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## PHD BY PUBLICATION

### The safety and effectiveness of interventions for aggression in mental health nursing

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THE SAFETY AND EFFECTIVENESS  
OF INTERVENTIONS FOR  
AGGRESSION IN  
MENTAL HEALTH NURSING

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**A thesis submitted in partial fulfilment  
of the University's requirements  
for the Degree of Doctor of Philosophy**

March 2009

Coventry University

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## **Abstract**

This document presents five published journal articles all of which investigate the safety and effectiveness of interventions for aggression in mental health nursing.

Early work focuses upon studies of the safety and effectiveness of interventions in the clinical setting.

In the first article the research project examined the safety and effectiveness of a course of training in 'control and restraint' (C&R) at a medium secure mental health unit. Mixed findings are reported, with some aspects of the study showing an increase in injuries whilst the overall outcome showed no significant change. The second article reports the pattern of incidents, and staff interventions, over a three year period in a different medium secure unit. A low threshold of reporting was encouraged and substantial numbers of incidents are described.

Later work narrows the focus of the study onto a specific area of the safety of physical interventions for aggression: sudden death related to restraint.

A published review of the literature on 'positional asphyxia' is presented, discussing the key literature and developing the concept of 'positional asphyxia.' Two research publications are also presented. In the first article the effect of body position on the rate of recovery from exercise is studied using pulse oximetry as a proxy measure of respiration. Equivocal results are reported. The second study shows a development of the methodology, following a similar design but using computer assisted pneumotachography to provide direct measurement of lung function. A clear pattern is demonstrated showing significant changes in lung function in prone restraint positions where the participant is flexed and/or body weight is applied.

The development of the concept of positional asphyxia and the contribution of the articles, academic and professional, is discussed. It is suggested that positional asphyxia should be viewed as one factor in a multi-factorial model of risk.

The body of work is presented as having clear implications for practice. Early work examining the pattern of incidents in clinical settings has relevance to staff training, particularly in terms of a clearer understanding of the potential risks which need to be addressed by training. Later work has considerable implication for both policy and training by identifying those restraint positions which present less risk to the restrained person.

Directions for future research are discussed.

# Overview

This is a portfolio consisting of five published outputs:

## Output One

Parkes, J. (1996) 'Control and Restraint Training: A Study of Its Effectiveness in a Medium Secure Psychiatric Unit.' *Journal of Forensic Psychiatry*. 7(3) 525-534.

Reports a prospective, before and after, study of the effectiveness of an aggression management training programme for the staff of a medium secure mental health unit.

## Output 2

Parkes, J. (2003) 'The Nature And Management Of Aggressive Incidents In A Medium Secure Unit.' *Medicine Science & The Law* 43(1) 69-74

This is a prospective study of the management of aggression in a secure mental health facility, conducted over a period of 3 years and reporting 1799 untoward incidents during that period.

## Output 3

Parkes, J. (2002) 'A Review Of The Literature On Positional Asphyxia As A Possible Cause Of Sudden Death During Restraint.' *British Journal Of Forensic Practice*. 4(1) 24-30

A review of the literature on 'positional asphyxia' as a potential cause of the death associated with restraint.

## Output 4

Parkes, J. (2000) 'Sudden Death During Restraint: A Study to Measure The Effect Of Restraint Positions On The Rate Of Recovery From Exercise.' *Medicine Science & The Law*. 40(1) 39-44

This is a laboratory study using pulse oximetry to measure the effect of restraint position on the rate of recovery from exercise.

## Output 5

Parkes, J. & Carson, R. (2008) 'Sudden Death During Restraint: Do Some Positions Affect Lung Function.' *Medicine, Science and the Law* 48(2) 137-41

This is a laboratory study using computer assisted pneumotachography to measure the effect of restraint positions on lung function, to measure lung function.

Violence and aggression is a frequent and significant experience for those working or residing within mental health facilities. Particularly those specialist facilities identified as having particular responsibility for the care of mentally disordered persons who offend or who present with challenging behaviour will have admission criteria which tend to concentrate potentially aggressive people within those facilities and high levels of aggressive incidents may result.

Traditionally aggression has been understood in terms of internal aggressive tendencies of the individual (Berkowitz 1992) or in terms of the additional pressures towards aggression that may result from mental disorder (Swanson Et.Al. 1990; Link Et.Al. 1992). Clearly if individuals demonstrating aggressive tendencies and also experiencing mental disorders which may increase aggression are selectively admitted to, and concentrated in, some mental health services, then the potential for aggression is greatly increased. However, the influence of situation and particularly interactions between aggressor and target of aggression are also of significance. Mental health nurses, particularly those employed in specialist services, can be argued to have dual role which includes custody as well as therapy (Burrow 1993; Burrow 1998). This dual role may necessitate interactions with patients which give rise to frustration or aversive experiences for the patient, for example preventing a patient from leaving the ward or obliging them to take medication which they would prefer to refuse (Whittington & Wykes 1996). Here an interactional perspective implies that the nurse's role, over and above any aggressive disposition exhibited by the patient, increases the frequency with which nurses may encounter aggression directed at themselves, or may be obliged to intervene in aggressive incidents which are initially unrelated to themselves. Predictably the level of aggressive behaviour encountered by mental health nurses is high, both in comparison with other occupations and in comparison with other occupational groups within health care (National Audit Office 2003).

The above academic argument is entirely consistent with the author's personal experience as a mental health nurse working in specialist services. Nursing staff encountered substantial levels of aggression as a normal part of their daily work and were obliged to actively seek out and attend to aggression in which they were not initially involved. The management of aggression was a significant issue.

Manual restraint of aggressive patients is utilised at a high frequency as a response to such incidents. Several studies have reported on the incidence of manual restraint in medium secure facilities. For example, Gudjonson Et.Al. (2000) analyse records of 2174 incidents over a 16 year period, 1457 (67%) of which resulted in restraint whilst Legget & Silvester (2003) report 557 incidents of manual restraint over a four year period. It will be argued later that even such high levels of violence and restraint may be an under reporting of the actual number of these incidents.

At the commencement of the author's career, formal training, let alone evidence based practice, in the management of aggression was rare. Simple guidance on the law was offered by the Department of Health and Social Security (1976). Formal training was not offered and staff learnt basic skills by modelling the actions of more experienced colleagues.

This approach was subsequently deemed unacceptable. The most compelling argument here was the statutory requirement to provide training imposed by the Health and Safety at Work Act (1974). However an additional impetus was provided by an inquiry into the death of a patient at Broadmoor high security hospital whilst the patient was being restrained. Staff at a specialist service caring for large numbers of potentially violent patients were found to have received no formal training in restraint and had subsequently engaged in unsafe practices which had been followed by the death of a patient (Ritchie 1985). Both this inquiry and a subsequent



government report (Health Services Advisory Committee 1987) recommended formal training for appropriate staff as a matter of urgency. It should be noted here that although formal study of death during restraint only occurred at a later point in time, at least in the UK (Parkes 2002), it is was the death of a patient associated with restraint which lead to public interest and impetus for change.

However, even at an early point objections were raised to the nature of the training being offered. The courses provided at the high security hospitals, starting with Broadmoor hospital but then spreading to Ashworth and Rampton hospitals, were essentially the ‘Control and Restraint’ procedures developed by the prison service. Only minor amendments, for example omission of shield training, distinguished health service training from that of the prison service. Although these concerns were emerging in the early 1990s (Tarbuck 1992; Hopton 1995), it may be argued that both of these objections have gathered support in succeeding years (Wright 1999). Increasing criticism of the use of pain compliance has eventually resulted in state guidance (Department of Health 2008) that such techniques should only be used in emergencies, effectively precluding their routine use in the management of patient aggression. Equally the argument that health and safety at work requires the provision of training to staff appears to have become generally accepted and such training is now regarded as ‘mandatory’ by most employers (NHS Security Management Service 2005).

It was at this early point that the author developed an interest in the study of this field. The author was employed in a specialist role at a medium secure unit which intended to implement formal aggression training for staff. Considerable debate had occurred before permission was granted by the health authority and this permission was contingent on the training being formally evaluated. The author acted as a key member of the steering group responsible for the training course and was tasked with carrying out the formal evaluation. This three year project

forms the basis for output one: Parkes (1996), "Control and Restraint Training: A Study of it's Effectiveness in a Medium Secure Psychiatric Unit."

It should be stated here that much of the author's subsequent work focuses upon physical interventions for aggression. It should not be assumed that this implies an undue emphasis on physical interventions as a primary means of managing aggression. Indeed it is clear that not only in health settings, but even in more robust settings such as police or prison procedures, non-touch interventions should form the primary response to potentially aggressive situations. It can be suggested that a range of responses are required to effectively manage aggression, particularly in services which have a specialist role in so doing. Environmental preventive measures such as the provision of facilities for activity, reduction of overcrowding, unhindered observation of emerging problems and the provision of leadership for staff and patients are known to be important (Whittington 2000; Bowers Et.Al. 2006). Where aggression still emerges then interpersonal and interactional skills will be crucial to prevent physical violence, particularly in combination with physical skills for use as a last resort (Philips and Rudestam 1995). However, although such measures may substantially reduce violence it is unlikely that they will entirely eliminate the need for physical interventions and there is no evidence that they have done so. It has been repeatedly noted, over a prolonged time period, that physical interventions for violence have an unusually poor evidence base (Special Hospitals Services Authority 1993; Royal College of Psychiatrists 1995; Wright Et.Al. 2002; National Institute of Health and Clinical Excellence (NICE) 2005; Richter et.al. 2006). It can be argued that physical interventions are pervasive, potentially of serious impact to all those involved and demand more evidence to support their evaluation and development. It was therefore the study of physical interventions which increasingly became the focus of the author's research.

This portfolio also demonstrates a further progression and focussing of the area of interest. Early work shows a broad approach, examining the safety of staff and patients but also more general aspects of physical interventions such as patterns of use and perceptions of effectiveness in managing incidents. Later work, and indeed the author's current research, focuses more narrowly on patient safety and indeed a specific aspect of patient safety, sudden death during restraint. It is suggested here that this demonstrates a development of the theme, where the narrowing of the focus allows greater depth of scholarship and enhanced prospects of providing a novel contribution to a highly specialised field. However the work continues to address the overall theme of developing empirical evidence in relation to the safety and effectiveness of physical interventions for aggression in mental health settings.

## **Output One: Parkes (1996)**

'Control and Restraint Training: A Study of It's Effectiveness in a Medium Secure Psychiatric Unit.'

*Journal of Forensic Psychiatry.* 7(3) 525-534.

This is a before and after study of the effectiveness of 'Control and Restraint' training in a medium secure mental health unit.

## **Background to the Study**

This study was conducted at a 56 bedded medium secure mental health unit.

Prior to the project no formal training in the management of violence and aggression had been provided to staff within this service. Argument was raised by staff representatives that an identifiable risk to health and safety existed and the provision of training was a legal requirement of the Health and Safety at Work Act (1974). Resistance to this proposition emerged from senior nurses, arguing that the training available at that time, control and restraint (C&R), originated from the prison service, involved pain compliance holds and was therefore inappropriate to a health care environment. As previously noted, these concerns were echoed in the literature (Tarbuck 1992; Hopton 1995)

At the commencement of this project the argument of health and safety of staff prevailed and the provision of training was authorised by the trust board. However, concern remained and the trust board also required that the project be formally evaluated.

This research study is the result of this requirement for formal evaluation.

## **The Training Project**

The author was directly involved in the training project from its' earliest conception, drawing up a case of need to the trust board, briefing managers and acting as a champion for the project. The chief psychologist of the trust was tasked with oversight of the evaluation and was responsible for liaising with the author, monitoring the evaluation and communicating back to the trust board.

The author participated as the senior nursing member of a steering group which developed plans for the training programme, initiated and participated in recruitment and selection of an experienced instructor and had oversight of the project to train staff, including the challenging issue of staff release and replacement from the clinical environment to attend the training. A venue in a disused area of a large mental hospital was identified and adapted for the course under the direction of the author and subsequently in partnership with the recently employed instructor.

The training course was conducted over five days. Non-touch ('de-escalation') measures, 'break-away' techniques and the use of a team of staff to restrain a resistive person were all taught. Use of protective equipment (shields, helmets etc) to manage incidents involving weapons was not taught. General theory, for example theories of aggression, were not taught and the orientation of the course was practical. All nursing and occupational therapy staff employed at the medium secure unit received this 5 day course. Training of all staff involved continuous, consecutive courses for a period of six months. Subsequently refresher training was provided on a basis of two days training every year and shorter courses, covering only non-touch and break away techniques were provided to other staff such as doctors, psychologists, domestic staff etc.

## **Design of the Study**

The intention of the study was to provide objective evidence of the safety and effectiveness of the techniques taught on the course. Three related hypotheses were identified:

1. After training, the frequency of staff injuries will be lower than before training.
2. After training, the frequency of patient injuries will be lower than before training.
3. After training, staff confidence in the safety and effectiveness of their restraint techniques would be higher than before training.

At this point it was assumed that ‘safety and effectiveness of the course’ would be equivalent to ‘safety and effectiveness of the techniques taught on the course.’ This was based upon an assumption that whatever was taught would then be used by the staff. Clearly if the staff attended the course, then did not carry out the techniques we would be evaluating the course, but could not evaluate any techniques which the staff did not put into practice. This potential limitation of the study was not identified prior to commencement, but became apparent subsequently. In terms of conclusions drawn from the study this issue would become an important lesson learned.

The author decided to conduct a before and after study. In discussion with the steering group it was apparent that a control condition would improve the study. The author was aware of one unpublished study which had used a control group, training only half of the staff group. However, with only one establishment available in which to conduct the study an obvious

confounding factor was apparent. If only half of our staff were to be trained – perhaps an immediate training group compared with waiting list group – then we would be unable to ensure that the staff who were trained in the new and apparently more effective techniques would not be used differentially, either in more incidents or at more difficult incidents. It could be argued that if staff with the new training were placed in greater risk then the results would be distorted in showing the trained staff as experiencing more injuries than the untrained staff, even if the training was safer and more effective.

For this reason the author made two decisions regarding the design of the study. Firstly, we would not attempt to compare groups of trained and untrained staff. Secondly, data would be gathered before the training and after the training but not during the period when training was in progress and only some staff were trained. An additional argument for excluding events whilst only some staff were trained was one of definitions. If a team of four staff, two of whom were trained and two of whom were untrained, restrained a patient then it would be unclear as to whether this should be considered part of the ‘before training’ or ‘after training’ data. By invoking a policy of excluding the period of partial training, the definition of ‘before and after’ was made very clear.

In order to obtain detailed and accurate information it was decided to conduct the study prospectively, approaching staff involved in an incident as rapidly as practical after the incident and completing a standardised form. No retrospective use was made of existing hospital records.

The author was aware of two common difficulties in studying aggression in healthcare settings: defining what constituted an ‘incident’ and the risk of under reporting. Since this was a study of the effectiveness of restraint techniques it was decided to define an ‘incident’ as

being any occasion when a patient was restrained. Data would not be gathered on, for example, an occurrence of verbal aggression in which a patient threatened a member of staff but was not subsequently restrained. On reflection this had the advantage of providing a precise and reliable definition of when data should be gathered and reduced the risk of under reporting, but also excluded many incidents which might be described as near misses. The substantial extent of this supplementary area of investigation is clearly demonstrated in the second study in this portfolio (Parkes 2003). The risk of under reporting was addressed by using a prospective and pro-active approach. The author would actively identify incidents to follow up either by being physically present or by seeking them out in handover or nursing notes the during next shift. Staff would be actively approached by the author, who would utilise the consistent definition of an incident. It might be argued that incidents might still occur which were not mentioned in any way. However, the author's experience of the culture of the unit was that it was very unlikely that staff would not make any kind of record of occurrences where a patient was restrained due to their concerns regarding potential complaints or litigation. The intent to reduce under reporting also formed another justification for only investigating incidents involving restraint: these incidents appeared to be more consistently recorded, whilst incidents which involved no physical intervention were rather more inconsistent in terms of recording. It is argued here that although this approach could not be proven to have completely eliminated under reporting it did substantially reduce this potential confounding factor.

The author identified a concern that the usual pattern of events in dealing with a incident of restraint might lead to conflicting results at different points in the incident. For example the restraint might be highly effective in holding a patient still but very poor when it came to moving them. This would result in two conflicting effects which might counter each other and weaken the results. The author made a decision to gather information by using a four stage model of an incident:



**Incident**

A patient attempts to strike another person, attempts to injure themselves or attempts to abscond. This is the immediate event which precipitates the staff response. If the event is a physical attack on staff, eg. the patient attempts to punch the nurse, then the outcome of any defensive 'break away' measure is recorded here.

**Restraint**

In this stage a team of staff restrain the patient, usually taking them to the floor and attempting to render the patient immobile or at least unable to carry out any harmful acts to themselves or others.

**Movement**

The patient is moved, with or without their cooperation to a safer location. This may be a very short distance, for example from the middle of a room to a sofa. It may also be a longer move, for example from a public area to a bedroom or seclusion room. It may also be a distance of many hundreds of metres, for example from a therapy area or sports field back to a ward

**Intervention**

This is the phase where staff attempt to apply interventions to calm the patient and end the altercation. This often verbal interventions but can also include medication by mouth or injection and also seclusion.

The use of this four stage model was subsequently justified by the results of the study, with clear differences being shown between the different stages.

## Conduct of the Study

Data was collected from all incidents involving restraint which occurred over a non-continuous 30 month period. This was approximately 18 months before the training programme and 12 months after the training programme. This apparent inconsistency is accounted for by a delay in commencing the training which caused data collection, in effect, to commence too early. The stated intention of the study was to compare all incidents for one year before the training with all incidents for one year after the training.

Following an incident the author would attempt to identify if the events suggested a key individual to approach. In many incidents this was not the case, a group of staff had been collectively involved. However in many incidents a specific member of staff had been involved from the outset, perhaps observing a patient engaged in some untoward behaviour or being subject to some form of aggression, with or without precipitating interventions from the staff member. At a later point other staff may have become involved, but this was a key member of staff who had been present from the outset. If a key person could be identified the author would approach that person, even if this person was not immediately available<sup>1</sup>. It was considered that the advantages of approaching the key person outweighed the disadvantages of increased delay might have in terms of accurate recall.

In total the author approached and interviewed staff following **347 incidents** over a **three year** time period.

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<sup>1</sup> On two occasions this 'key person' was the target of serious assault which resulted in long term sickness, and in one of these cases the staff member never returned to work. In these two cases the next best staff member was identified and interviewed.

## **Discussion of Results**

The results are, of course, reported and discussed in the original journal article. However it is also possible to further discuss the results in the light of subsequent experience and literature.

The results of this study have been widely reported but often misreported. Analysis of the results overall showed a non-significant increase in the number of staff injuries. However, separate analysis of the four phases indicates a statistically significant increase in staff injuries during the restraint phase of the incidents.

Two important issues can be identified from this. Firstly, the use of a four stage model in the design of the study is considered to be justified: there was a substantial difference between the results overall and the results for specific phases. Secondly, it is noted that the analysis used is somewhat different from other studies. Data for one year immediately after the training is compared with an equivalent number of incidents immediately before the training. The analysis of injuries is based on like numbers of incidents before and after. The levels of injuries are therefore analysed on the basis of injuries per incident of restraint and not injuries per year. It is suggested that this is an important distinction. Highly effective non-touch techniques might result in a reduction in the number of incidents, and therefore the number of injuries, without the restraint techniques being any more effective than those used before the training. Analysis in terms of injuries per incident eliminates this confounding factor and allows conclusions to be drawn about the effectiveness of the restraint techniques alone. This is both a strength and a weakness of this study. The strength is that this study may have isolated the effectiveness of the restraint techniques, however it may also have failed to analyse and identify the effects of the non-touch techniques. Analysis of injury per incident was a deliberate choice. It was considered that analysis which incorporated the number of incidents which occurred in a fixed time period was flawed since the frequency of incidents could vary significantly due to patient admission

variables, independent of any effects of the training. For this reason the number of incidents per year before and after training was not analysed or reported in the original article. However, had the number of incidents per year been reported it was not, in fact, significantly different before and after training. The analysis of injuries per incident is unusual and may account for an atypical outcome from this study. Other studies of training courses demonstrate no significant change or reductions in injuries, but not increases (Wright Et.Al. 2002; NICE 2005; Richter et.al. 2006). Following the analysis above, this may be a result of other studies reporting injuries per time period, which would include effects caused by reducing the number of incidents, even where the physical restraint techniques, defined by injuries per incident, were no more effective.

In interpreting the apparent failure of the course to achieve substantial reductions in staff injuries a further issue was identified. It had been assumed that techniques taught on the course would be used by the staff in the real world. In that event, evaluation of outcomes on the wards would also constitute evaluation of the techniques taught. However, it became clear that whilst the restraint techniques taught on the course appeared to have been used, there was a striking lack of use of the defensive techniques, termed 'breakaways', which had been taught. There may be two explanations for this finding. Firstly, participants in such courses appear to have a limited ability to carry out the defensive techniques they have been taught, even when tested shortly after completion of the training (Taylor 1997). Secondly, the defensive techniques were predominantly responses to holds, grabs and strangles: forms of attack which occurred comparatively infrequently. The most common form of attack on staff, punches, had not received any training whatever. This failure to match training to the most likely forms of attack is also noted by Southcott Et.Al. (2002) (but not in Southcott & Howard 2007). An important lesson learned in the conduct of this study was that hypotheses must be carefully considered and defined. An evaluation of outcomes from a course is not an evaluation of the techniques

taught in the course unless those techniques are actually used. However, the study can be argued to be a valid evaluation of the course, since planning of a course of training should ensure that techniques are both retained by the trainees and are subsequently relevant to the work setting.

This publication reports a before and after study, evaluating a training project. It may be appropriate to discuss here the value and weaknesses of this research design. Clearly a before and after design carries with it the potential weakness that relevant confounding variables may not have been adequately controlled. For example, a before and after study may suggest that levels of staff injury have been significantly reduced following a programme of training. However, further analysis might show that staffing levels had increased, overcrowding had reduced, a new treatment had been adopted or patient mix had changed during the period of the study. It would remain open to argument that the observed change had occurred due to one of these confounding variables, not the intervention under evaluation. One review of the literature on aggression training summarises this:

"On considering pre-post designs without control groups it becomes increasingly difficult to exclude the possibility that the observed changes may be due to extraneous variables..." (Richter Et.Al. 2006: 214)

This view is clearly reflected in the hierarchies of evidence adopted by various authorities, with the 'Randomised, Controlled Trial' being considered the most convincing form of evidence from a single study (Muir-Gray 1997; NICE 2007; Higgins & Green 2008)

The practical difficulties of conducting a controlled trial in the operational circumstances has been discussed, and the decision to use a before and after design, is both discussed and justified

above. It should be noted that randomised controlled trials are rare in the context of aggression training, arguably as a result of the difficulties inherent in using such an approach in this setting. Richter Et.Al. (2006) identify 39 studies of aggression training courses conducted internationally, yet only one randomised controlled trial was identified, Needham (2004). Notably Needham's valuable enterprise in conducting a randomised controlled trial resulted in equivocal results, perhaps a reflection of the limited statistical power provided when using a cluster controlled trial design<sup>2</sup>. It is suggested here that the general principle that the randomised controlled trial is the most trusted form of evidence for medical research does not justify the exclusion of every other design, particularly in a highly specialist area of study. Writing in the context of public health research Petticrew (2003) considers the issue of why certain reviews of evidence find difficulty in reaching firm conclusions based solely upon evidence acceptable within the hierarchies listed above, concluding that the absence of evidence acceptable to systematic reviews does not necessarily indicate that no effect from public health interventions exists or has in fact been demonstrated. In public health settings the nature of the situation and the interventions may be too complex and wide ranging to allow simple controlled trials. Notably, this would appear to include the NICE (2005) evaluation of the evidence for interventions in the management of aggression and also the earlier attempt at a systematic review conducted by the Royal College of Psychiatrists (1995). In both instances significant numbers of research studies were identified in the systematic literature search phase of the project, but large numbers were then deemed to be inadmissible due to not meeting the criteria set by the study group. Different approaches appear to be accepted in other countries. In the United States Robson (2001), writing for the National Institute for Occupational Health takes a broader view of evidence, whilst the Occupational Safety and Health Administration (OSHA 2004) evaluates evidence on workplace training for aggression and takes a offers a more inclusive appraisal, accepting evidence which appears convincing, without demanding the

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<sup>2</sup> However, a study using a similar cluster randomised controlled trial was able to demonstrate statistically

standards considered appropriate for a medical trial. Brown and Lilford (2008) address the same issue in the context of evaluating the effectiveness of interventions to enhance patient safety in health care settings. Brown and Lilford argue that before and after studies may be appropriate in such projects:

“Much quality and safety improvement research involves before and after studies in single institutions. Such studies may provide convincing evidence of effectiveness...If the effects are small, these studies are a relatively weak method to distinguish cause and effect, since any observed change might plausibly be attributed to secular trends (for example due to other service developments) or regression to the mean. Nevertheless, this design may be the only feasible option in some circumstances—for example, when service managers wish to evaluate a local initiative...” Brown and Lilford (2008)

Clearly there is no attempt to suggest that the randomised controlled trial is anything other than a gold standard in the context of trialling new medical treatments. However, it may be argued that a training package for preventing needle stick injuries or, in this case, reducing the harm caused by aggressive incidents, is not a treatment and therefore other approaches may be both reasonable and appropriate.

## **Impact Of The Study**

Parkes (1996) is a substantial research project which took place over a total of two and a half years of active research and more than three years for the project in total.

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significant effects in the evaluation of a risk assessment protocol (Aberhalden Et.Al. 2008)

The research was accepted for publication in an appropriate double blind, peer reviewed journal, the Journal of Forensic Psychiatry<sup>3</sup>.

The research made a novel contribution to methodology, specifically the use of phases in the analysis of the incidents.

This study has made a significant contribution to the knowledge base in this field, which is acknowledged as being under researched. At the time of this study, knowledge of the effectiveness of restraint training was very limited. The effectiveness of ‘control and restraint’ training had been examined using a before and after trial in a prison (Brookes 1988). Parkes (1996) was the first published study of this training, and the first formal study in a health care setting. The study gave rise to a challenge to the prior assumption that training would inevitably result in positive change. The study gave new knowledge on the encounter patterns for violence in mental health settings and the need to tailor training to meet local needs. Prior to this study there had been concerns that the use of complex holds, based on martial arts techniques, would give rise to increased numbers of patient injuries. The empirical evidence here is that no such increase in patient injuries was observed.

Acknowledgement of Parkes (1996) by competent peers is considerable:

- This study was *selected in* and cited by the National Institution for Health and Clinical Excellence (NICE) in the NICE guide ‘Violence: The Short-Term Management of Disturbed/Violent Behaviour in Psychiatric In-patient and Emergency Departments Guideline.’

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<sup>3</sup> Now ‘The Journal of Forensic Psychiatry and Psychology.’



- This study is cited by a substantial number of peer reviewed articles, reports and book chapters. These include international citations and citations by government reports in both the UK and other countries. A list of publications citing this output is included at appendix three.
- This study was published in 1996, yet continues to be cited as recently as 2008. For an academic article to be continuously cited over a period of twelve years demonstrates a substantial impact factor.

The second study discussed here (Parkes 2003) also reports on the management of violence in a medium secure mental health unit, though a different unit from that in the first study.

This study collects and analyses information from 1799 untoward incidents occurring over a period of three years. The methodology here is observational, with no experimental manipulation. This methodology is consistent with that used in multiple other published studies by competent peers (Torpy & Hall 1993; Kennedy Et.Al. 1995; Agarwal & Roberts 1996; Smith & Humphries 1997; Dale Et.Al. 1999; Gudjonson Et.Al. 1999; Gudjonson Et.Al. 2000; Grassi Et.Al. 2001; Ryan & Bowers 2006).

## Output Two: Parkes (2003)

Parkes, J. (2003) 'The Nature And Management Of Aggressive Incidents In A Medium Secure Unit.'

*Medicine Science & The Law* 43(1) 69-74

### Background to the Study

This study was conducted in a 54 bed NHS medium secure mental health unit. This is not the same unit as discussed in output one.

The medium secure unit discussed in this study had been subject to external review and a new management team employed in order to improve the service, particularly in relation to security and public safety. As part of the new management team the author considered the systematic reporting and review of untoward incidents to be a crucial area for change.

At the commencement of this project incident reporting was weak. For example in the year preceding this project only 35 untoward incidents were formally reported, yet through direct knowledge of events it was clear that many more had occurred but had not been formally reported.

Potential weaknesses in NHS management of untoward incidents have been noted, with the suggestion that a structured and strategic approach is not always used (Leadbetter 2003). As well as being used to facilitate the study discussed here, the structure of incident reporting described below was also used to support clinical and managerial decision making. For example consultants and named nurses commonly requested information regarding individual

patients to assist clinical reviews and managers utilised patterns of incidents to inform changes to policy, working practices and staffing.

## Design of the Study

This is a descriptive study based on analysis of the data collected above and assisted by the use of a computer database developed by the author.

The data base was written using Microsoft Access. A full relational structure was used with separate tables for patient information, ward information and incident information: linked to provide overall incident reports. The database was capable of providing automated reports regarding individual patients for clinical purposes or ward/departmental reports for incident review. Data could also be queried, extracted and exported to Microsoft Excel for further analysis and graphing. Input of data was either by the author or by a clerical assistant.

Data was gathered over a period of more than 3 years and the data set for a 3 year period was examined. This data set comprised 1799 incidents.

## Conduct of the Study

In gathering the descriptive data, two issues were apparent to the author: the need to counter any risk of under-reporting and the need to ensure the accuracy of the data.

The following structure was developed by the author:

- All incidents were recorded immediately, by the staff involved, on a standardised report.

- Each morning (of the next working day) a meeting was held, attended by managers (including at least one member of the unit management team), clinicians and staff from each ward. Any incident reports from the preceding day were brought to this meeting for discussion and any action required urgently could be taken.
- All incident reports were entered onto the database developed by the author.
- Each month an incident monitoring meeting was held. In addition to the author, this was attended by all ward managers, a senior manager, a consultant and the manager of the unit security staff. Print outs of the incidents for each ward, taken from the database, were provided. At this point any inaccuracies in the database were identified and could be corrected.
- The information gathered on the database formed a pool of data which was analysed for this study.

A key issue in the development of the above structure was an awareness of the risk of under reporting. In the clearest demonstration of this phenomenon Crowner Et.Al. (1994) compared the reporting of aggressive incidents by formal incident report with the number of actual incidents observed on CCTV coverage of the same facility. Substantial under reporting was found, particularly of minor incidents not involving injury. This under reporting is seen as distorting research and impeding the development of evidence based responses (OSHA 2004). In order to counter the tendency to under report, the form was kept deliberately short with no replicated information. For example, a patient's date of birth is easily obtained from notes or computer systems, so was not asked for on this form. This might, of course, create a risk of misidentification of a patient in the longer term, for example if two patients had the same name.

A unique patient identifier was added at the data input stage, not by reporting staff. The author was aware of a potential weakness in this approach. Whilst the new incident report could be completed rapidly, encouraging reporting, it was not a validated and peer reviewed tool. For example a tool such as the SOAS (Palmstierna & Wistedt 1987) might have been used with the advantage of demonstrated reliability and validity. It was considered that the advantages of a very simple and rapidly completed form outweighed the disadvantages, particularly in facilitating the reporting and study of relatively minor incidents which appeared to occur in large numbers but were not currently being documented. It is argued that this approach was subsequently vindicated by the breadth of data collected.

Other measures to counter the risk of under-reporting were also adopted. Previously, staff had operated under a very restrictive definition of a 'reportable incident' which only applied to serious events involving injuries or issues likely to give rise to legal action. The definition of an 'incident' for the new structure was deliberately set very broadly and could include not just physical aggression but also verbal aggression and 'near misses.' Ward managers were asked to follow up any occurrence which they became aware of, for example through handovers or clinical records, which should have generated an incident report but had not done so.

The accuracy of the data on the database was assured at two points. Firstly at the morning meetings any ambiguities in the incident reports could be clarified before entry onto the database. Secondly any inaccuracies in the database could be corrected when the print out of the actual database entry was discussed at the monthly incident management meeting.

## Discussion of the Results

This is a descriptive study, therefore no experimental manipulation occurred, much less any control conditions to eliminate confounding variables. With such a design, it will often be

reasonable only to identify tentative conclusions which might be confirmed by narrower research which focuses on a specific hypothesis. However the value of such descriptive studies is noted by other authors. For example Doyle and Dolan (2002) suggest that information of this type is of crucial practical value to allow risk management. Duxbury Et.Al. (2006) support this view, providing multiple examples of the use of patterns of incident times being used to inform decisions regarding staffing levels and diversionary activities for patients.

One important issue which is clearly addressed by a study of this type is the provision of empirical information on the nature of attacks experienced by staff. In output one it was noted that one of the issues which may have compromised the effectiveness of the training programme was that although much emphasis was placed on training staff to counter grabs, holds, hair pulling etc, these attacks were found to be much less common than simple punches, for which no response had been taught. This finding is supported by Drinkwater (1986) and Southcott Et.Al. (2002) in mental health settings and is also reported by studies in other settings such as police officers (Brown 1994). This finding is once again supported by the results of this study. Clearly if staff are given no training in how to respond to the most likely forms of attack then they are unlikely to be able to use the training effectively. Detailed information on the forms of attack encountered in the work environment is clearly essential to inform the development of training packages.

A contemporary issue at the time this study was conducted was the role of pain compliance and non-aversive holds for the restraint of violent patients. Some writers criticised the use of restraint techniques which deliberately caused pain, whilst others suggested that this might be an undesirable but sometimes necessary approach in the face of severe resistance (Paterson & Tringham 1999). Training which offered entirely non-aversive techniques had been described and the notion of allowing staff an option of different techniques to choose from was raised

(Stirling & McHugh 1997; Stirling & McHugh 1998). Stirling & McHugh had developed a non-aversive system of restraint and evaluated this in practice. However, it was accepted that whilst the non-aversive holds had been used successfully in many incidents, in some situations they had been perceived as inadequate:

*“...it is important to remember that for some clients, C&R may still be the most effective and safe method of managing their violent behaviour.”*

Stirling & McHugh 1997: 309

At the service described in output two, the staff had the option of both aversive restraint holds (control and restraint based) and also non-aversive holds. Three conclusions emerged from the data collected:

- Staff given an option were willing to use less aversive techniques when they considered them appropriate and did not automatically default to the more coercive holds.
- The non-aversive holds could be safely used in some incidents.
- If the non-aversive holds proved inadequate, and the staff then had to move to more effective techniques, then the risk of injury was high.

The issue of pain compliance is now apparently settled in all but extraordinary situations by edict of the Mental Health Act Commission Code of Practice (MHAC 2008). However, some writers suggest that a role for pain compliance may exist in certain incidents (Patterson 2005), for example where prolonged, resisted restraint may pose a serious risk to both the patient and



the staff. The findings in this study support the view that a more flexible alternative to a prohibition of pain compliance may have been possible and appropriate.

However the most salient issue arising from the analysis was the substantial number of ‘minor’ incidents, not resulting in violence, injury or restraint, which occurred. Correctly it is suggested that training for nurses should emphasise non-touch, de-escalation techniques to prevent violence (NHS Security Management Service 2005). More negatively some writers suggest that nurses are overly reliant on physical interventions in response to violence and do not attempt to calm potentially aggressive behaviour (Aberhalden Et.Al. 2006), a position summarised by Tucker (2004):

“Physical restraint needs to be a last resort... but for some nurses it has become the first resort and that is wrong” (Tucker 2004)

In this study a total of 1473 patient related incidents were recorded, yet restraint techniques were deployed in only 169 incidents. The nature of the service and the clientele must also be repeated here: this is a medium secure unit taking only patients who have offended and/or have proven unmanageable in less secure services. Clearly the staff of the service were faced with substantial numbers of incidents which they prevented from escalation to the point of violence or which they managed by measures other than physical restraint. There was little evidence to support the assertion that nurses used physical restraint as a ‘first resort.’ The author would suggest that this finding is supportive of the methodological decision to emphasise increased reporting, including the decision to reject the use of a validated assessment tool. If staff had not felt empowered and enabled to report even minor incidents then this very interesting and useful data would not have been elicited.

## **Impact Of The Study**

This is a substantial research project which involved three years of data collection in addition to set up of the project and analysis of the data. The research was accepted for publication in an appropriate multi-disciplinary, peer reviewed journal.

The research made a novel contribution to methodology, specifically the focus on managing under-reporting. Substantial numbers of incidents which would not previously have been reported were documented and analysed during this study, leading to new insights into the pattern of aggressive incidents.

The study contributed to and extended the body of knowledge in the following areas.

- The study demonstrated the high number of minor or 'near miss' incidents encountered by mental health nurses which are dealt with without recourse to physical intervention. Many of these incidents may not be disclosed in other studies.
- The study also added to the view (Larkin 1988) that injuries are a poor measure of the seriousness of incidents in a secure setting: incidents which had very serious intent may be terminated by staff action before any injury at all has occurred.
- Information was presented on the encounter pattern for violence encountered by mental health staff, for example the prevalence of punches rather than grabs, holds and strangles. This has important implications for staff training.

Outputs three, four and five show a shift in focus onto a specific aspect of safety during physical interventions for aggression: sudden death associated with restraint. As noted above,

the author first became aware of this important issue in relation to the inquiry into the death of a patient at Broadmoor high security hospital (Ritchie 1985) which had formed a compelling part of the argument in favour of nurses receiving formal restraint training. Subsequently the death of two further patients in the same hospital, both associated with restraint, gave rise to a second report (Special Hospitals Services Authority 1995) which was again significant to the author. However, it was the death of a female patient in a local learning disability service (York City Council 1997) which directly motivated the author's involvement in the study of sudden death associated with restraint. It was becoming increasingly apparent from mutually supporting sources, inquiries, press reports and academic papers, that a small but significant number of people were dying in close temporal relationship to restraint (Paterson 1998; Parkes 2002; Paterson Et.Al. 2003).

In the United Kingdom the possible causation of such deaths appeared to be an enigma to the people conducting inquiries. For example in the case of the third death associated with restraint at Broadmoor hospital the inquiry team persisted in attempts to attribute the death to medication even though no generally accepted pharmacological mechanism could be identified to explain the sudden death of a person who had received depot medication, which has a slow and delayed release, and died only minutes later (SHSA 1995). The role of medication in sudden death during restraint had been questioned in the UK, for example Dolan Et.Al. (1995) reported the death of a mental health patient during restraint and were critical of the idea that death was caused by medication, but had difficulty identifying an credible alternative mechanism.

However, a body of literature had developed in the United States, some dated almost a decade before the above inquiry at Broadmoor hospital, which appeared to be largely unknown in the United Kingdom. This body of literature proposed the concept of 'positional asphyxia' which suggests that body position during restraint may restrict breathing to a degree that is directly

causal of death (Reay 1996). Several publications describing case series of deaths associated with restraint were available (Reay Et.Al. 1992; Stratton Et.Al 1995; O'Halloran & Lewman 1995) whilst early laboratory research had suggested significant effects on breathing due to restraint position (Reay Et.Al.1988).

Output three (Parkes 2002) provides a more detailed critical review of the literature on 'positional asphyxia' and evaluates the relevance of this concept to death associated with restraint. For this reason, the debate is not repeated in detail at this point.

## Output Three: Parkes (2002)

‘A Review Of The Literature On Positional Asphyxia As A Possible Cause Of Sudden Death During Restraint.’

*British Journal Of Forensic Practice.* 4(1) 24-30

### **Background to the Article**

This article is clearly dated subsequent to output four, Parkes (2000). This article is included here, and in this order, to provide background information for readers who may not be familiar with the literature on sudden death during restraint and particularly the controversy regarding positional asphyxia.

The article was accepted for publication in the ‘British Journal of Forensic Practice.’ This is a peer reviewed journal.

It was apparent in conducting any literature review that although the above case reports and laboratory studies from the United States were available, often in the context of law enforcement procedures (O’Halloran & Lewman 1995; Reay 1996), little evidence existed in relation to procedures used in health care settings in the United Kingdom, a situation which persisted even at the later NICE (2005) review of the evidence on the safety of restraint techniques.

## Output Four: Parkes (2000)

'Sudden Death During Restraint: A Study To Measure The Effect Of Restraint Positions On The Rate Of Recovery From Exercise.'

*Medicine Science & The Law.* 40(1) 39-44

### **Background to the Study**

This study was conducted in part fulfilment of a Master of Medical Science degree at Sheffield University.

At the commencement of planning for this study the study of restraint death and the relevance of positional asphyxia was relatively new to the UK, having attracted greater attention the literature in the United States of America. However, interest in this area was growing, and was only increased by the highly publicised death of a patient during restraint at a medium secure mental health unit (Blofeld 2004)<sup>4</sup> at the same time as this study was being carried out. Only one small study of the physiological effects of restraint was available at this time, Reay Et.Al. (1988). The author's study intended to follow the methodology of this American study with the crucial difference that restraint positions in common use in the UK would be substituted for the US police restraint positions used by the original study.

### **Design of the Study**

This is a repeated measures design using 16 participants. All participants were volunteers from amongst the staff group of a medium secure NHS mental health unit. The number of participants was chosen based upon a power analysis of the results reported by Reay Et.Al. (1988) using a similar design.

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<sup>4</sup> Report published in 2004, however the underlying incident occurred in 1998.

The methodology reported by Reay was enhanced, particularly by the introduction of randomisation. In the Reay study, it appears that participants exercised, were tested in the seated (control) position, then exercised again and were tested in the restraint position. Clearly this gives rise to concern that the results may have been distorted by the failure to randomise. Two potential weaknesses emerge. Firstly the participants may become fatigued by the exercise, resulting in a deterioration in their performance. Secondly, it is clear that breathing is open to influence by either conscious control or emotional arousal. It is possible that in repeated runs of the procedure participants would become more familiar or habituated to the procedure with a resulting influence upon their performance. To counter this flaw the order in which participants experienced the three experimental conditions was randomised. Recording sheets for the results were prepared listing the conditions in different orders, based upon the 'Latin square' approach, giving equal probability of the participant encountering each condition first, second or third. These sheets were then placed upside down and each participant was allowed to take a sheet of their choice from the pile, blind as to the order shown on the opposite side. The sheet selected then set the order in which the three positions were encountered by that participant.

Another methodological issue was the use of pulse oximetry to measure the effects of the restraint positions. The accuracy of pulse oximeters was known to be influenced by motion effects. The underlying theory for pulse oximetry relies upon the differentiation of oxygenated blood from de-oxygenated blood based upon the pulsing of arterial blood in arteries. The introduction of extraneous bodily motion detracts from this procedure by introducing a generalised motion (Barker & Shah 1996). Existing research on this area suggested that a figure located probe would be less vulnerable to these motion effects than an ear probe (Mengelkoch Et.Al. 1994) and a finger mounted probe was therefore adopted for the study. However, in

addition to the movement during the exercise phase of the each condition of the study, the procedure also involved placing the participants in restraint holds, involving flexion of the wrist and the grip of the restraining person around the participant's wrist. In practice, this was found to introduce unacceptable inaccuracies in the measurements and on some occasions a complete failure to obtain a measurement. An ear mounted probe was therefore substituted and was found to be effective. It was noted that the key readings of oxygen saturation were being taken whilst the person was at rest, not during the physical exercise, and therefore it was considered that any issues due to motion effects were unlikely to influence the accuracy of the results.

### **Ethical Issues.**

The nature of this study, and also output 5, raises both general ethical issues and also specific issues related to potentially hazardous research involving human participants.

Research involving human participants must be subject to ethical review. This research study was conducted on NHS premises, and involved NHS staff. Ethical review was therefore sought from the appropriate NHS local research ethics committee. The initial review found the proposed study to be generally acceptable but required that written, as well as verbal, information be given to prospective participants. A printed leaflet repeating the key information was produced and provided to all potential participants.

In addition to the general ethical principles of research on human participants, this study also required consideration of the ethical issues of researching a potentially hazardous subject. The background to the study is that people had died during restraint and the intent of the study was to investigate the restraint positions which were thought to be implicated in those deaths by repeating them on volunteers. This clearly raised specific issues related to the management of potentially hazardous research.



The proposed research had an ethically desirable aim: to identify the effects of restraint in order to inform policy and training, thereby potentially saving life. However, the presence of a good intent is not of its self sufficient to ensure that research is ethical. Two classic examples are apparent. During world war two Nazi doctors conducted studies to investigate the physiology and prevention of hypothermia in persons partially submerged in ice water. The laudable aim of this research was to prevent deaths in airmen shot down over the north sea, however this laudable aim was entirely negated by the callous lack of regard for concentration camp inmates used as experimental subjects who frequently died during the research (Baumslag 2005; Weindling 2005). Not only is the conduct of these studies condemned, but even the uncritical use of data from them is subject to ethical debate (Bogod 2004).

Less distant and more recently ministry of defence scientists conducted research into the effects of nerve agents, lethal war gasses, at the Porton Down research establishment (Evans 2000). The desirable intent of this research was to provide superior protective equipment for troops who might encounter nerve agents on the battlefield, thereby potentially saving many lives. However, at least one participant died and several other reported lasting harm following their deliberate exposure to the nerve agents during the experiments. The influence of ethical responses to the Porton Down situation may be identified in the response of the local research ethics committee to the original proposal for this study. In the Porton Down experiments multiple participants report having been told that they were to be involved in a study of the common cold, not potentially lethal war gasses. Clearly any consent given by a participant is negated if the consent was not fully informed, much less deliberately misleading. Authorities at Porton Down state that the participants were informed verbally of the nature of the experiments once they were present at the research establishment. However, many participants refute this and there is no written record of the information given to the participants. It is apparent that

contemporary guidance and the LREC requirements were readily justified by incidents such as this.

There is no presumption that research into potentially hazardous issues can never be carried out. However it is clear that ethical principles must be taken into account. At the heart of NHS research ethics is the world medical association 'Declaration of Helsinki' which forms an internationally accepted standard for medical research involving human participants (Masterton & Shah 2007). Article 20 of the Helsinki Declaration on research ethics states:

“Physicians may not participate in a research study involving human subjects unless they are confident that the risks involved have been adequately assessed and can be satisfactorily managed.” (World Medical Association 2008)

In this instance it could be demonstrated that the risks could be assessed and managed. In the vast majority of restraint episodes, operational or during training, it is clear that no deaths occur. Indeed in the UK, restraint deaths in health and social care can be estimated at approximately one per year (Paterson Et.Al 2003), despite very high numbers of incidents of restraint. The assessed risk to an individual participant being restrained is therefore very low. In Stratton et.al. (2001) cases of collapse during restraint attended by paramedics were studied, comparing those cases where the subject died with control cases where the subject did not die. The factors associated with death during restraint were found to be prolonged struggling, obesity, pre-existing ill health and use of illicit drugs. Of these risk factors, prolonged struggling during restraint was found to be most associated with death. Having identified objective evidence upon which to base an assessment the author specified measures to manage the risk. Physical exertion would be limited to a heart rate of 120 beats per minute, substantially below the maximal heart rate for persons under 50 years of age. Exclusion criteria would

include age greater than 50 years, obesity (defined as body mass index greater than 30), pre-existing ill health or use of illicit drugs (identified by a health declaration form). These precautions are consistent with similar studies (Chan Et.Al. 1997) and indeed subsequent studies have gone much further by involving maximal exercise by the participants whilst under restraint (Michalewicz Et.Al. 2007). These safety measures were identified to the research ethics committee and were accepted as appropriate and adequate.

## **Discussion of the Results**

The results of the study partially confirmed the original hypothesis: restraint in a prone position resulted in a greater recovery time than the restraint in a supine position. However the results were not consistent with the anticipated pattern whereby the supine restraint position might be expected to show a small increase in recovery time compared with the seated (control position). No effects on oxygen saturation were detected and the overall effect of prone vs. supine restraint was not large.

This study utilised a design which was a partial replication of the study reported by Reay Et.Al. 1988. The results from this study clearly failed to replicate the results reported by Reay Et.Al. (1988). This in turn gives rise to consideration of the nature and value of replication in research. Replication, and perhaps more importantly, failure to replicate the results of experiments is a crucial part of the scientific method. A fundamental part of faith in published research is that the methods are declared in sufficient detail that others may verify the stated results by replication of the experiment. By this means, error or fraud can be detected and exposed. Replication of the methodology used by Reay Et.Al. (1988) had academic merit even if, and perhaps more so, if the results failed to replicate Reay's findings. The study partially replicated the methodology described by Reay Et.Al. (1988) but there were methodological enhancements. For example Reay Et.Al. make no mention of randomisation. It appears that all

participants were tested in the seated (control) position first and the restraint position second, leading to the possibility that fatigue, or habituation, may have distorted the results. To repeat a study which has identified flaws, with the flaws effectively managed, again has value. Finally, Reay Et.Al. studied a restraint position used by US police, the 'hobble prone restraint position' or 'hogtie.' This study tested the effects of different positions, as used by health and prison staff in the UK. Again, it appeared to be valid to repeat research which had been carried out on one restraint position to investigate others.

No significant changes in oxygen saturation occurred in response to exercise and therefore no recovery time could be calculated in terms of oxygen saturation. However, it is also noted both in the original article and here, that laboratory studies of this nature are subject to necessary ethical constraints. In conducting research simulations of restraint positions it is necessary to eliminate all those factors which might result in a fatal level of restriction of breathing.

Therefore it should not be expected that the research will then demonstrate a potentially fatal level of restriction. This type of research is able to demonstrate the relative effects of different restraint positions but will not simulate the effects of a fatal incident. The implications of the findings are in terms of suggesting to trainers, operational staff, and investigators of deaths that one position may be safer than another.

This study was one of only two pieces of research on restraint position selected for inclusion in the National Institute of Health and Clinical Excellence (NICE) guide on the prevention and management of aggression (NICE 2005)<sup>5</sup>. Following the publication of the inquiry into the death of David Bennett (Blofeld 2002) the issue of the safety of prone restraint had become controversial, the inquiry having recommended a time limit should be mandated on the use of prone restraint. The recommendations of NICE regarding restraint position are as follows:

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<sup>5</sup> The other research article is Chan Et.Al. (1997)

“... the guideline development group believe that there are dangers related to restraint in any position and therefore decided not to highlight one position as safer than another, but to discourage restraint for prolonged periods in any position.” NICE (2005)

As one of two studies considered by the guideline development group the equivocal results of this study appear to have contributed to the opinion that restraint position is not a significant factor in death associated with restraint. However, it should be noted that this is not the conclusion drawn by the author. The author’s conclusions in the original article were as follows:

“It is not the case that the relevance of positional asphyxia to sudden death under restraint has been conclusively demonstrated, and the phenomenon has recently been questioned, both in the literature and in the U.S. courts. However, there are now multiple sources of evidence to suggest that restraint of a highly resistive subject in the prone position may have more effect on breathing than restraint in a supine position. It is therefore reasonable to suggest that restraint position be considered as a factor both in the training of those who must restrain violent individuals and in the investigation of sudden deaths in such circumstances.” Parkes (2000)

It remains the case that every published research study of restraint positions, including the study described here, show a statistically significant increase in the level of deficit in the prone position (Reay 1988; Chan Et.Al. 1997; Roeggla Et.Al. 1997; Schmidt and Snowden 1999; Michalewicz 2007; Parkes and Carson 2008).

## **Impact Of This Study**

Inclusive of literature review, planning, ethical approval, conduct of the study and writing up this study required approximately seven months of work.

The research was accepted for publication in an appropriate peer reviewed journal. The article is published in 'Medicine, Science and the Law,' which is the professional journal of the British Academy of Forensic Sciences.

This study has made a significant contribution to the knowledge base in this field, which is acknowledged as being under researched. The study confirmed criticism of the previously influential work by Reay Et.Al. (1988) confirming that this study could not be replicated. The study provided the first empirical information on the physiological effects of restraint positions used in the UK, all previous work having examined restraint (normally using handcuffs rather than manual restraint) as used in the United States.

Acknowledgement of the study by competent peers is considerable:

- This study was *selected in* and cited by the National Institution for Health and Clinical Excellence (NICE) in the NICE guide 'Violence: The Short-Term Management of Disturbed/Violent Behaviour in Psychiatric In-patient and Emergency Departments Guideline.' (NICE 2005)
- This study is cited by multiple peer reviewed articles, reports and book chapters. These include international citations and citations by government reports in both the UK and other

countries. A list of publications citing this article is included at appendix four. This is a list of those publications identified by the author, and clearly this may not be a complete list.

- This study was published in 2000, yet continues to be cited as recently as 2009. For an academic article to be continuously cited over a period of nine years demonstrates a substantial impact factor.

It should be noted here that although much comment and debate has arisen regarding the issue of ‘prone restraint,’ (Tucker Et.Al. 2006) the results of Parkes (2000) did not show large and consistent differences in the rate of recovery from exercise between face up (supine) and face down (prone) restraint. Subsequent to the completion of this study the issue of death associated with restraint, and specifically prone restraint, was given increased prominence following the publication of the inquiry into the death of another mental health patient (Blofeld 2004). In the UK there has been considerable debate of this issue with some sources arguing for time limits on prone restraint (Blofeld 2004), some sources calling for complete bans on prone restraint (Bond 2006), whilst others argue that prone restraint offers no unmanageable risk (Miller Et.Al. 2006). A similar debate regarding specific restraint positions, particularly the ‘hobble prone’ or ‘hogtie’ position, is evident in the literature emanating from the United States (Michalewicz 2007). Parkes (2000) was one of two studies selected in for inclusion in the NICE (2005) review, the conclusion of the reviewers being that no compelling evidence could be found that prone restraint presented a greater risk to patients than any other position.

The NICE (2005) guidance took the view that no one restraint position should be regarded as presenting than any other:

“... the guideline development group believe that there are dangers related to restraint in any position and therefore decided not to highlight one position as safer than another, but to discourage restraint for prolonged periods in any position.” NICE (2005)

This was highly controversial, particularly amongst campaigners who had called for a complete ban on prone restraint (George 2005; MacAttram 2005). Additionally it was not entirely consistent with the author’s views, nor with the conclusions which had been published in Parkes (2000), which was part of the evidence upon which this conclusion had been based.



This lack of clarity in both the evidence and the conclusions being drawn regarding prone restraint motivated the next study conducted by the author and discussed here. Output five (Parkes and Carson 2008) was a laboratory study of lung function in four different restraint positions. Three of these four positions could be classified as prone restraint, face down. However, one of the prone positions was flat on the floor with no body weight applied to the participant, whilst the other two were prone but also involved body weight being applied to the participant and/or a folded body position. It was intended that this study would provide high quality evidence on the issue of whether some restraint positions would result in greater restriction of lung function and whether prone or supine positioning was in fact the critical issue in any such restriction.

## Output Five: Parkes, J. & Carson, R. (2008)

Parkes, J. & Carson, R. (2008) 'Sudden Death During Restraint: Do Some Positions Affect Lung Function.' *Medicine, Science and the Law* 48(2) 137-41

### Background to the Study

A degree of controversy has arisen with regard to the significance of 'prone restraint' in cases of sudden death during restraint. For example a prominent team of researchers in the United States has conducted several laboratory studies of restraint positions, in each case that the effects on lung function were not clinically significant (Chan Et.Al 1998; Chan Et.Al 2000; Chan Et.Al. 2004; Michalewicz 2007). A study of restraint incidents in a UK mental health setting (Lancaster Et.Al. 2008) found no increased risk of injury to patients associated with prone restraint, however the sample size (680 restraint episodes) may limit the relevance of this finding to patient injuries, as distinguished from restraint deaths which are very uncommon events. This controversy is reflected in the literature in the United Kingdom. For example some authorities argue for time limit on prone restraint (Blofeld 2004) whilst others call for a complete moratorium (Bond 2006). In other literature an argument is made that prone restraint is not alone in being associated with sudden death and should not be singled out as presenting exceptional levels of risk (Miller Et.Al. 2006). This final position is supported by official guidance from NICE (2005) who take the view that no restraint position should be considered to present greater risk than another:

“... the guideline development group believe that there are dangers related to restraint in any position and therefore decided not to highlight one position as safer than another, but to discourage restraint for prolonged periods in any position.” NICE (2005)

As noted previously, this was not the conclusion drawn by the author in output 4 (Parkes 2000), the results of which appeared to have influenced the findings of the guideline development group. It should be noted that the NICE guidance has been highly controversial, particularly amongst groups campaigning for civil rights or in response to the death of a restrained patient (George 2005; MacAttram 2005).

The study discussed here intended to look at the issue of prone restraint in more detail. 'Prone restraint' is no more specific than stating that the person was restrained face down. Clearly a wide range of procedures could fall within this description. The intention was to examine if the perceived greater risk from prone restraint is empirically supported for all prone positions, or whether any increased risk is related to specific positions, some of which are prone.

## Design of the Study

The experiment hypotheses tested in this study were:

1. The level of restriction in lung function will be greater in prone positions than in supine positions.
2. The level of restriction in lung function will be greater in those restraint positions where the participant is in a flexed position and/or body weight is applied to the person.

The study utilised a similar design to output 4 (Parkes 2000), a repeated measures design comparing within subjects. In each case the participant's lung function would be measured in a standing, control, position and compared with measurements in four restraint positions. The order in which the participants experienced the positions was carefully randomised using the

Latin square method, with each participant having equal probability of encountering any of the positions first, second etc.

The study made use of computerised pneumotachograph in order to measure lung function. This is viewed as a substantial enhancement over the use of pulse oximetry in output 4 (Parkes 2000). Firstly, the pulse oximetry demonstrated difficulties in practice during the course of the study. These difficulties were managed, however they can not be viewed as desirable. Secondly, pulse oximetry was utilised to measure the rate of recovery from exercise, which was considered to be a proxy measure of lung function: the more restricted the participants breathing the longer it would take for them to recover from exercise. In this study the technology used is superior in that it gave a direct, not indirect, measure of lung function. The computer assisted pneumotachograph was particularly appropriate to this study in that it allowed simultaneous measurement of multiple parameters of lung function during one complete breath cycle. This was a substantial practical benefit in the conduct of the study since each participant was able to carry out just one cycle of breathing in each position rather than requiring repeated measurements.

Attention is drawn to the discussion of ethical issues in the study of potentially hazardous phenomena in output 4 (Parkes 2000). Once again, the risk was carefully managed by eliminating known risk factors. Persons with a body mass index greater than 35 were excluded, as were persons declaring existing ill health or use of illicit or prescribed drugs. Exclusions included one volunteer who was taking prescribed medication for a mental health problem. In this study, further reduction of risk was achieved by conducting all measurement without prior exertion. In this study the intention was to isolate the independent variable of restraint position. It was considered that nothing would be gained by causing the participants to exercise prior to

or during measurement whilst the risk to participants would be further decreased by not requiring such exertion.

In this study undergraduate students were used as the participants. This gave rise to an additional ethical issue. It may be argued that a university lecturer, who is in a position of power with regard to students, may exert inappropriate pressure or influence when calling for volunteers from the student body. A process of volunteering, which should be entirely voluntary may suffer a degree of coercion. Gerrish and Lacey (2006) discuss the 'need to manage power relationships,' whilst Moreno (1998) likens the position of undergraduate student participants to that of other 'captive populations' such as prisoners or members of the armed forces. In some cases, previously common place in undergraduate psychology courses, substantial pressure has been applied, with students being obliged to participate in research projects as a requirement of the course: "The potentially coercive nature of being a student may arise from a course requirement that they serve as a study subject." (Moreno 1998:123) However, it may also be argued that participation in the research process is beneficial to student development. For example the Higher Education Research Forum (2004) suggest a role for research by allowing students "vicarious exposure to the current research of their teachers," thereby increasing skills and promoting an internalisation of their role in research. In this study, careful attention was applied to this issue. Students were verbally informed of the study in announcements to whole groups. At this point it was carefully emphasised that participation was voluntary and that no adverse experiences would result from choosing to not participate. A cooling off period of at least half a day was allowed before students were then given the opportunity to volunteer. All volunteers were given further explanation and the information was reinforced with a written information leaflet. Both the verbal information and the leaflet repeated that participation was voluntary and non-participation would not influence the students progress at the university.

No formal inducements, specifically payments, were used in this study. Students were reminded of the potential benefit to patient safety and professional risk provided by the study. They were advised of the benefit to themselves of observing the research process as a learning experience. All participants were offered copies of the completed journal article for their portfolios. These motivations proved to be adequate to achieve sufficient volunteers.

All of the above was anticipated and managed. However, an unanticipated source of coercion emerged. Students themselves were observed applying coercion to colleagues. When two or more students volunteered, they and other students, could be observed encouraging or even deriding other students in their attempts to get them to volunteer. The author had not observed this phenomenon in previous research. It was necessary to intervene, telling some students to desist from this behaviour and reminding others of their right to decline.

## Discussion of Results

The use of computerised pneumotachography proved to be superior to pulse oxymetry and no difficulties were encountered during the measurements.

There was no significant difference between restraint flat on the floor in prone and supine positions and neither of these positions showed significant reductions in lung function compared with the standing control position. However, those restraint positions involving the application of body weight and/or flexing of the participant did demonstrate a statistically significant reduction in measures of lung function.

As noted above, previous discussion has centred on the risk of 'prone restraint.' The findings here are important in taking this debate forward. These results support the contention that some

restraint positions present a greater risk than others. Whilst some positions presenting greater risk may be prone; prone as opposed to supine positioning does not appear to be the crucial issue. It may be hoped that this important finding will encourage a more sophisticated and evidence based debate of the subject, with the potential to enhance the safety of vulnerable patients.

### **Impact Of The Study**

The research was accepted for publication in an appropriate peer reviewed journal. The output is published in *Medicine, Science and the Law*, which is the journal of the British Academy of Forensic Sciences.

The use of computerised pneumotachography is novel in this field. This is an important development in that it allows assessment of multiple measures of lung function for each restraint position in one practically achievable procedure. This methodology is being taken forward to future studies which investigate other variables related to restraint and lung function.

The study provides new information on the risks of restraint positions which contributes to and extends the body of knowledge. This knowledge has the potential to reduce risk to vulnerable patients who must be restrained

This study is recently published and therefore not yet formally cited in published literature. However, national and international interest is already apparent. The study has formed the basis for a successful bid to the Youth Justice Board for England and Wales to conduct a study using the same methodology to evaluate the effects of restraint positions currently used in the custody of young people. The study has been acknowledged in the recent independent review of

restraint in juvenile secure settings (Smallridge & Williamson 2008). The author has also received multiple inquiries from clinical and legal personnel in both the UK and the US regarding the research findings. It is anticipated that this study will generate significant numbers of national and international citations in time.



## The Concept of ‘Positional Asphyxia’

Parkes & Carson (2008) produced results which are not consistent with either proposals to limit prone restraint, nor with the current official guidance that no restraint position should be considered as presenting a greater risk patients (NICE 2005). The authors’ conclusions on these findings, and on the ‘positional asphyxia’ debate are stated in the article:

“Non-significant reductions in lung function were found in two restraint positions. In two restraint positions which involved body weight being applied to the participants and/or flexing of the participant’s body, a significant reduction in lung function was observed. The authors conclude that some, but not all, prone restraint positions cause significant restriction of lung function. It is argued that a restraint position should be considered a risk factor for sudden death during restraint and that some restraint positions are demonstrated to present a greater risk to the patient than others.”

(Parkes & Carson 2008: 141)

It may be argued that the concept of ‘positional asphyxia’ as first described by Reay (Reay Et.Al.1992; Reay 1996) has not only been at the root of the ongoing debate, but has been conceptually developed by the work of this author and interaction with other authors internationally. The original proposition by Reay suggests that the restriction of lung function due to restraint position is sufficient to be a direct cause of death, as implied in the very term ‘positional asphyxia.’ This position was challenged both academically and in the US courts by a team of researchers including Chan, Neuman and Michalewicz (Chan Et.Al 1998; Chan Et.Al 2000; Chan Et.Al. 2004; Michalewicz 2007). In a series of studies, these researchers compellingly discredit the proposition that a restraint position alone may directly cause sufficient restriction of lung function to be fatal.

This author suggests that the original concept proposed by Reay is flawed in that it implies a direct, fatal effect as a single cause of death. This appears to be grounded in Reay's earlier work which examined the relationship between neck holds and death during restraint (Reay & Eisele 1982; Reay & Holloway 1982). In the case of holds around the neck there does appear to be evidence of a direct causal linkage of the neck hold to death as a single cause of death, and this conception appears to have been carried over to the study of restraint position. In the counter argument by Chan and colleagues, the debate appears to be in relation to discrediting the proposition that restraint position causes sufficient restriction of lung function to be a sole cause of death. The context of both groups of researchers may be relevant here. In both cases the context of the research is investigation of the death of police arrestees and the subsequent legal argument. Indeed the study reported in Chan Et.Al 1998 was funded by the city of San Diego in response to a civil court case brought by the relatives of a man who died whilst being restrained by police: the results of the research were successfully used to discredit the claim of 'positional asphyxia' as a cause of death and the authorities won this legal case (County of San Diego 1998; Price v San Diego [1988]).

Clearly the context in which the above authors research and write is a legal context, and indeed many of those authors are medical examiners. In a legal context there is a search for a cause of death (or cause and manner of death in some US states). This search for singular cause is further emphasised in the adversarial context of a civil or criminal court case. In the context of such legal proceedings it is predictable and understandable that researchers will seek a singular cause of death and discredit mechanisms which do not offer a direct explanation of the death. This conceptualisation of positional asphyxia was initially adopted by the author and the study reported in Parkes (2000) was conducted in an attempt to identify if restraint techniques used by nurses in the UK resulted in sufficient physiological effects to directly cause death. The extent of the effect demonstrated was not sufficient to support such a position. The author

concluded that the circumstances of real life restraint is markedly different to that of a laboratory study, and that the small effects demonstrated during the study could act as a contribution to the cause of death. A person at rest may not be harmed by a relatively small reduction in lung function, however a highly disturbed person, resisting violently and subject to stress may require an increase in respiration which can not be matched by the restricted lung function in the restrained position. The restraint position would contribute to the death, but other factors such as severe resistance would also contribute. This was consistent with research on risk factors for death during restraint conducted by Stratton Et.Al. (2001). The position taken by the author was taken up by the team in the US, and a study was conducted to include participants who carried out substantial exertion during the restraint in order to test the hypothesis that restraint position and exertion would result in substantial effects:

“Even though the decreases in pulmonary function as a result of weight force applied to the back remain with the normal clinical parameters for a healthy person at rest, the circumstances of PMRP-related sudden death cases are very different. Sometimes, the victim has been involved in high-intensity exercise (e.g., running, fighting) before being restrained and, afterwards, will continue to resist the restraint violently. It has been suggested that under these circumstances, oxygen consumption may exceed ventilatory capacity in individuals placing them at risk for respiratory compromise (Parkes 2000)<sup>6</sup>. As such, we also measured  $\dot{V}O_2$  and  $\dot{V}E$  while in the PMRP and compared them with similar measurements from maximal treadmill tests.” (Michalewicz 2007: 174)

In Parkes & Carson (2008) the author further developed this debate. It was noted that the conditions simulated in laboratory studies remained far short of worst case real world conditions. Indeed any ethical study with volunteers would inevitably eliminate factors likely to

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<sup>6</sup> Vancouver style referencing in original amended to Harvard style for clarity and consistency in this document.

result in harm to participants as an inevitable part of ethical process. The results of laboratory studies should therefore be interpreted as identifying the relative risks of various restraint positions, not the absolute effects in worst case real world situations. The author suggested that the role of restraint position is as a risk increasing factor; one risk increasing factor amongst several, in an overall challenge to the restrained person which may result in death. This is a markedly different conceptualisation of death associated with restraint when compared with the original position that restraint position alone was a direct, singular cause of death. It is suggested that this development of the conceptualisation of positional asphyxia is an important, and ongoing, national and international debate to which the author has made a significant contribution.

## Values Of The Researcher

The topic and setting of the research discussed here presents particular issues in terms of the philosophy and values of the researcher.

The research is conducted against a healthcare background. Nominally this implies that the working practices and values of healthcare research will be appropriate. For example the traditional high value placed upon evidence from experimental studies and, particularly, randomised controlled trials would appear to be appropriate here (Muir-Gray 1997; NICE 2007; Higgins & Green 2008).

However, the setting of this body of work is mental health and particularly mental health nursing. The dominance of experimental over other forms of evidence is not universally accepted in this field. Dale (2004) questions the role of medically oriented evidence hierarchies in nursing, noting that such hierarchies appear to entirely exclude the use of evidence from qualitative studies, a major component of nursing research. (Although it might be suggested that such evidence can be incorporated in guidance via the use of 'expert' opinion, which may draw upon qualitative evidence and directly include the views of service users) McKenna (1999) suggests that the empirical evidence available to nurses is of mixed quality. Drawing upon Carper (1978), McKenna proposes that a variety of sources of knowledge are equally valid, including ethical, aesthetic and personal sources of evidence.

The authors position approximates to that of McKenna. It is suggested that empirical evidence, whilst valuable, may be difficult to obtain in a mental health setting. If a rigid framework of considering only empirical evidence is insisted upon, then the available may be very limited. Indeed if the most rigid standards are applied and there is an insistence upon randomised controlled trials then evidence may be entirely lacking, not because evidence does not exist but because much of it has been excluded by the overly rigid framework. This phenomenon is perhaps illustrated by medical attempts at a review of the literature on aggression in a mental health setting (Royal College of Psychiatrists 1995) which identified multiple pieces of evidence during a

literature search, excluded the great majority and unsurprisingly reported that little evidence was included in the report. This appears to be an unproductive approach.

Evidence is likely to vary in relation to setting. In this body of research the author seeks the most objective evidence which it is practical to obtain. In a laboratory setting, typical of the later work studying lung function, it is possible to control the situation and the variables. The most objective and defensible evidence is possible. However, despite this apparent scientific rigour it is possible to question this type of evidence on other grounds. As an example Michalewicz (2007) assert that the effects of position on lung function are not sufficient to cause fatal effects, suggesting that other mechanisms such as 'excited delirium' (DiMaio & DiMaio 2006) are the cause of sudden death in restraint incidents. This is an argument which is difficult to resolve in the laboratory. The laboratory study is capable of giving robust evidence as to the effect of position upon lung function, but it is not able to demonstrate that diminished lung function is the cause of deaths during real world incidents. Taking into account a different source of evidence, case studies, may help to address the issue. If laboratory studies of lung function are predictive of the findings of case reports (high levels of restriction of lung function in a restraint position correlate with real world reports of deaths in that position) then this supports the view that the lung function is relevant area to study. Although the case studies show putative weaknesses in a variety of areas (sampling, lack of controls, inability to verify witness descriptions of the incident) they have the capability to furnish important validation of the applicability of the laboratory studies.

Although later work consists of laboratory studies, earlier work studies practical outcomes from the use of physical interventions in a real world clinical setting. Here the author accepted, and continues to defend, certain compromises. For example in Parkes (1996) it was not practical to use a controlled design. In collecting data in the same study, the author was dependent upon the recall and honesty of the staff who provided the descriptions of individual incidents. This is not necessarily the same as an objective and verifiable source, such as examination of video recordings of the same incidents. It must be accepted that distortions, omissions and inaccuracies,

both deliberate and unconscious, may have occurred. In a laboratory study of breakaway techniques it is possible to utilise two expert observers taking contemporaneous notes (Rogers Et. Al. 2006, Dickens Et. Al. 2007), offering a high level of accuracy in data collection with potential for objective measures of inter-rater reliability. This is unlikely to be achievable in a study conducted in a clinical setting. Again the author takes the position of accepting a degree of compromise. The role play study is likely to excel in terms of rigour, however the clinical study will be defensible in terms of it's validity. For example the role play study is unlikely to fully reproduce the stress of a real world incident nor would it be able to identify the finding (Parkes 1996, Parkes 2003) that patients were not presenting the forms of attack that had been anticipated in the breakaway training. Neither design offers a clear and incontrovertible superiority over the other.

In conclusion the author takes an eclectic approach, broadly accepting the concept of a hierarchy of evidence, with highly rigorous controlled studies being desirable, whilst acknowledging the practical and complimentary value of other designs of study.

## Conclusion and Summary

This portfolio presents five publications linked by the theme of safety and effectiveness of interventions for aggression. Early work looks at a range of issues on safety and effectiveness in a clinical setting, whilst later publications focus on a specific issue of safety: sudden death during restraint.

In article one (Parkes 2003) the implementation of a training programme is evaluated. Both at the time of publication, and to this date, this remains an under researched area. This study was the first published study of the effectiveness of C&R training and the first such study in a health setting. The study made a novel contribution in terms of methodology, using a model of four phases for the analysis of incidents. This model demonstrated findings which would not have been apparent had data been gathered only for the incident as a whole. The study contributed to the knowledge base by challenging both the assumption that training would inevitably lead to a reduction in staff injuries and also prior assertions that the use of holds based on martial arts joint locks would result in an increase in patient injuries. Neither of these assertions was supported by the outcomes of this study. The study contributed much needed information on the encounter pattern for attacks on staff. It was demonstrated that the most common forms of attack were inconsistent with those being emphasised in the training and provided new evidence for the improvement of the training packages. This article has been extensively cited by peers over a period of 14 years and was selected for inclusion in a NICE guide (NICE 2005).

Article two (Parkes 2003) describes a study of untoward incidents in a medium secure unit. The primary novel contribution of this study is the use of measures to reduce the level of under-reporting and substantial numbers of comparatively minor incidents are reported. This approach allows the study of large numbers of incidents which may not have been disclosed in other studies and allows an alternative analysis. Particularly the pattern of incident and response challenges the view that nurses routinely respond to aggression with the use of physical intervention.



At this point the portfolio focuses on a specific area of the safety of physical interventions: sudden death during restraint.

Article three (Parkes 2002) is a review of the literature on positional asphyxia. Clearly this is not intended to be primary research. However, the article makes a novel contribution to the field in developing the concept of positional asphyxia from an absolute and singular cause of death to a single factor in a multi-factorial model of risk. This is a theme which is further developed in later articles.

Articles four and five (Parkes 2000, Parkes & Carson 2008) focus the study of death during restraint onto objective measurement of effects of restraint position measured in a laboratory setting. Article four represents an interim methodology, using rate of recovery from exercise as a proxy measure for lung function. Article five shows a development of the methodology, using computer assisted pneumotachography to directly measure lung function. These articles make an important novel contribution to the field, and to the profession, by contributing empirical evidence on the effect of restraint position. Article five presents a clear challenge to existing official guidance that no one restraint position represents a greater risk than any other.

The author's work on sudden death associated with restraint has attracted both national and international attention. A list of official reports, academic articles and books citing this research is attached as part of the discussion of output four (Parkes 2000). The author has disseminated the findings of this research at a conference at Coventry University in 2008. The author has also been retained to provide education to violence and aggression trainers operating throughout the North of England and to clinical staff at a learning disabilities NHS trust, focussing on the specialist area of sudden death associated with restraint.

Parkes (2000), Parkes (2002) and Parkes & Carson (2008) have been cited in several court cases in the United States and the author has advised legal personnel on these issues in relation to these cases.

The author has worked closely with a large NHS mental health trust and specifically with the clinical staff of its medium secure unit providing consultancy on patient safety during restraint. This has focussed on areas such as the safe movement of highly resistive patients and the safe management of a highly resistive patient suffering from both schizophrenia and severe sickle cell disease; a known risk factor for sudden death during restraint (Mercy Et.Al. 1990; Channa-Perera & Pollanen 2007). This work demonstrates a clear and direct application of the academic study discussed in this portfolio.

The author has recently acted as an invited contributor to the “Independent Review of Restraint in Juvenile Secure Settings,” (Smallridge & Williamson 2008), an independent review for the Ministry of Justice, which followed the death of a young offender during restraint in a secure facility. The author also acted as a pre-publication reviewer for the authors of this report. Parkes (2000), Parkes (2002) and Parkes and Carson (2008) are extensively cited in this report and again demonstrates a clear real world application of this academic work.

Current progression of the work on restraint position involves examination of different restraint positions in a three phase study funded by the Youth Justice Board for England and Wales (YJB). Phases two and three of this study will examine the effects of seated restraint positions, which have not been studied at this time. This will have important safety implications for both young people and health settings.

Future developments of this research are likely to extend the use of computer assisted pneumotachography to other forms of restraint and to the study of other variables which may impact upon lung function during restraint. For example body weight (obesity) has been identified as a risk factor in field studies (Stratton Et.Al. 2001) but has not been studied in an experimental setting at this time. Direct evaluation of the effects of body weight, utilising participants with a broad spectrum of body mass index and waist measurements, would allow the use of regression analysis to determine the contribution of body weight to restrictions in lung function, particularly in the prone restraint position. Equally, it is noted that the research described here has focussed

upon lung function as the dependent variable. Future research might address other areas, such as the effect of restraint on blood pressure, intra-abdominal pressure or even psychological variables such as stress.

The author is also in the early stages of a study of the duration of restraint as a factor in sudden death during real world incidents. 'Prolonged restraint' is frequently identified as a risk factor in restraint death (Stratton Et.Al. 2001, NICE 2005). However, the term 'prolonged' is either not defined or where defined, for example by the UK prison service as greater than four minutes (Parliamentary Ombudsman 1999), the definition is not objectively justified. This variable will be investigated using coroners records for restraint deaths in both health and criminal justice settings, specifically attempting to identify the duration of restraint prior to death.

The current and proposed research on restraint attempts to provide high quality, objective evidence on critical areas of safety. There are clear implications for practice. For example the current guidance for health care (NICE 2005) is challenged by the finding that some, but not all, prone restraint positions have considerably more effect on lung function than other restraint positions. On this issue the guidance should reflect the available evidence, both for the protection of persons being restrained and also to facilitate the best possible restraint techniques to maintain the safety of restraining staff. Similar findings are now emerging regarding the safety of seated restraint positions. A general recommendation is that where high quality evidence does not exist then it is incumbent upon persons in appropriate positions of responsibility to ensure that evidence is sought and to facilitate the development of such evidence.

Submitted: March 2009

Final Document With Amendments: June 2010

## **Appendix One: Other Publications by the Author**

### **Other Publications on the Theme of Safety and Effectiveness of Interventions for Aggression in Mental Health Nursing**

Literature review on the theme of safety and effectiveness of interventions for aggression in mental health nursing, conducted on behalf of the UKCC (United Kingdom Central Council for Nursing and Midwifery: professional regulatory body for nurses, now succeeded by the Nursing and Midwifery Council):

Gournay, K., & A Team From The Department of Health Services Research Institute of Psychiatry. (2001) *'The Recognition, Prevention And Therapeutic Management Of Violence In Mental Health Care.'* London: United Kingdom Central Council For Nursing and Midwifery.

(Also from the above project)

Wright, S., Grey, R., Parkes, J., Gournay, K., (2002) *'The Recognition, Prevention And Therapeutic Management Of Violence In Mental Health Care: A Literature Review and Evidence Based Recommendations for Good Practice.'* London: United Kingdom Central Council For Nursing and Midwifery.

The author was approached to provide a specialist section within the review dealing with the literature on sudden death during restraint. This publication is not double blind peer reviewed and is not included in the main body of this submission. Having been published by a professional regulatory body it is, however, noted as an esteem indicator.

### **Publications on Other Topics.**

The following two publications are entirely unrelated to the theme of this proposed PhD, but are mentioned for reference:

Parkes, J. (2004) 'Hair Testing for Illicit Drugs.' *British Journal of Forensic Practice* 6(4) 21-5

Scanlan, M.; Smart, D.; Gregory, S.; Armstrong, E.; Campbell, J.; Parkes, J. (2006) 'Evaluation Of The Effect Of Practice Nurses On The Management Of Depression.' *Primary Care Mental Health* 4(2) 107-112

Both of these articles are published in peer reviewed journals.

## **Appendix Two: Contribution of Other Persons to the Outputs**

### **Output 1:**

Sole author.

All research and writing up conducted by the author. Advice from Dr Chris Leech, principle psychologist, Wakefield Health Authority.

### **Output 2:**

Sole author.

All research and writing up conducted by the author.

### **Output 3:**

Sole author.

All preparation and writing of the article by the author.

### **Output 4:**

Sole author.

All research and writing up conducted by the author.

Support from Dr Jean Peters, SChARR, University of Sheffield.

### **Output 5:**

Dual authors.

John Parkes:

First named and corresponding author.

Original idea, research proposal and ethical review.

Equal contributor to conduct of study.

Contributed equally to writing up.

Dr. Ray Carson:

Equal contributor to conduct of the study.

Contributed equally to writing up.

### **Appendix Three: Publications Citing Parkes (1996)**

This is a list of articles, government reports and books citing Parkes (1996). This is a list of those publications identified by the author, and clearly this may not be a complete list.

1. National Institute for Health and Clinical Excellence (2005) 'Violence: The Short-Term Management of Disturbed/Violent Behaviour in Psychiatric In-patient and Emergency Departments Guideline.' London: NICE
2. Masters (2001) "Practice Parameter For The Prevention And Management Of Aggressive Behavior In Child And Adolescent Psychiatric Institutions With Special Reference To Seclusion And Restraint" American Academy of Child and Adolescent Psychiatry.
3. Hart, D. & Howell, S. (2004) "Report on the use of Physical Intervention across Children's Services." London: National Childrens Bureau.
4. Wright, S., Gray, R., Parkes, J., Gournay, K. (2002) 'The recognition, prevention and therapeutic management of violence in in-patient psychiatry: literature review and evidence based recommendations for good practice.' London: United Kingdom Central Council for Nursing and Midwifery.
5. Wright, S., Sayer, J., Parr, A., Gray, R., Southern, D., Gournay, K. (2005) "Breakaway and physical restraint techniques in acute psychiatric nursing: Results from a national survey of training and practice." *Journal of Forensic Psychiatry and Psychology* 16(2) 380-98
6. Royal College of Psychiatrists (2005) The evidence base for the management of imminent violence in learning disability settings. (Occasional Paper OP57) London: Royal College of Psychiatrists
7. Wright, S. (1999) "Physical restraint in the management of violence and aggression in in-patient settings: A review of issues" *Journal of Mental Health* 8(5) 459-72
8. Paterson, B. (2000) "Standards for Violence Management Training" *Security Journal* 13(4) 7-17 (1996)
9. Lee, S., Gray, R., Gournay, K., Wright, S., Parr, A., Sayer J. (2003) "Views of nursing staff on the use of physical restraint." *Journal of Psychiatric & Mental Health Nursing*. 10: 425-30
10. The University Of Strathclyde And The Centre For Residential Child Care (2000) "The Edinburgh Inquiry - Recommendation 55: The Independent Evaluation Report."
11. Dix, R. (2001) 'De-Escalation Techniques.' In Beer, D.M., Pereira, S.M., Paton, C. (eds) *Psychiatric Intensive Care*. Cambridge: Cambridge University Press
12. Bonner, G., Lowe, T., Rawcliffe, D. & Wellman, N. (2002) "Trauma for all: a pilot study of the subjective experience of physical restraint for mental health inpatients and staff in the UK." *Journal of Psychiatric & Mental Health Nursing*. 9(4): 465-73

13. Southcott, J. (2002) 'Control and Restraint Training in Acute Mental Health Care.' *Nursing Standard* 16(27) 33-6
14. Bowers, L., Brennan, G., Flood, C., Lipang, M., Olapado, C. (2006) 'Preliminary outcomes of a trial to reduce conflict and containment on acute psychiatric wards: City Nurses.' *Journal of Psychiatric and Mental Health Nursing*. 13 165-72
15. Perkins, J., Leadbetter, D. (2002) 'An evaluation of aggression management training in a special educational setting.' *Emotional and Behavioural Difficulties* 7(1) 19-34
16. Bowers, L., Nijman, H., Allan, T., Simpson, A., Warren, J., Turner, L. (2006) 'Prevention and Management of Aggression Training and Violent Incidents on U.K. Acute Psychiatric Wards.' *Psychiatric Services* 57 1022-6
17. Peek-Asa, C. (2001) 'The Role of Surveillance and Evaluation Research in the Reduction of Violence Against Workers.' *American Journal of Preventive Medicine* 20(2) 141-8 (1996)
18. Richter, D. (2005) 'Effekte von Trainingsprogrammen zum Aggressionsmanagement in esundheitswesen und Behindertenhilfe: Systematische Literaturübersicht' Munster, Germany: Landschaftsverband Westfalen-Lippe & Westfälische Klinik Münster
19. Epps, K., Moore, C., Hollin, C. (1999) 'Prevention and management of violence in a secure youth centre.' *Nursing & Residential Care* 1(5) 261-7
20. Tarbuck, P., Eaton, Y., McCauliffe, J., Ruane, M., Thorpe, B. (1999) 'Care and Responsibility Training: Survey of Skills Retention and Diminution.' In Tarbuck, P., Topping-Morris, B. & Burnard, P. (Eds) *Forensic Mental Health Nursing*. London: Whurr Publishers
21. Irwin, A. (2006) 'The nurse's role in the management of aggression.' *Journal of Psychiatric and Mental Health Nursing* 13(3) 309-18
22. Royal College of Nursing (2006) *Practice Guidelines: Violence*. London: Royal College of Nursing.
23. University of Central Lancashire (1999) 'Nursing in Secure Environments A scoping study conducted on behalf of the United Kingdom Central Council for Nursing, Midwifery and Health Visiting by the Faculty of Health University of Central Lancashire.' London: United Kingdom Central Council for Nursing
24. Lowe, T. & Bunch, N. (2005) 'Acute Inpatient Care.' In Tummey, R. (ed) *Planning Care In Mental Health Nursing*. Basingstoke: Palgrave-MacMillan (1996)
25. Richter, D., Needham, I., Kunz, S. (2006) 'The Effects of Aggression Management Training for Mental Health Care and Disability Care Staff: A Systematic Review' in Richter, D. & Whittington, R. (Eds) *Violence in Mental Health Settings: Causes, Consequences, Management*. New York: Springer

26. Lee, S.; Wright, S.; Sayer, J.; Parr, A-M.; Gray, R.; Gournay, K. (2001) 'Physical restraint training for nurses in English and Welsh psychiatric intensive care and regional secure units' *Journal of Mental Health* 10(2) 151-162
27. Southcott, J., Howard, J. (2007) 'Effectiveness and Safety of Restraint and Breakaway Techniques in a Psychiatric Intensive Care Unit.' *Nursing Standard* 21(36) 35-41
28. McIntosh, M. (2003) 'Testing An Intervention To Increase Self-Efficacy Of Staff In Managing Clients Perceived As Violent.' University of Cincinnati: PhD Thesis
29. Paterson, B. (2007) 'Restraint and the Question of Validity.' *Nursing Ethics*. 14(4) 535-45
30. Lynch, J.E. (2002) 'Getting What They Pay For?' *Criminal Justice Matters* 47(1) 42-3
31. Dix, R. (2008) 'Restraint and Physical Intervention.' In Beer, M.D., Pereira, S.M., Paton, C. *Psychiatric Intensive Care*. (2ed) Cambridge University Press.
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33. Quincey, V.L. (2000) 'Institutional Violence Amongst The Mentally Ill.' Hodgins, S. *Violence Amongst The Mentally Ill*. Netherlands: Kluwer Academic Publishers.
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## **Appendix Four**

### **Publications Citing Parkes (2000)**

This is a list of articles, government reports and books citing Parkes (2000). This is a list of those publications identified by the author, and clearly this may not be a complete list.

1. National Institute for Health and Clinical Excellence (2005) 'Violence: The Short-Term Management of Disturbed/Violent Behaviour in Psychiatric In-patient and Emergency Departments Guideline.' London: NICE
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17. Sathyavagiswaran, L., Rogers, C., Noguchi, T. (2006) 'Restraint asphyxia in in-custody deaths: Medical examiner's role in prevention of deaths.' *Legal Medicine* 9(2) 88-93
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**Appendix Five**  
**Data Collection Tool - Parkes (1996)**

Data collection tool utilised in output one, Parkes (1996) is included overleaf.

**INCIDENT No .**

DATE :

TIME :

TYPE OF INCIDENT:            SELF INJURY                      PHYSICAL AGGRESSION  
    VERBAL AGGRESSION                      DESTRUCTIVE BEHAVIOUR

LOCATION :

DISPOSAL:                                      TI    SECLUSION  
    OTHER    SPECIFY :

TYPE OF ATTACK (STAFF) :

TWO Pts. (BOTH RESTRAINED?) :    BOTH                      ONE                      N/A

MEDICATION:                                      I/M                      ORAL

DESCRIPTION OF INCIDENT :

INCIDENT PHASE:

STAFF PRESENT                                      STAFF INJURY                                      Pt INJURY                                      3RD PARTY

RESTRAINT PHASE:

FLOOR                                      WALL                                      OTHER  
STAFF PRESENT                                      STAFF INJURY                                      Pt INJURY                                      3RD PARTY

MOVEMENT PHASE:

STAFF PRESENT                                      STAFF INJURY                                      Pt INJURY                                      3RD PARTY

DISPOSAL PHASE:

STAFF PRESENT                                      STAFF INJURY                                      Pt INJURY                                      3RD PARTY

WEAPON (Y/N) :                                      TYPE :

MULTIPLE PATIENT :                                      NUMBER :

DIFFICULTY:                                      1                                      2                                      3                                      4                                      (FOUR HARDEST)

PERCEPTION:                                      1                                      2                                      3                                      4                                      (FOUR MOST AT RISK)

**Appendix Six**  
**Data Collection Tool - Parkes (2003)**

Data collection tool utilised in output two, Parkes (2003) is included overleaf.

Patients Name:	Date:
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Description of Incident:  
(Including any action taken immediately in response.)

Name & Grade:	Signature:
------------------	------------

Form to be sent to Clinical Services Manager

<b>Location</b>				
Pennine		Snowdon		PDU
Lounge	Bedroom	Office	Corridor	Toilet
Bathroom	Kitchen	Seclusion	Other:	
Reception	Dining	Rec.Area	OT	Leave

**Tick Boxes**

**Other Information**

Tick more than one box if required

Alarm activated

Patient injured

C&R used

Staff injured

Medication given

Public/visitor injured

Seclusion used

Duration:

Weapon involved

Time of Incident	
------------------	--

List all witnesses

**Office Use:**

Incident Type:

Incident Number:

Reportable Incident Procedure



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