "noisy" have brought many of these claims. One such area was hospital employees. Therefore it was decided to carry out a systematic study of the types and levels of noise present in hospitals as these would normally be considered a 'quiet' environment.

In NSW the Occupational Health and Safety (Noise) Regulation 1996[1] regulates exposure to noise, it declares a workplace "..unsafe and a risk to health if any person is exposed there to noise levels:

(a) that exceed an 8-hour noise level equivalent of 85 dB(A); or

(b) that peak at more than 140 dB(lin)."

The regulation is complemented by the Code of Practice[2] which explains methods for noise management available to enable conformance with the regulation.

This study assesses the likelihood of noise levels above these criteria being present but does not assess the time of exposure, as this will vary enormously from person to person and from day to day.

2. METHODOLOGY

To establish the likely exposure of hospital employees, an effort was made to target this section of the work and also to go back through old reports to extract data available from WorkCover files [3]. New sites were also visited during the year as time permitted. Hospitals visited were limited to NSW and ranged from large metropolitan to small country hospitals. All results were extracted, pooled and then categorized according to function and occupation. All measurements were carried out using class 1 or class 2 integrating sound level meters or personal sound exposure meters in accordance with AS 1269 and the noise regulation current at the time of the test. Analysis was carried out using Lotus 123 and the statistical functions available therein. At the conclusion a search of noise information was carried out and extracted data compared with this study.

3. RESULTS

A compilation of every result available was made with readings for $L_{Aeq,T}$ and peak. These were ordered and separated into functional areas to enable comparison. Each area was analyzed and graphically represented. For comparison, data from the Canadian CCINFO [4] studies were downloaded and presented. By the conclusion of the study, 632 measurements were compiled from 32 hospitals throughout NSW and 122 results from the CCINFO database were analysed.

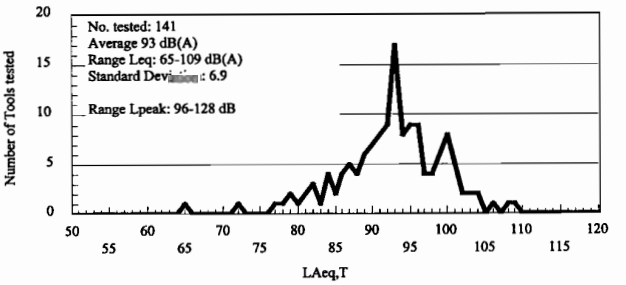

Figure 1. Distribution of noise levels for carpenters.

From the example of results shown in Fig.1, it is interesting to note the large number of tools and equipment used which generate noise levels above 85 dB(A) and the dominance of noise sources with levels above 93 dB(A). Using the equal energy principle (3 dB exchange rate) and assuming a 94dB(A) noise level from tools, a carpenter's allowable daily noise exposure of 85dB(A) would be exceeded in only 1 hour of work with these tools. As one hour of tool work could not be considered unusual in an 8 hour day, it is important that a specific 'safe system of work' is implemented in such areas.

Results in the form of Fig 1 and Table 1 were compiled for each area. Due to space limitations of this article, all the data relating to the measurements is available from the authors as an addendum. This addendum of 8 pages provides the above information for each occupational group shown in Table 2.

A further analysis for other sections of the hospitals is summarized below in Table 2. This shows that the carpentry, engineering and gardening sections all have a propensity to exceed statutory limits depending on length of operation. The range of noisy equipment should also be considered as well as the peak measurements. For example, the medical and auxiliary range was 58-96dB demonstrating the diversity of

Table 1. Noise levels for carpenters in hospitals.

Tool	High $L_{Aeq,T}$	Low $L_{Aeq,T}$	Average $L_{Aeq,T}$	SD	Number tested	Peak high	Peak low
Compressed air nozzle	106		*	*	1	120	
Compressor	85	82	*	*	2	100	
Drill	104	88	*	*	2	119	102
Fan	72	65	*	*	2		
Jointer	92	78	85	*	3	127	109
Key cutter	91		*	*	1		
Laminex trimmer	88		*	*	1	103	
Linisher	89	82	*	*	2	105	
Nail gun	94		*	*	1	128	
Planer	100	88	94	3.5	11	122	105
Router	104	81	95	5.3	19	118	100
Sander	98	77	88	5.7	16	112	96
Saw	109	80	94	5.9	69	128	101
Spindle	93	79	87	*	3	115	112
Thicknesser	99	85	92	5.2	8	117	100

* = insufficient data

functions from the dialysis machine to a compressed air nozzle and bone and plaster cutting saws. No peak measurement approaching 140dB was measured.

To benchmark the data to other work, a brief search of literature revealed a Canadian [4] study. The results of this are compared with the present NSW case. The agreement is good with divergence explained primarily by sample size. However, in the case of 'Medical', the sample source differed. The Canadian Study concentrated on laboratory technicians only, whereas this study examined all medical areas from bone cutting and plaster saws to dialysis machines.

4. CONCLUSIONS

Although one would expect a hospital to be a quiet place of work with no risk of noise induced hearing loss, this is not the case. This compilation of 632 noise level measurements in hospitals shows a different picture. The carpentry, engineering and gardening sections all exhibit areas of high noise exposure. Interestingly a significant number of contested hearing loss claims originate from the laundry, kitchen and cleaning areas. These areas were found not to be excessively noisy.

Of the 632 noise level measurements taken 286 were above 85 dB(A), 118 were above 95 dB(A) and 47 were above 100 dB(A). All these have a propensity to produce noise injury and the old road sign "Quiet Please - Hospital" takes on a meaning not originally intended.

Full results of all defined areas and equipment types are available separately from the authors.

REFERENCES

[1] WorkCover NSW "NSW Occupational Health & Safety (Noise) Regulations" (1996).

[2] WorkCover NSW "Code of practice for the management of noise at work " May (1996).

[3] WorkCover NSW internal reports and surveys.

[4] Canadian Centre for Occupational Health and Safety "CCINFO DISK": Nova Scotia Hearing & Speech Clinic (1995); New Brunswick OH&S Commission (1981)

Table 2. Comparison of noise levels in different areas of hospitals and between NSW and Canadian results.

Occupation	NSW Hospitals 1997-98				Nova Scotia Hearing & Speech Clinic 1995 New Brunswick OH&S Commission 1981[4]		
	No. tested	Range $L_{eq,T}$ dB(A)	Average $L_{eq,T}$ dB(A)	Range peak dB(lin)	No. tested	Range $L_{eq,T}$ dB(A)	Average $L_{eq,T}$ dB(A)
Carpenter	141	65 - 109	93	96-128	3	91 – 97	95
Cleaner	70	63 - 90	76	76-105	7	74 – 94	79
Kitchen	72	68 - 95	80	83-127	17	70 – 94	79
Printer	4	76 - 91	82	100-120	10	65 – 96	82
Medical	78	58 - 96	74	90-121	61	58 – 88	69
Engineer	189	64 - 110	88	-	17	75 – 107	87
Gardener	66	79 - 104	91	81-111	3	92 – 100	95
Laundry	12	64 - 83	75	-	4	68 – 82	76
TOTAL	**632**				**122**		