



City Research Online

City St George's, University of London

Citation: Bowers, L., Flood, C., Brennan, G. & Allan, T. (2008). A replication study of the City nurse intervention: reducing conflict and containment on three acute psychiatric wards. *Journal of Psychiatric and Mental Health Nursing*, 15(9), pp. 737-742. doi: 10.1111/j.1365-2850.2008.01294.x

This is the unspecified version of the paper.

This version of the publication may differ from the final published version. To cite this item please consult the publisher's version.

Permanent repository link: <https://city-ref-test.eprints-hosting.org/id/eprint/3435/>

Link to published version: <https://doi.org/10.1111/j.1365-2850.2008.01294.x>

Copyright and Reuse: Copyright and Moral Rights remain with the author(s) and/or copyright holders. Copies of full items can be used for personal research or study, educational, or not-for-profit purposes without prior permission or charge, unless otherwise indicated, provided that the authors, title and full bibliographic details are credited, a hyperlink and/or URL is given for the original metadata page and the content is not changed in any way. For full details of reuse please refer to [City Research Online policy](#).

***A REPLICATION STUDY OF THE CITY NURSES
INTERVENTION: REDUCING CONFLICT AND CONTAINMENT
ON THREE ACUTE PSYCHIATRIC WARDS***

ABSTRACT

Conflict and containment on acute inpatient psychiatric wards pose a threat to patient and staff safety, and it is desirable to minimise the frequency of these events.

Research has indicated that certain staff attitudes and behaviours might serve to accomplish this, namely positive appreciation, emotional regulation, and effective structure. A previous test of an intervention based on these principles, on two wards, showed a good outcome. In this study we tested the same intervention on three further wards. Two "City nurses" were employed to work with three acute wards, assisting with the implementation of changes according to the working model of conflict and containment generation. Evaluation was via before and after measures, with parallel data collected from five control wards. Whilst simple before and after analysis of the two experimental wards showed significant reductions in conflict and containment, when a comparison with controls was conducted, with control for patient occupancy and clustering of results by ward, no effect of the intervention was found. The results were therefore ambiguous, and neither confirm nor contradict the efficacy of the intervention. A further intervention study may need to be conducted with a larger sample size to achieve adequate statistical power.

A REPLICATION STUDY OF THE CITY NURSES INTERVENTION: REDUCING CONFLICT AND CONTAINMENT ON THREE ACUTE PSYCHIATRIC WARDS

INTRODUCTION

Acute psychiatric wards deal with severely mentally disturbed and ill people, a substantial number of whom are legally detained against their will. One of the primary purposes of such wards is to keep patients safe, and keep others safe from what such patients might do whilst ill (Bowers 2005; Bowers et al 2005a). Disturbed inpatients can be aggressive, hostile and violent (Nijman et al 1997), they may harm themselves or commit suicide (Meehan et al 2006), abscond from the ward (Bowers et al 1998), consume drugs or alcohol (Phillips and Johnson 2003), refuse to obey the necessary rules for community living (Alexander and Bowers 2005), and refuse or resist their treatment (Schwartz et al 1998). In this paper we refer to such patient behaviours collectively as 'conflict'. Psychiatric ward staff use a number of means to keep patient safe, including extra medication given at the nurses discretion (Szczesny and Miller 2003), special observation (Bowles et al 2002), manual restraint (Winship 2006). We refer to these collectively as 'containment'.

In order to preserve patient and staff safety, and to increase the acceptability of psychiatric care to patients, it is highly desirable to reduce levels of both conflict and containment. Our previous research suggested that this can be accomplished by

increasing staff's positive appreciation of patients, their skills in managing their own natural emotional responses to patients' behaviour, and through the provision of an effective structure of rules and routines for ward life, based upon ethical principles (Bowers 2002).

We therefore designed an intervention based upon the appointment of clinical experts, City Nurses, to work with wards to apply and embed the principles of our working model. The first stage of this work with two wards has already been reported (Bowers et al 2006; Flood et al 2006; Brennan et al 2006). Statistically and clinically significant decreases in conflict were achieved, with falls in aggression, absconding and self-harm. Ward atmosphere improved and nurse–patient interaction rates increased. There was no significant change in containment method use. Two other projects have recently been reported using similar methods and models to the City Nurse project, both within Psychiatric Intensive Care Units. One achieved a significant reduction in seclusion use, without any reduction in officially reported adverse incidents (Guy et al 2007) and the other reported no change (Björkdahl et al 2007). In this chapter, we describe a replication of this study on three further wards, evaluated with a more rigorous methodology.

METHODS

Aim

The aim of this study was to reduce conflict and containment on acute psychiatric wards

Design

Non-randomised controlled trial, incorporating elements of action research.

Sample

The project was advertised to the staff of thirteen acute admission psychiatric wards in the East End of London, following the conclusion and local dissemination of results from the former study (Wards 1 & 2). Three wards applied to participate, and their Ward Managers were interviewed about their desire to participate, plans for development, forthcoming planned changes, freedom from managerial pressure to participate, and readiness of their staff teams to engage with the project. Following that interview, two wards were accepted into the project (Wards 3 & 4). Nine months into the intervention phase of the project, the Ward Manager on Ward 4 was moved to take on other duties elsewhere within the Trust, and not replaced for some time. As this sudden change could have impacted on the research results, the decision was taken to end the project on this ward, and a third (Ward 5) was recruited through a similar process, and received a rather shorter intervention. We thus present the results from three wards, one with a intervention period of 12 months, another 9 months, and a third 3 months. Remaining wards at the same hospitals (5 in total) acted as controls. All wards were generic acute admission wards serving defined multiethnic and highly deprived localities in the East End of London.

Intervention

Two City Nurses were appointed for the project, and were recognised clinical experts in acute inpatient care with long experience of practice development work. They worked with the wards' staff, three days per week, using the working model mentioned above, to bring about change towards low conflict, low containment, high therapy nursing. The intervention (described more completely in Flood et al 2006) incorporated elements of action research, in that: all changes and the methods by which they were achieved were negotiated with staff, and feedback on outcomes was periodically provided to the wards.

Instruments and outcomes

The Patient-staff Conflict Checklist Shift Report (PCC-SR) was used to collect information about rates of conflict and containment. This tick box checklist is completed at the end of each shift, and consists of 21 conflict behaviour items and 9 containment measures, for which definitions are provided. The person completing the form (usually the nurse in charge of the shift) indicates the frequency of each conflict behaviour or containment measure during the shift, just prior to handing over to the next shift of nurses. Locking of the ward door to patients leaving is also recorded on a five-point scale, with 5 representing the door being locked for the whole shift, and 1 not at all. An inter-rater reliability is 0.69 (kappa, Bowers et al 2005b), and correlations with official reported incidents supports the validity of the scale (Bowers et al 2006). The PCC-SR also includes items for recording the numbers of nursing staff on duty for the shift.

Details of officially reported adverse incidents (violence, absconding, and self-harm) and admissions/occupancy (age, gender and ICD-10 diagnosis) were obtained for all experimental and control wards.

Procedure

The project plan was submitted to, and approved by, the local Research Ethics Committee. Following recruitment to the project, the PCC-SR was used for three months on each participating ward in order to assess the baseline rates of conflict and containment. Completion of the PCC-SR then continued for the remaining period of the study. Parallel collection of the PCC-SR also took place on the control wards at the same hospitals. Ward 3 commenced baseline data collection in July 2004, commenced the intervention in November 2004 and completed the project in October 2004; Ward 4 commenced in July 2004, commenced the intervention in October 2004 and was withdrawn in July 2005; Ward 5 commenced baseline data collection in April 2005, commenced the intervention in October 2005 and completed in January 2006.

Data analysis

Two analyses were conducted. Firstly rates of conflict and containment before and after the intervention was in use were compared using Mann-Whitney-U tests. Nonparametric tests were chosen because of the skewed nature of the data, i.e. many observations with low values and few with higher values. SPSS v12 was used to conduct the analysis, and all analyses took place on the combined data from all three

wards, except where stated otherwise. This analytic method was identical to that applied in the first stage of the study and reported by Bowers et al (2006).

A second and more stringent analysis was then conducted. For this second stage replication study, data from control wards at the same sites but not undergoing the intervention were available. In addition, we were able to acquire official data on occupancy levels, admissions, gender and diagnostic mix for both experimental and control wards, factors known to impact on adverse incident rates (Bowers et al 2007). Finally it was possible to take into account the clustering of results by ward. PCC-SR results from the same ward have a tendency to be more alike than those from different wards. This hierarchical clustering of data can give rise to misleading estimates of effects, unless corrective formulae are applied (Donner and Klar 2000). We therefore compared before and after data from experimental and control wards using ordinal logistic regression, controlling for shift, occupancy levels, admissions, gender and diagnostic mix; and controlling for clustering by ward. This analysis was conducted using Stata v9.

RESULTS

A total of 5316 PCC-SRs were collected, 630 during baseline periods on experimental wards (vs. 550 on control wards) and 1444 during the intervention periods on experimental wards (vs. 2692 on controls). These were equally distributed across the three shifts, and represent a 58% response rate.

Before and after analysis

Findings are presented in Table 1. Conflict and containment events both fell significantly between during the intervention period, the former by 20% and the latter by 18%. At the finer grained level of different conflict incident types, verbal abuse fell significantly by 21%, violence of objects by 34%, physical violence to others by 41%, refusing to eat by 35%, refusing to attend to personal hygiene by 32%, refusing to get out of bed by 29%, and demanding PRN medication by 19%. Nearly every type of containment fell significantly in frequency: PRN medication by 21%, enforced IM medication by 42%, seclusion by 57%, continuous observation by 9%, manual restraint by 46% and time out by 50%. Intermittent observation increased by 1%, however during the course of 2005 Trust policy changed to facilitate the use of this approach. Door locking increased by 11%, however during 2005 Trust policy also changed to require the locking of the door on Ward 3 during the night shift. There was a slight but significant increase in the numbers of staff per shift in the intervention period (baseline mean 4.41, intervention mean 4.59, $t = 2.7$, $df = 2088$, $p = 0.007$). The mean rate of officially reported incidents per week fell from 1.00 in the before period to 0.56 in the after period, however this fall was not significant by Mann-Whitney-U test ($p = 0.386$).

Analysis with controls, occupancy, admissions and clustering

As Ward 5 was at the same hospital as Ward 3, and had a short intervention period, its data were excluded from this analysis. For the remaining wards (2 experimental and 5 controls), each shift was joined to occupancy and admission data, providing numbers on the ward and numbers admitted that shift, a mean age, numbers of men, and

numbers with primary discharge diagnoses in the following ICD-10 categories: mental and behavioural disorders due to psychoactive substance abuse (F10-F19); schizophrenia, schizotypal and delusional disorders (F20-F29); mood (affective) disorders (F30-F39); neurotic, stress related and somatoform disorders (F40-F48); disorders of personality and behaviour (F60-F69). In the ordinal logistic regression analysis these variables were entered into the regression equation, with a dummy variable to control for type of shift (morning, afternoon or night), and indicator variables to assess before vs after, experimental vs control conditions, and any interaction effect. Correlation of observations within wards (clustering) was controlled for in the analysis.

On the primary outcome measures of total conflict and total containment, no significant change occurred on the experimental or control wards. The majority of conflict and containment items were also unchanged, however the City nurses intervention was associated with lower 'refusing to eat' and locking of the ward door ($p < 0.005$), and higher 'absconding (missing without permission)' ($p = 0.040$), 'refusal of regular medication' ($p = 0.002$), 'given prn medication' ($p < 0.001$), and 'sent to PICU' ($p < 0.001$). An additional analysis of all officially reported adverse incidents, using the same analytic method, also failed to detect an effect for the experimental condition. Table 2 shows the main before and after results for each ward, both experimental and control. Although both experimental wards showed reductions in total conflict, so did four of the five control wards. There is a similar mixed picture for containment, with one experimental ward showing a reduction and one a small increase, while four of the five control wards show reductions. Overall, the second,

stronger analysis shows no statistically significant change in comparison to control wards, with patient characteristics and clustering by ward are taken into account.

DISCUSSION

The intervention was well received in the study Trust, and highly valued by patients, ward staff and by managers. It generated a great deal of local and some national interest, and the study Trust was very keen to keep the intervention going or extend the project in any way possible. Nevertheless the findings do not unambiguously support the efficacy of the intervention.

There are several possible explanations as to why the second, stronger analysis yielded a null result. The underlying model might be incorrect, it may not have been strong or intense enough to produce change, the design may have been under powered leading to Type II error (the failure to detect an effect when in truth there is one), or there may have been contamination between experimental and control wards.

If the intervention truly had no effect, this could be because the underlying theory for the intervention, which suggests that conflict and containment rates are in part determined by staff's positive appreciation of patients, their ability to manage their own emotional reactions to patient behaviour, and the deployment of an effective structure or rules and routines, may be incorrect or account for too small a proportion of variance in conflict and containment rates. Alternatively some elements of the intervention may have perversely increased conflict whilst others reduced it, leading to an overall null effect.

Another option is that the intervention itself may not have been strong enough to produce sufficient change. The City Nurses themselves may not have communicated the theory effectively enough, or may have unconsciously modified it during transmission to the ward staff. Or the freedom that was given to both City Nurses and the ward staff to together decide on specific ward based interventions consonant with the theory (in line with the action research element of the study design) might have led to significantly different implementations and changes on wards, and attenuated any impact.

It is also possible that the barriers to change described in a previous paper (limited staffing resources; problems with the physical environment and other resources; insufficient beds and the process of bed management; hierarchical ambiguity and multidisciplinary issues; the over-demanding role of the ward manager; and pervasive anxiety about the potential for serious untoward incidents and their implications for staff, Brennan et al 2006) were simply too high. However, the intervention was very intensive, with City Nurses present on the ward four days a week during the intervention period, their presence and the changes they were involved in producing were very highly valued by staff, and they participated in regular supervision from the principal investigator.

If the intervention did have an effect, as indicated by the before and after analysis, but this was not detected by the second more stringent analysis, this might be because the numbers of experimental wards were insufficient to deliver sufficient statistical power for the trial. Power calculations based on PCC-SR data from another study (Bowers et

al 2007) have suggested that many more wards are required for such a study. If the City Nurses intervention was to be attempted on this scale, many City Nurses would have been required, with additional research assistants, in order to run the trial. The overall cost would have been significantly larger than the project undertaken on this occasion, moreover the recruitment of experienced and skilled potential City Nurses for one year fixed term contracts might have posed difficulties. However the inclusion of admission and occupancy variables in the analysis may have increased the power of the study and perhaps partially compensated for the smaller number of wards included.

A further problem occurring during the course of the trial was the withdrawal of one ward prior to completion of the full intervention period, due to redeployment of staff. This also reduced the statistical power of the study.

The final potential explanation of the null finding of the stronger analysis is that there was contamination between wards, and the City Nurses intervention had an impact on all the wards, control and experimental. The City Nurse project did have a major impact on the Trust where the research took place, and was very highly regarded. Following the project the nursing structure was changed to place a Practice Improvement Nurse on every ward, to fulfil a function similar to that of the City Nurse. Inevitably, the City Nurses interacted with all the ward managers and with many other staff at training events, or when other staff covered shifts on the experimental wards.

CONCLUSIONS

These results do not rule out the efficacy of the City Nurses intervention, as the failure to detect an effect in the second analysis may be due to the sample size being too small, or contamination occurring between wards at the same site. However, neither do the results unambiguously support the efficacy of the intervention.

The main lessons for future psychiatric nursing research utilising whole ward interventions are as follows. Uncontrolled before and after studies have methodological weaknesses, and should not be used where resources are available for more robust designs. The additional use of control wards improves the rigor of such studies, but leads to a diminution of statistical power due to the clustering of results by wards, which may only be partially remedied by controlling for patient occupancy variables. Trials of this degree of rigor cannot be carried out cheaply, and are likely to require significant investment with careful planning and preparation. Even then, changes of local policy or key personnel can have a detrimental effect, eroding the power of the initial design through contraction of the sample, suggesting that at the outset studies should be over rather than under powered. In other words, tests of whole ward interventions to reduce conflict and containment are likely to require substantial sample sizes. When running those trials consideration should be given to keeping intervention wards in separate hospitals from the control wards, to overcome the problem of contamination.

Further research is therefore required before firm conclusions can be drawn about its efficacy and the validity of the underlying theory of the City Nurses intervention.

However, given the positive results of others (Guy et al 2007), and the solid inductive base of the theory (Bowers 2002), there may be some room for optimism and for trusting the before and after analysis.

ACKNOWLEDGEMENTS

This study was funded by the Square Smile Appeal and Henry Smiths Charities.

REFERENCES

Alexander, J. and Bowers, L. (2004) Acute Psychiatric ward rules: a review of the literature. *Journal of Psychiatric and Mental Health Nursing* 11(5)623-631

Bjorkdahl, A. Heilig, M. Palmstierna, T. and Hansebo, G. (2007) Changes in the occurrences of coercive interventions and staff injuries on a psychiatric intensive care unit. *Archives of Psychiatric Nursing* 21 (5):270-277.

Bowles N., Dodds P., Hackney, D., Sunderland, C., and Thomas, P. (2002) Formal observations and engagement: a discussion paper. *Journal of Psychiatric and Mental Health Nursing* (9):255-260

Bowers (2002) *Dangerous and Severe Personality Disorder: Response and Role of the Psychiatric Team*. London: Routledge

Bowers, L. (2005) Reasons for admission and their implications for the nature of acute inpatient psychiatric nursing. *Journal of Psychiatric and Mental Health Nursing* 12:231–236

Bowers, L. (2006) On conflict, containment and the relationship between them. *Nursing Inquiry* 13(3)172-180

Bowers, L., Jarrett, M. & Clark, N. (1998) Absconding: A Literature Review. *Journal of Psychiatric and Mental Health Nursing* 5:343-353

Bowers, L., Flood, C. Brennan, G. LiPang, M. and Oladapo, P. (2006) A trial to reduce conflict and containment on acute psychiatric wards: City Nurses. *Journal of Psychiatric and Mental Health Nursing* 13:165-172

Bowers, L., Simpson, A., Alexander, J., Hackney, D., Nijman, H., Grange, A. and Warren, J. (2005a) The Nature and Purpose of Acute Psychiatric Wards: The Tompkins Acute Ward Study. *Journal of Mental Health* 14(6)625-635

Bowers, L., Douzenis, A., Galeazzi, G., Forghieri, M., Tsopelas, C., Simpson, A., and Allan, T. (2005b) Disruptive and dangerous behaviour by patients on acute psychiatric wards in three European centres. *Social Psychiatry and Psychiatric Epidemiology* 40:822-828

Bowers, L., van der Werf, B., Vokkolainen, A. Muir-Cochrane, E., Allan, T. & Alexander, J. (2007) International variation in attitudes to containment measures for

disturbed psychiatric inpatients. *International Journal of Nursing Studies* 44(3)357-364

Bowers L, Whittington R, Nolan P., Parkin D, Curtis S, Bhui K. et al. (2007) The City 128 Study of Observation and Outcomes on Acute Psychiatric Wards. Report to the NHS SDO Programme. London: NHS SDO Programme

Brennan, G., Flood, C. and Bowers, L. (2006) Constraints and blocks to change and improvement on acute psychiatric wards – lessons from the City Nurses project. *Journal of Psychiatric and Mental Health Nursing* 13:475-482

Donner, A and Klar, N (2000) Design and analysis of cluster randomisation trials in health research. London: Arnold.

Flood, C., Brennan, G., Bowers, L., Hamilton, B., LiPang, M. and Oladapo, P. (2006) Reflections on the process of change on acute psychiatric wards during the City Nurses project. *Journal of Psychiatric and Mental Health Nursing* 13:260-268

Guy, S. Fyffe, S. and Ifill, W. (2007) Low conflict, high therapy nursing in a psychiatric intensive care unit. In *Forensic Nursing: Forensic Aspects of Acute Care*. London: Quay Books.

Maslach C. & Jackson, S. (1981). *The Maslach Burnout Inventory*. Palo Alto, CA: Consulting Psychologists Press.

Meehan, J Kapur, N Hunt, I Turnbull, P Robinson, J Bickley, H Parsons, R Flynn, S Burns, J Amos, T Shaw, J and Appleby L (2006) Suicide in mental health in-patients and within 3 months of discharge: National Clinical Survey. British Journal of Psychiatry 188:129-134.

Nijman, H. Allertz, W. Merckelbach, H. and Ravelli.D. (1997) Aggressive Behaviour on an Acute Psychiatric Admissions Ward. European Journal of Psychiatry 11 (2):106-114.

Phillips P. and Johnson S. (2003) Drug and Alcohol Misuse Among In-Patients with Psychotic Illnesses in Three Inner-London Psychiatric Units. Psychiatric Bulletin 27 (217):220.

Schwartz, Harold I.; Vingiano, William; Bezirgianian Perez, Carol. (1988) Autonomy and the Right to Refuse Treatment: Patients' Attitudes After Involuntary Medication. Hospital and Community Psychiatry. Oct. Vol. 39 No.10. 1049-1054

Szczesny S and Miller M. (2003) PRN medication use in inpatient psychiatry. Journal of Psychosocial Nursing 41 (1):16-21.

Tyson, G.A., Lambert, W. & Beattie, L. (1995). The quality of psychiatric nurses' interactions with patients: An observational study. International Journal of Nursing Studies, 32 (1), 49-58.

Weiss, D., Dawis, R., England, G. and Lofquist, L. (1967) Manual for the Minnesota Satisfaction Questionnaire. University of Minnesota.

Winship,G (2006) Further thoughts on the process of restraint. Journal of Psychiatric and Mental Health Nursing 13:55-60.

Table 1. Before and after rates of conflict and containment compared using Mann-Whitney-U test

Item	Before		After		z	p
	Mean per shift	Std. Dev.	Mean per shift	Std. Dev.		
Conflict total	4.799	3.933	3.828	3.636	-5.904	< 0.001
Containment total	4.560	2.642	3.740	2.337	-6.717	< 0.001
Verbal aggression	0.561	0.912	0.443	0.766	-3.282	0.001
Physical aggression against objects	0.135	0.405	0.089	0.323	-3.080	0.002
Physical aggression against others	0.104	0.366	0.061	0.288	-3.268	0.001
Physical aggression against self	0.075	0.313	0.084	0.414	-1.196	0.232
Suicide attempt	0.008	0.088	0.003	0.052	-1.653	0.098
Smoking in non smoking area	1.066	1.985	0.688	1.099	-1.250	0.211
Refusing to eat	0.307	0.621	0.199	0.525	-4.488	0.000
Refusing to drink	0.068	0.257	0.057	0.260	-1.274	0.203
Refusing to attend to personal hygiene	0.302	0.567	0.206	0.494	-4.646	0.000
Refusing to get out of bed	0.165	0.520	0.117	0.422	-2.420	0.016
Refusing to go to bed	0.222	0.596	0.212	0.666	-1.776	0.076
Refusing to see workers	0.042	0.224	0.034	0.216	-1.088	0.276
Alcohol misuse (suspected or confirmed)	0.096	0.330	0.108	0.342	-0.853	0.394
Substance misuse (suspected or confirmed)	0.129	0.423	0.118	0.404	-0.341	0.733
Attempting to abscond	0.234	0.470	0.215	0.467	-1.112	0.266
Absconding (missing without permission)	0.083	0.304	0.111	0.343	-1.848	0.065
Absconding (official report)	0.039	0.210	0.045	0.263	-0.090	0.928
Refused regular medication	0.274	0.518	0.291	0.538	-0.635	0.526
Refused prn medication	0.189	0.510	0.160	0.455	-1.121	0.262
Demanding prn medication	0.811	1.114	0.661	0.894	-2.072	0.038
Given prn medication	0.969	1.154	0.761	0.954	-3.279	0.001
Given IM medication (enforced)	0.069	0.266	0.040	0.217	-2.931	0.003
Sent to PICU	0.016	0.125	0.010	0.104	-1.382	0.167
Seclusion	0.016	0.125	0.007	0.098	-2.338	0.019
Intermittent observation	1.508	1.863	1.518	1.541	-2.445	0.014
Continuous observation	0.164	0.395	0.149	0.470	-2.226	0.026
Restrained	0.057	0.257	0.031	0.180	-2.389	0.017
Time out	0.107	0.425	0.054	0.257	-3.273	0.001
Door locked	2.622	1.929	2.912	1.911	-2.462	0.014

Table 2. Mean rates of total conflict and containment per shift, before and after the intervention, for both experimental and control wards entered in the second analysis.

	Total conflict		Total containment	
	Before	After	Before	After
Experimental				
Ward 3	3.21	2.87	4.23	3.05
Ward 4	8.02	5.22	1.46	1.62
Controls				
Control 1	4.57	2.80	1.83	1.44
Control 2	7.81	4.63	1.75	1.54
Control 3	10.69	7.71	2.31	1.97
Control 4	2.29	2.46	2.08	2.16
Control 5	3.15	2.68	2.12	2.04