Title.

Is knowledge and practice safer in England after the release of national guidance on the resuscitation of patients in mental health and learning disabilities?

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Abstract

Rationale, aims and objectives

In 2008 the National Patient Safety Agency (NPSA) issued a Rapid Response Report (RRR) aimed at healthcare organisations providing inpatient care for mental health and learning disability patients, requiring organisations to make proper provision for life support and resuscitation for these patients. This paper examines whether effective implementation of the Rapid Response Report recommendations had occurred across health providers in England.

Methods

1) Questionnaires were distributed nationally to clinical staff and implementation leads.

2) A national comparison of the number and severity of pre and post Rapid Response Report release related incidents involving choking/cardiac/respiratory arrest in Mental Health and Learning Disabilities settings was conducted.

3) Organisational compliance with the patient safety alert for all NHS Organisations in England was measured.

Results

There were five deaths post implementation of the Rapid Response Report that were considered to have serious enough error associated with the resuscitation. This was down from 18 pre the Rapid Response Report release.

Conclusion

Although our survey responses show a contradiction between organisational implementation and clinical staff awareness, our analysis suggests a reduction in moderate and severe harm cases and of deaths. There is evidence of a reduction in the worst types of error resulting in death, albeit with small numbers.

Key words. Patient safety, resuscitation, cardiac arrest, mental health

Accessible summary

- This paper reports on the issue of resuscitation in mental health inpatient environments. It reviews the literature on national standards and best practice when emergency situations arise in mental health settings. The discussion on the best practice literature takes place alongside the reporting of a national evaluation of how National Patient Safety Agency improvement guidelines for the provision for life support and resuscitation for mental health service users was effectively implemented across health care providers in England.

- Methods used to establish the effective use of the guidelines include feedback from clinical staff and staff responsible for the implementation of the new national standards for resuscitation. Serious incident data was also compared prior to the release of the national guidelines and after the guideline release dates. This included looking at events around choking and cardiac/respiratory arrest in inpatient areas.

- There were five deaths post implementation of the guidelines that were considered to have serious enough error associated with the resuscitation process. This was down from 18 prior to the release of the guidelines. However our survey showed that despite organisations reporting 100% compliance with the implementation of the guidelines, around half of frontline clinical staff were not aware of them.

- Although our survey responses show a contradiction between organisational and clinical staff awareness, our analysis suggests a reduction in moderate and severe harm cases and of deaths. There is evidence of a reduction in the worst types of error resulting in death, albeit with small numbers.

Introduction - background to study and overview of harm from the literature

This study looks at evaluating national guidance developed to reduce the incidence of death and harm associated with mismanaged resuscitation in mental health settings. This harm is evidenced in the patient safety literature and in the national data sets reported as patient safety incidents and collated at a national level.

Patients in mental health and learning disabilities settings can be vulnerable to cardiac or respiratory arrest through coexisting physical illness, self-harm, and the effects of medication, including rapid tranquilisation. They are also vulnerable to choking from a variety of causes such as dysphagia associated with illnesses like dementia, behaviour such as food bolting, pica (attempting to eat non-food items) or intentional self-harm. (National Patient Safety Agency, 2008 Rapid Response Report and Supporting Information).

The association of higher rates of physical disease and increased rates of morbidity and mortality for people with mental health problems has been widely reported for decades. (Harris and Barraclough, 1998). They are at an increased risk of a whole range of physical conditions including coronary heart disease, diabetes, and respiratory diseases. Antipsychotic medications have also been implicated in sudden cardiac deaths. (Mehtonen et al 2002 and Aziz et al 1999). People with learning disabilities are at a higher risk of additional health problems than the general population including increased respiratory difficulties, poor nutrition and hydration, and choking. (Aziz et al, 1999). No other published international work exploring the impact of policy changes on safer resuscitation practice in mental health could be found by the authors of this paper. This maybe because clinical research into acute trauma resuscitation is not well documented generally (Champion et al, 2007).

National Patient Safety information and subsequent alert and intervention

The National Reporting and Learning Service manages a national safety reporting system that receives confidential reports of patient safety incidents from healthcare staff across England and Wales. Clinical safety experts then analyse this data to identify common risks, trends and numbers of events to help inform policy and improve patient safety. Where necessary alerts are distributed throughout the NHS on the basis of this information received to highlight where services need to immediately address practice concerns or specific risks. An analysis of National Reporting and Learning Service data prior to 2008 had revealed 599 reports of at least moderate harm related to choking or cardiac or respiratory arrest in Mental Health and Learning Disabilities settings. (National Patient Safety Agency 2008).

The National Reporting and Learning Service data received in relation to resuscitation in mental health demonstrated wide variations in standards of resuscitation. Of these incidents, 26 described significant lack of staff knowledge, skills, or equipment. Three patient deaths occurred after choking

on food. Another 22 reports were of moderate or severe harm following choking. In November 2008 therefore, the National Patient Safety Agency issued a Rapid Response Report (2008) aimed at healthcare organisations providing inpatient care for mental health and learning disability patients. It required organisations to make proper provision for life support and resuscitation for these patients. Evidence from the reports had indicated a wide variation in standards of resuscitation, as well as failure to act on deterioration of patients and missed physical symptoms. The National Patient Safety Agency (2007) highlighted these concerns and reinforced actions, (based on NICE guidance and Resuscitation Council UK standards), by issuing a Rapid Response Report to all NHS organisations with actions to improve the rate of successful resuscitation in mental health and learning disability settings. The deadline to complete these actions was 20 May 2009. The Rapid Response Report provided the following recommendations;

1. Basic life support (BLS) training is based on Resuscitation Council (UK) standards, including the management of choking.

2. Patient areas have immediate access to BLS equipment, and automated external defibrillators where appropriate.

3. All patient areas where a cardiac arrest might be expected at least once every five years should have access to Automated External Defibrillators (AEDs) within three minutes.

4. Units where rapid tranquilisation, physical intervention, or seclusion may be used have access to staff trained in immediate life support and equipment.

5. Training includes regular practices where feasible.

6. Healthcare organisations identify a leadership role for resuscitation issues. They should also audit and report on life-support training attendance, and act on any lapses.

To determine whether the implementation of the Rapid Response Report recommendations had occurred, an evaluation was undertaken which are described in the next section.

Evaluation methods

A questionnaire was distributed nationally through patient safety action leads in each of the nine Strategic Health Authorities to all their mental health clinical staff to assess whether the Rapid Response Report actions had been acted upon. The survey began by reminding staff that in November 2008 the National Patient Safety Agency had issued a Rapid Response Report - *NPSA/2008/RRR010: Resuscitation in mental health and learning disability settings*. It was explained that the evaluation was seeking to establish awareness of the alert amongst staff and evidence of successful implementation of the actions of the Rapid Response Report. These leads were asked whether their organisations were compliant with guidelines that promoted a rolling programme of basic life support training for all staff (based on Resuscitation Council UK standards that include the management of choking). Staff were asked what resuscitation training programmes had been completed (or refreshed) in the last year. All surveys were electronic based and included free text boxes at the end of the surveys to allow staff to share other views on the Rapid Response Report system and the information

provided by the National Patient Safety Agency. This gave completers of the survey the opportunity to give feedback on issues important to them whilst providing some potentially valuable additional qualitative data.

Secondly a comparison of the number and severity of pre Rapid Response Report release and post Rapid Response Report release related incidents involving choking or cardiac or respiratory arrest in Mental Health and Learning Disabilities settings, (using data reported via the National Reporting and Learning System), was conducted. This was intended to establish if reported levels of harm with relation to adverse events around resuscitation and in mental health and learning disability settings had altered. This involved using expert clinical reviewers pre and post the Rapid Response Report implementation to assess whether problems identified in resuscitation events reported to the Reporting and Learning Service, were preventable and avoidable.

Lastly the Central Alert System was reviewed up until April 2010 one year after the original implementation date. The Central Alert System is a web-based system for issuing patient safety alerts and other safety guidance to

the NHS and is used as a mechanism for checking organisational compliance with patient safety alerts for all NHS Organisations in England. Organisations are required to 'sign off' via the Central Alert System when they have assessed that they have implemented the guidelines recommended in the Rapid Response Report. Although organisational (self) reporting is a limited proxy measure for establishing whether implementation has occurred, it was considered to be a potentially useful measure alongside the measurement of staff views and incident reporting.

Findings

      Staff responses came from 19 organisations out of a total of 58 mental health providers, (number of mental health trusts in UK 2011), with some Trusts having a number of responses. A variety of staff responded. Table 1 show that on average 50% of the respondents were not aware of the Rapid Response Report, with community staff being the least aware with less than a quarter of community staff being aware of the Rapid Response Report (21%). Awareness of Rapid Response Report was greatest amongst senior staff (50%), followed by front line staff (36%). However 51% of frontline staff and 50% of the total respondents had no awareness of the Rapid Response Report. Front line staff consisted of any ward based clinical staff such as doctors, nurses and nursing assistants but not consultant grade medical staff (as will be seen later this group was included in a more senior category). Community staff included clinical nurses, community psychiatric nurses and liaison staff. Senior/managerial staff consisted of consultant psychiatrist, modern matrons, nurse managers, risk managers and other senior managers.

Most staff had at least basic life support training or more including immediate and advanced life support. Table 2 shows that of the community staff 61% had some form of life support training. For frontline staff this figure was 82% and for senior staff and managers this figure was 83%. The figures returned in our survey suggest a low level of advanced life support training across all the three staff groups; community (2%), frontline staff (6%) and senior clinical or managerial posts (10%). Resuscitation experience (Table 3) was equivalent for community and frontline staff (26% and 27%) and higher for more experienced staff. (48%).

In terms of feedback from implementation leads, 27 organisations out of a possible 56 mental health providers reported compliance with the Rapid Response Report actions (identified earlier in the paper). These ranged from 41% for action 5, 67% for actions four and six and 78% for actions one, two and three. We also asked implementation leads whether risk assessments had been carried out on whether Automated External Defibrillators were required and 56% said they had.

Qualitative feedback from the clinicians provided by them at the time of completing the surveys.

A number of respondents took the opportunity to comment more generally when responding to the survey at the end of the survey in free text boxes provided. For example some frontline staff found the training to be interesting, but that there was not enough training given around emergency drug administration, or for skills and knowledge around working with elderly people. One community staff member commented that they had received additional advanced training for anaphalaxis since the swine flu vaccinations as well as for the administration of intra-muscular adrenaline. Another commented that whilst working in the community setting, the recent stance had been that community psychiatric nurses/social workers did not require basic life saving skills updates.

One senior manager expressed a view that there was a 'mess in Learning Disability services, under local authority management.' Furthermore that the role of clinicians was unclear and caused a lot of confusion as to what

was required regarding NHS requirements. Not all feedback was complimentary. Another senior manager expressed a view that in 'my 25 years on inpatient units I have never really had to use Basic Life Support and I wonder if the time spent in training and policy making is disproportionate.'

Qualitative feedback from the implementation leads

Similarly the implementation leads were also given the opportunity to comment more generally in open text boxes within the electronic surveys at the end of the questionnaire. A few themes emerged from the free text responses including seeing the implementation of the national guidance as a 'useful' process for organisations, finding the supporting information on the clinical issue useful in itself, identifying that the implementation of the national guidelines could be impeded by organisational barriers and that the process had an effect of promoting best practice. Some examples of the implementation leads qualitative responses are shared here.

The usefulness of the implementation process

Implementation leads commented that their Trusts had a greater understanding of response times to medical emergencies as a result of the Cardio Pulmonary Resuscitation drills undertaken in clinical areas. Two leads commented on how their managers had become more aware of the need for regular training in skills that are rarely used whilst simultaneously staff had become much more aware of their roles and responsibilities in particular around the importance of the Resuscitation Officer. Two Trusts commented on how the implementation process had led them to a review of the equipment and to realise that some of their equipment was out of date or in the wrong location. The clear advice and guidance, that had the effect of increasing awareness and clarity was appreciated with one lead giving the example of how standardisation (promoted within the guidelines) would help emergency teams respond in unfamiliar areas, such as out-patients, with deteriorating patients using oxygen, and 'increased awareness of how to use the defib equipment.' Others commented that the Rapid Response Report had proved to

be a positive tool in reinforcing the importance of the availability of resuscitation equipment and standards required in life support training.

The supporting information was considered useful

The critical incident examples provided were reported by several implementation leads to be interesting and useful; they provided helpful contextual information; gave senior clinical staff a framework for reviewing practice and support decision making. Previously the Resuscitation Council literature had been very acute care focused and therefore specific risks for mental health had not been included commented one implementation lead.

Barriers to implementation

As far as barriers to implementation were concerned 19% of organisations reported a lack of resources, time and staff, whilst 15% reported difficulties around standardisation and maintaining training programmes as specific difficulties around the implementation of the national guidelines.

Table 1. Here

Table 2. Here

Table 3. Here

Comparison of the number and severity of pre Rapid Response Report release and post Rapid Response Report release related incidents involving choking or cardiac or respiratory arrest in Mental Health and Learning Disabilities settings

Tables 4 report the Reporting and Learning System data used at the National Patient Safety Agency to determine if levels of harm and death in relation to adverse events around resuscitation and in mental health and learning disability settings had altered. Table 4 shows a pre Rapid Response Report total number of 8 combined severe and moderate harm to patients with 18 deaths totalling 26 cases. The table shows a post Rapid Response Report total number of 8 combined severe and moderate harm to patients with 5 deaths, totalling 13 cases. Table 5 shows a Chi Squared analysis of the proportion of harm and death to numbers of reported harms for pre Rapid Response Report (26/599) compared to post Rapid Response Report (13/567). This result was at a borderline level of significance of just over 0.05. However a further comparative analysis shown in table 6, of just the proportion of deaths for pre Rapid Response Report (18/599) and post Rapid Response Report (5/567) was highly significant at the 0.01 level.

Finally the Central Alert System returns reported that all mental health providers had implemented the guidelines recommended in the Rapid Response Report.

Table 4 Here

Table 5 Here

Table 6 here

Discussion

The following discussion outlines the change in numbers of resuscitation errors pre and post the Rapid Response Report. It also examines organisational compliance with the Rapid Response Report, as well as resuscitation awareness amongst staff and knowledge. Additionally it explores staff views on the usefulness of information issued as part of the alert from the National Patient Safety Agency.

There were five deaths post implementation of the Rapid Response Report considered to have serious enough error associated with the resuscitation, such that they were reported to the National Reporting and Learning Service. This was down from 18 such cases prior to the release of the Rapid Response Report. The details of these 5 incidents included; on one occasion a defibrillator machine being in situ but failing to work when used; an emergency situation whereby a call had to be made to the ambulance service three times in order to get an ambulance to attend; a collapsed patient after a hanging attempt, with a manager attempting four times to call emergency services but could not get through (older adults); a deteriorating

patient complaining of chest and arm pain resulting in the duty doctor being called but then not responding until an hour later. After 20 minutes of waiting emergency services were called.

Our survey showed a 100% compliance reporting from organisations with the Rapid Response Report. However around half of frontline staff were not aware of the Rapid Response Report. Under a quarter of community staff were aware of the Rapid Response Report. Lower rates of awareness amongst community staff may reflect a perception that resuscitation and medical emergencies are less of an issue in the community setting. Being away from the hospital environment may lead to a view that medical emergencies are not the role of community based psychiatric professionals perhaps partly being reflected in some of the textual responses from staff. If this is the case, then this is far from ideal as the original scoping exercise performed by the National Patient Safety Agency identified concerns about staff not having sufficent skills or being able to intervene before the paramedics arrived when medical emergencies did occur.

The difference in results between organisations and clinical staff could be explained by staff not being aware of the Rapid Response Report, yet being aware of the information, issues and necessary actions around resuscitation. In other words the Rapid Response Report may well have been implemented at the organisational level such that it had its intended 'effect' on training implementation, though staff were not aware of its existence as a national policy. The National Patient Safety Agency acknowledged that this was an unusual alert in that all the important aspects could be potentially implemented successfully without necessarily involving front line staff. Furthermore 'managers' are often clinically senior people themselves and therefore the cascading of training through professional leads such as emergency team leaders, may have reflected a higher awareness at a more senior level.

If however our results reflect a genuine lack of knowledge around resuscitation, then this is of concern. The difference in expressed awareness of the Rapid Response Report between organisations and clinical staff could raise questions as to how organisations successfully disseminate best practice guidelines. This is also a challenge given the numerous competing training

demands placed on staff and that managers have to ensure staff attend and complete.

However although our survey responses show a contradiction between organisational and clinical staff awareness, our statistical analysis of incidents does suggest a reduction in moderate and severe harm cases and of deaths.

Additional qualitative data provided as feedback from the implementation leads as part of their survey returns may not be as robust as the aforementioned data. It may even be susceptible to bias due to the small number of responses. However the implementation leads are senior experienced clinical staff who represent large organisations whose views of implementation process are worth reflecting on. For example the implementation leads had commented on how the issuing of a national Rapid Response Report with clear advice and guidance, had increased awareness and clarity. Favourable comments were also fed back via the electronic survey around the supporting information (National Patient Safety Agency, 2008 supporting information) which included defined rationales for training

requirements, as well as clear statistical evidence and guidance on the implementation. Specifically the supporting information on choking related incidents was commented upon as being helpful as this was specific to mental health. A theme of the implementation having helped to promote best practice emerged with some implementation leads expressing that the Rapid Response Report addressed risks and concerns which frontline practitioners may have long been aware of but not fully appreciated.

Life support. National standards and best practice

The Resuscitation Council UK (2010) requires all healthcare staff to have on-going training in basic life support, and additionally suggests that Automated External Defibrillator should be provided in any healthcare setting that might reasonably expect to use them at least once every five years.

Staff ought to be trained in immediate life support standards and have access to appropriate equipment for ILS (including Automated External Defibrillators), in situations where rapid tranquilisation is required. In any mental health or learning disabilities setting where rapid tranquilisation, physical intervention, or seclusion is never used (and cardiac arrest even once every five years is unlikely), it is important that staff still have the skills to provide basic life support. Furthermore the equipment they need to do this without risk to themselves (e.g. self-inflating bag-mask devices, bag valve masks, or mouth-to-mask devices) should also be available.

In the United Kingdom standards for clinical practice and training in cardiopulmonary resuscitation are set by the Resuscitation Council in collaboration with the Royal College of Anaesthetists, The Royal College of Physicians, and the Intensive Care Society, and based on expert review of the evidence base. Whilst the highest levels of resuscitation are only practical in acute general hospital settings, Resuscitation Council (UK) standards contain principles that can be adapted to the particular risks and challenges of all health care settings. These guidelines for basic life support also include an element on the management of choking.

Final thoughts, limitations and future work.

Resuscitation events are rare and preventable deaths associated with error in the resuscitation procedure are rarer still. The small numbers associated with these types of events does mean some caution is required in looking at the reductions in incidents around death and harm.

This evaluation of the implemetation of national guidelines for resuscitation raises a number of questions for debate and possible further

research. Firstly the low level of immediate life support in the community (only 2% compared to 25% for frontline and 31% for senior clinical and managerial staff) probably reflects the genuine challenge of providing trained personnel and access in the community to equipment such as Automated External Defibrillators, bag valve mask, oxygen, cannulas, fluids, suction and first-line medications. To an extent this low level of training for immediate support and for advanced life support for the same reasons would be expected, compensated for in the main by higher levels of basic life support. However of concern are the levels overall of no training at any level, basic or otherwise in the community, especially if considered alongside the non-responders which may also have a proportion of non-training within their numbers. Arguably, basic life support training is also a mechanism for appreciating the deteriorating patient as well and without training there is a risk of deteriorating patients being missed. It can also be questioned as to whether the low level of Automated External Defibrillator training in the community is a justified approach. Automated External Defibrillators are now available in many public spaces in the UK as the result of a successful government policy to promote and introduce public access defibrillation. (Davies et al, 2002). The question therefore arises that if the public can have access to Automated External

Defibrillators with no prior training in an emergency should community staff not be expected to have at least some means of readily accessing Automated External Defibrillators, such as within their vehicles and at Community Mental Health facilities or equivalent.

Future work should involve site visits to examine the physical standards and conditions of resuscitation equipment and the extent of knowledge and practice amongst inpatient and community staff. An audit tool is available from the authors for organisations to check the rational for the National Patient Safety Agency recommended actions as well as the compliance with the standards identified in the original Rapid Response Report in the supporting information in appendices 1 and 2. (National Patient Safety Agency, 2008).

The authors have found no evidence in the literature, or from their communications with external agencies, that systematic checking of cardiac arrest equipment and trolleys occurs as part of any external official visit or quality and safety checks. In future there needs to be a clear means identified

to ensure that monitoring resuscitation standards in mental health and learning disabilities continues.

As with all studies there are limits set regarding the time afforded to the study and what is being investigated. On this occasion the data explored used reasonable periods of time for pre and post comparison. However future research may explore using a longer period of trend data on death or severe harm associated with error in resuscitation in mental health settings to establish more certainty on sustained change in practice and safety.

In conclusion we can say that the initial data analysed by the National Patient Safety Agency leading up to the Rapid Response Report identified a problem in Mental Health Services. Since the release of the Rapid Response Report there have been national attempts to improve services, with some evidence of a reduction in the worst types of error resulting in death, albeit with small numbers. However this evaluation cannot provide conclusive evidence overall at this stage, for significant knowledge and practice changes around the management of physical health emergencies but it does show some encourages signs of safer services emerging.

Conflicts of interest.

None

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Table 1. Responses for awareness of RRR from community, frontline and senior /managerial staff

Count of Aware of RRR			group					
Aware of RRR	community		frontline		senior/managerial		Grand Total	
No Answer Entered	21%	13	13%	36	13%	7	**14%**	56
No	57%	35	51%	143	37%	19	**50%**	197
Yes	21%	13	36%	101	50%	26	**36%**	140
Grand Total	100%	61	100%	280	100%	52	**100%**	393

Table 2. Types of staff and training that they described as having undertaken

Count of resus training	group							
resus training	community		frontline		senior/managerial		Grand Total	
[No Answer Entered]	21%	13	13%	36	13%	7	47%	56
Advanced life support	2%	1	6%	17	10%	5	18%	23
Basic life support	57%	35	48%	135	42%	22	147%	192
First Response	0%		2%	5	0%		2%	5
Immediate life support	2%	1	25%	69	31%	16	58%	86
None	18%	11	5%	14	4%	2	27%	27
Other	0%		1%	4	0%		1%	4
Grand Total	100%	61	100%	280	100%	52	300%	393

Table 3. Resuscitation experience amongst community, frontline and senior /managerial staff

Count of Resus experience	group							
Resus experience	Community		frontline		senior/managerial		Grand Total	
[No Answer Entered]	21%	13	13%	36	13%	7	14%	56
No	52%	32	60%	168	38%	20	56%	220
Yes	26%	16	27%	76	48%	25	30%	117
Grand Total	100%	61	100 %	280	100%	52	100%	393

Table 4. Types of error associated with resuscitation procedure with recorded number of harm (severe and moderate) and death pre and post RRR

Theme of resuscitation problem	Outcome pre*			Outcome post**		
	Patient death	severe mod	Total	Patient death	severe mod	Total
Lack of staff knowledge or skills	6	2	8	0	1	
Availability/use of resuscitation equipment	5	2	7	1	0	
Unnecessary transfer	4	2	6	1	4	
Other reasons	3	2	5	3	3	
Total	**18**	**8**	**26**	**5**	**8**	**13**

*January 2006 - March 2008

**Combined 1st November 2008- 30th April 2009 (implementation period) and 1st May 2009 - 30th April 2010 (post rrr)

Table 5. All harm associated with error and preventable harm in resuscitation procedure. Preventable harm is determined using expert clinical review as described in the original NPSA Supporting Information National Patient Safety Agency (2008) Rapid Response Report NPSA/2008/RRR010: Resuscitation in mental health and learning disability settings.

Table of alert by harm

			harm		
			harmed	unharmed	Total
alert					
	post rrr	**Frequency**	13	554	567
		Percent	1.11	47.51	48.63
		Row Pct	2.29	97.71	
		Col Pct	33.33	49.16	
	pre rrr	**Frequency**	26	573	599
		Percent	2.23	49.14	51.37
		Row Pct	4.34	95.66	
		Col Pct	66.67	50.84	
Total		**Frequency**	39	1127	1166
		Percent	3.34	96.66	100

Statistics for Table of alert by harm

Statistic	DF	Value	Prob
Chi-Square	1	3.7783	0.0519
Likelihood Ratio Chi-Square	1	3.8594	0.0495
Continuity Adj. Chi-Square	1	3.1714	0.0749
Mantel-Haenszel Chi-Square	1	3.775	0.052
Phi Coefficient		-0.0569	
Contingency Coefficient		0.0568	
Cramer's V		-0.0569	

Fisher's Exact Test

Cell (1,1) Frequency (F)	13
Left-sided Pr <= F	0.0366
Right-sided Pr >= F	0.9833
Table Probability (P)	0.0199
Two-sided Pr <= P	0.0718

Sample Size = 1166

Table 6. Deaths associated with error in resuscitation procedure

Table of alert by harm				
		harm		
		death	other harm	Total
alert				
post rrr	**Frequency**	5	562	567
	Percent	0.43	48.2	48.63
	Row Pct	0.88	99.12	
	Col Pct	21.74	49.17	
pre rrr	**Frequency**	18	581	599
	Percent	1.54	49.83	51.37
	Row Pct	3.01	96.99	
	Col Pct	78.26	50.83	
Total	**Frequency**	23	1143	1166
	Percent	1.97	98.03	100

Statistic	DF	Value	Prob	
Chi-Square	1	6.7906	0.0092	
Likelihood Ratio Chi-Square	1	7.2373	0.0071	
Continuity Adj. Chi-Square	1	5.7369	0.0166	
Mantel-Haenszel Chi-Square	1	6.7847	0.0092	
Phi Coefficient		-0.0763		
Contingency Coefficient		0.0761		
Cramer's V		-0.0763		

Fisher's Exact Test				
Cell (1,1) Frequency (F)	5			
Left-sided Pr <= F	0.0072			
Right-sided Pr >= F	0.9982			
Table Probability (P)	0.0054			
Two-sided Pr <= P	0.0105			