UK Video Telemetry Units: are they safe?

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on behalf of
BSCN and ANS National Audit Group

The problem

- Aim to record seizures
- AED withdrawal
- Injury
- SUDEP
- Ensure patient safety
- Guidelines

Standards for safety of video telemetry : surveys and guidelines

An international survey of long term video EEG services	Fitzsimons	J Clin Neurophys	2000
ILAE : Recommendations regarding the requirements and applications for long term recordings in epilepsy	Velis	Epilepsia	2007
American epilepsy society EMU symposium		Unpublished	2008
Safety of long-term video-EEG monitoring for evaluation of epilepsy	Noe	Mayo Clin Proc	2009
Essential services, personnel, and facilities in specialised epilepsy centres – revised 2010 guidelines	Labiner	Epilepsia	2010
Video-EEG monitoring: Safety and adverse events in 507 consecutive patients	Dobesberger	Epilepsia	2011
Risk of adverse events on epilepsy monitoring units: a survey of epilepsy professionals	Shafer	Epilepsy & Behaviour	2011
Videotelemetry safety survey	McAuley	Arch diseases childhood	2012
Developing a culture of safety in the epilepsy monitoring unit	Spanaki	Epilepsy & Behaviour	2012
Safety considerations in the epilepsy monitoring unit for psychogenic nonepileptic seizures	Atkinson	Epilepsy & Behaviour	2012

Aims

- Measure safety of VT units
  - Adverse events
  - Professional attention during seizures
- Identify factors to improve safety
- Produce UK guidelines and standards

Methods

- 63 Clinical Neurophysiology departments registered for national audits invited to participate
- 31 participated : over 80% of units with VT
- 27 included : data incomplete in 4
- 2 forms
  - Unit infrastructure
  - Prospective study of seizures
    - First 5 seizures from first five patients 1/11/11 – 31/12/11
- Service evaluation

II. UNIT INFRASTRUCTURE	
9. How many video-telemetry beds do you have?	
10. How many video-telemetry beds are in single occupancy cubicles?	
11. How many video-telemetry beds are in multiple occupancy bays?	
12. Do you have a dedicated unit for videotelemetry distinct from the general neurology or neurosurgery ward? **If "Yes" please go to question 17** **If "No" please go to question 13**	Yes/No
13. How many beds are there on the ward in total?	
14. What is the minimum number of nurses*on the ward during the day?	
15. What is the minimum number of nurses on the ward during the night?	
16. Do your telemetry beds have nurses: (Please tick one option) **If '2' please go to question 19**	1. Dedicated to the VT beds or 2. Looking after the patients on VT as part of general nursing duties
17. If nurses are dedicated to telemetry or if it is a dedicated VT unit, how many nurses at any one time monitor the patient(s) during the day?	
18. If nurses are dedicated to telemetry or if it is a dedicated VT unit, how many nurses at any one time monitor the patient(s) during the night?	
19. Is the VT bed in direct view from the nurses' station?	Yes/No
20. How do the nurses monitor the patients? Please tick all that apply	TV or computer monitor at a nurses station Nurses sitting outside the patient's room Nurses sitting within the patient's room Alarms Other eg via relatives, carers
21. Is ECG monitored for all patients undergoing VT?	Yes/No
22. Can the nurses monitoring the patient easily see the ECG?	Yes/No
23. Is there a cot-side policy?	Yes/No
24. If so what is it?	
25. Overall do you find the intensity of nursing care appropriate?	Yes/No

*For the purposes of the questionnaire, the term 'nurses' includes unqualified healthcare assistants, support workers etc

FORM B :

- **Please complete one form for each of the first five attacks from five consecutive patients admitted for video-telemetry.**
- **Please exclude attacks provoked by Clinical Physiologist performing activation techniques**

Postcode of Centre (Please complete)		**Project Code** (Do not complete. For office use only)	

1. Was the patient monitored on the adult or paediatric unit?	Adult/Paediatric
2. Was the patient in a single occupancy cubicle or multiple occupancy bay?	Single cubicle/multiple bay
3. What was the nature of the attack?	Epileptic Non-epileptic (psychogenic) Other (please give details)
4. What were the main clinical manifestations of the seizure? Please provide a brief description	
5. Please circle any of the following options that best summarises the attacks: more than one description may apply.	**Epileptic** Negative motor phenomena/motor arrest Astatic eg slumping as part of a complex partial seizure Myoclonic Oro-facial,manual automatisms eg lipsmacking, plucking clothes Mild lower limb automatisms (mild movements lower limbs) Hypermotor (ie thrashing around) Tonic Tonic clonic Other **Non-epileptic events** Apparent unresponsiveness Slumping Obvious thrashing around Other
6. Using the 24 hour clock, what time did the initial **clinical** (not EEG) manifestations of the seizure begin (= T1)?	
7. Using the 24 hour clock, what time did the clinical manifestations of the seizure finish, including the post ictal confusional state (= T2)?	
8. How long was the seizure in seconds (T1 – T2)?	
9. Was the seizure attended to by health care professional?	Yes/No
10. Was a relative present at the time of the seizure?	Yes/No
11. Using the 24 hour clock what time did the health care professional attend to the patient (= T3)?	
12. What was the latency in seconds between the first initial clinical manifestations and the care from the health care professional (= T1-T3)?	
13. Did any adverse event occur during the seizure? if 'Yes' please circle all that apply	Yes/No Fall out of bed/ Fall from standing/ Fall from chair Hit head/ Hit limbs Status epilepticus/ Subconvulsive status epilepticus Psychosis/ Wandering Seizure unnoticed and found on post acquisition review Other (please list)
14. Do you feel that any adverse event was prevented during the seizure due to intervention by nursing staff/relative or friend?	Yes/No
15. If yes – what was prevented and by whom, (for example the patient was prevented from rolling out of bed, by nurse steadying the patient during the seizure)	
16. When was the VT study reviewed following acquisition?	

2 Forms

VT Unit Infrastructure

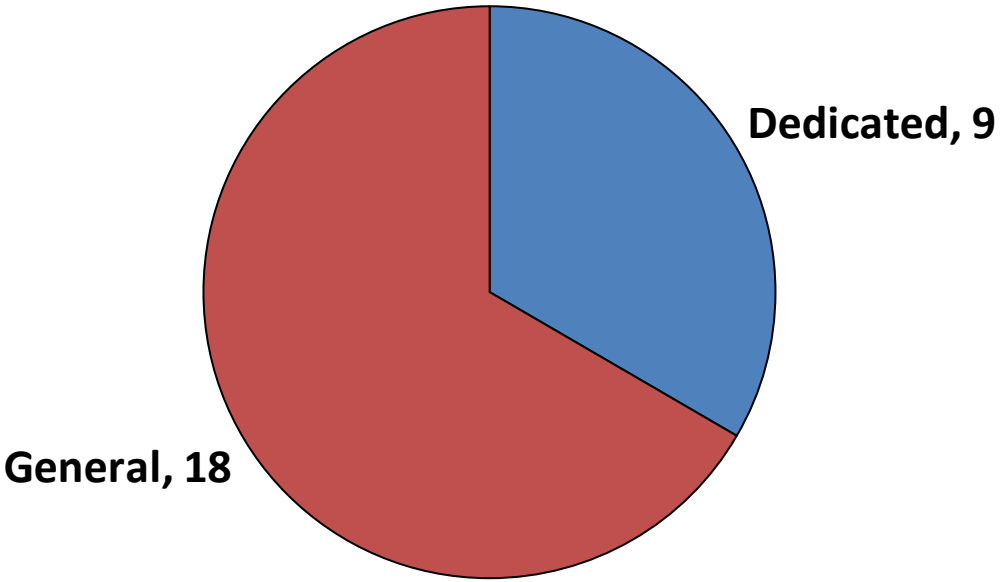
- Nurses*: Dedicated vs General
- Bay vs Cubicles
- Patient observation methods
- Nurse: patient ratios
- Other: ECG, cot sides
- Perception of intensity nursing care

Seizures

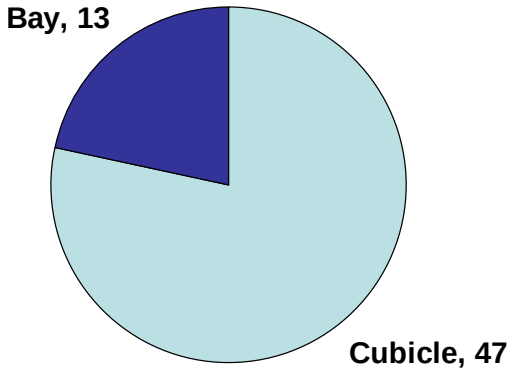
- Adult or child
- Type of attack
- Timing: Day or Night
- Nurse in attendance
- Delay to nurse attendance
- Relative in attendance
- Adverse events
- When study reviewed

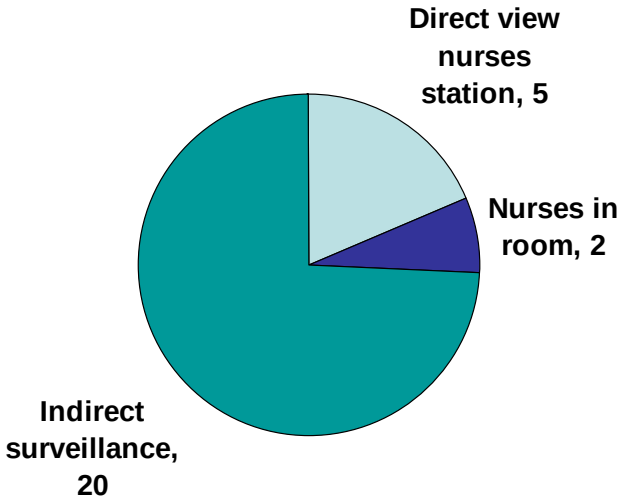
Results: Infrastructure

27 units: Nursing

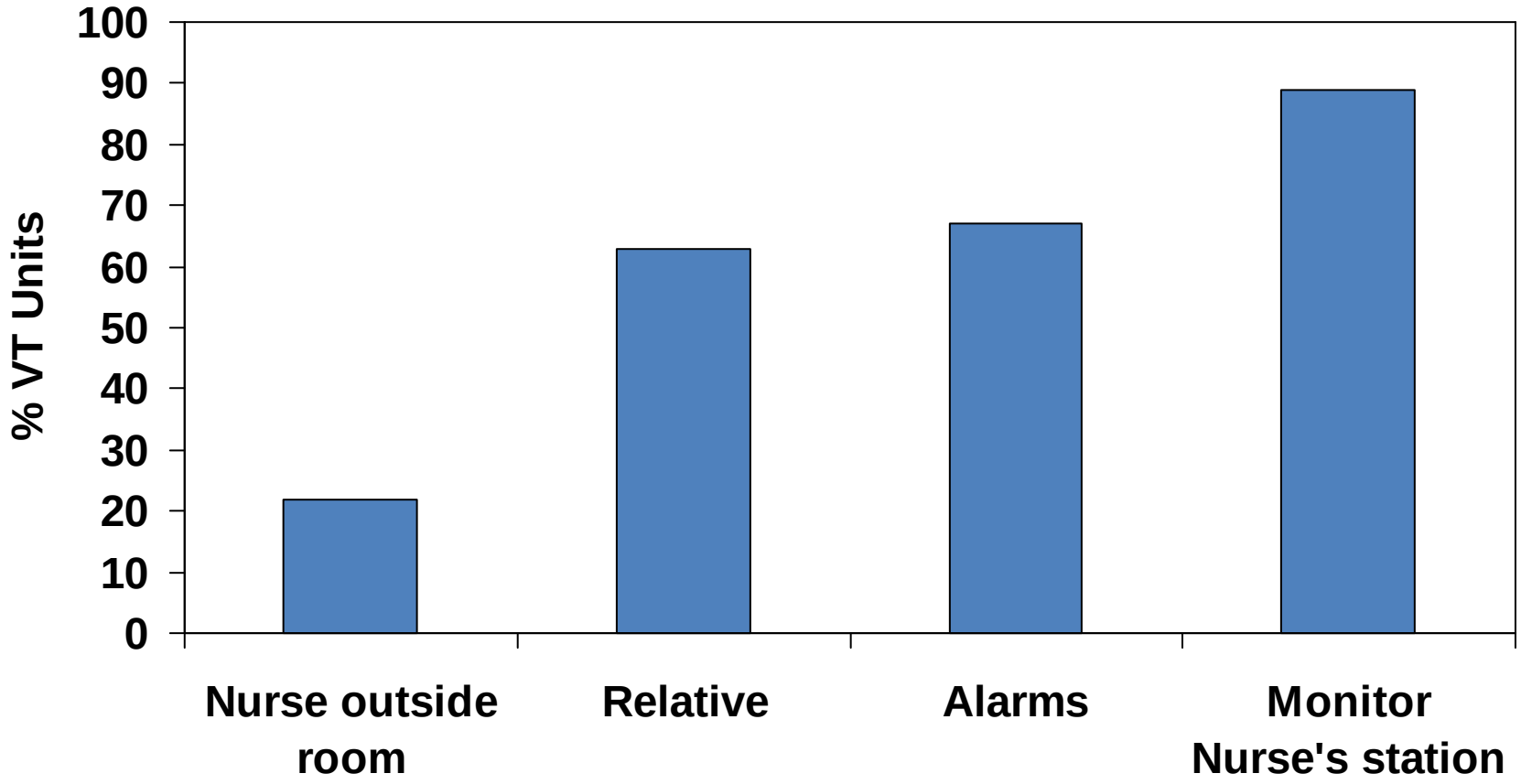


60 beds: median 2/unit range 1 - 7



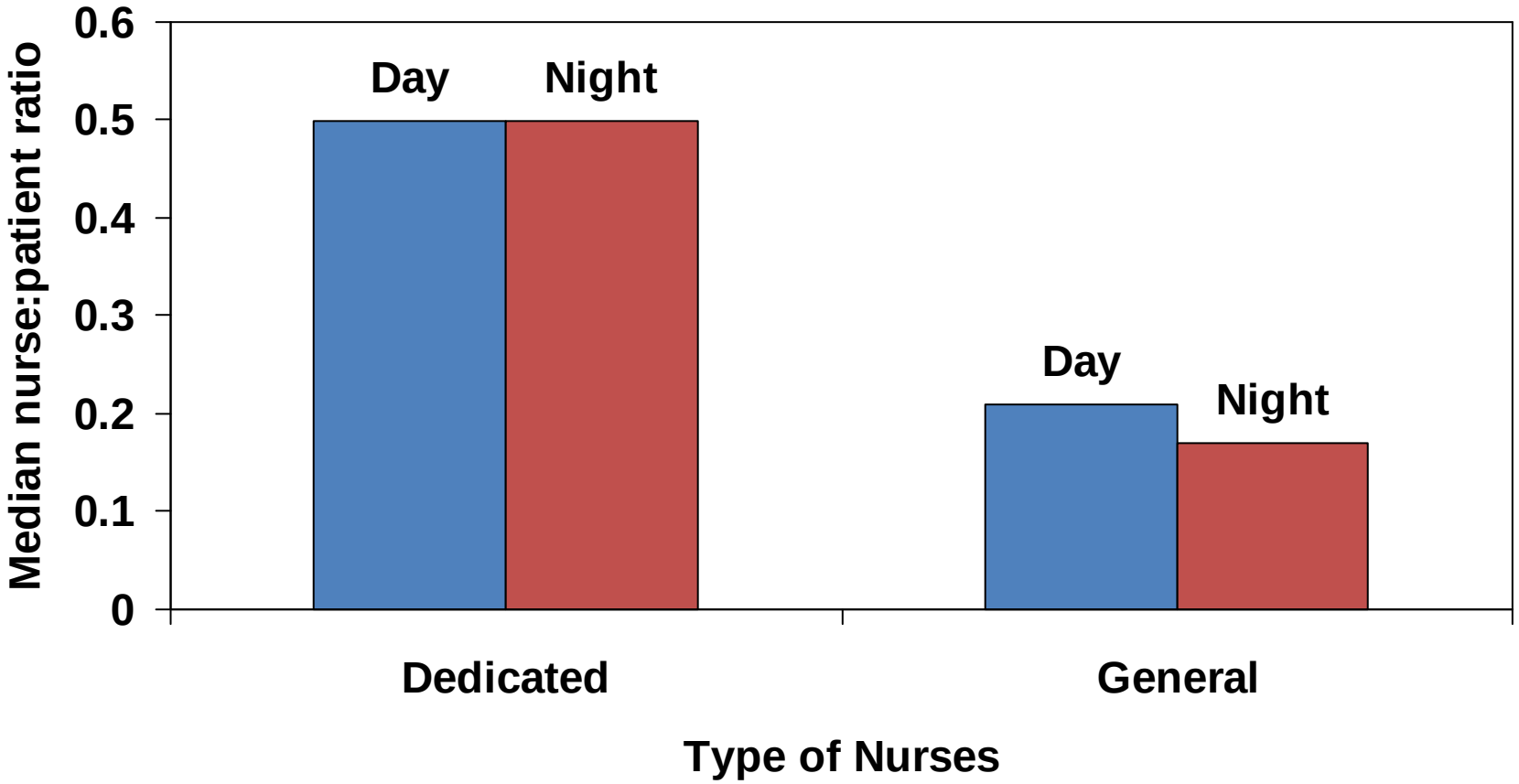


Indirect patient surveillance methods



Nurse to patient ratios day & night

Nurse to patient ratios: Median 1: 5 Range 1:1 to 1:15

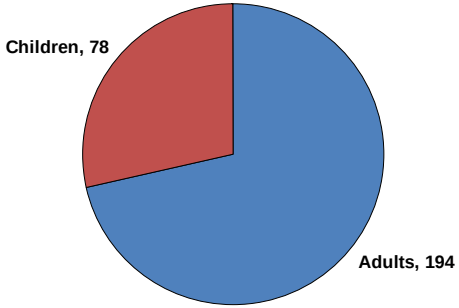


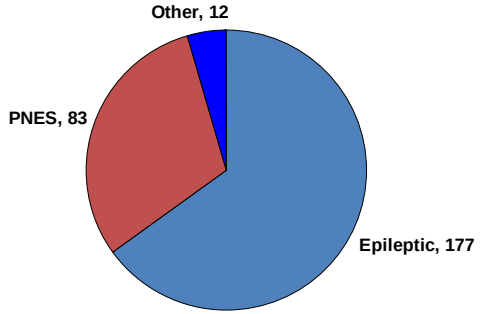
Other safety issues

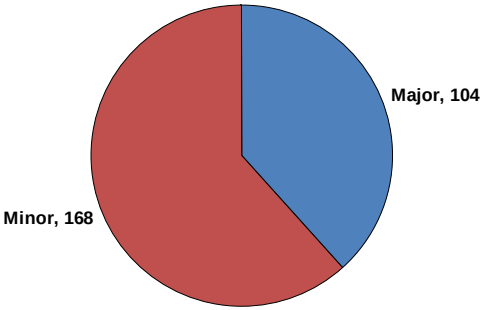
- All 27 units monitored ECG but only visible to nurses in 17
- 21 units had a cot side policy:
  - Up in 18
  - Down in 2
  - Not stated in 1
- Only 12/27 units thought intensity of nursing was appropriate

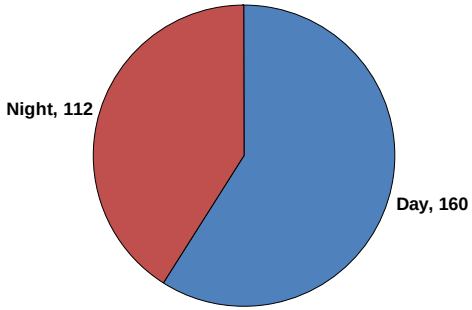
Results:
Prospective study of seizures

272 seizures: characteristics



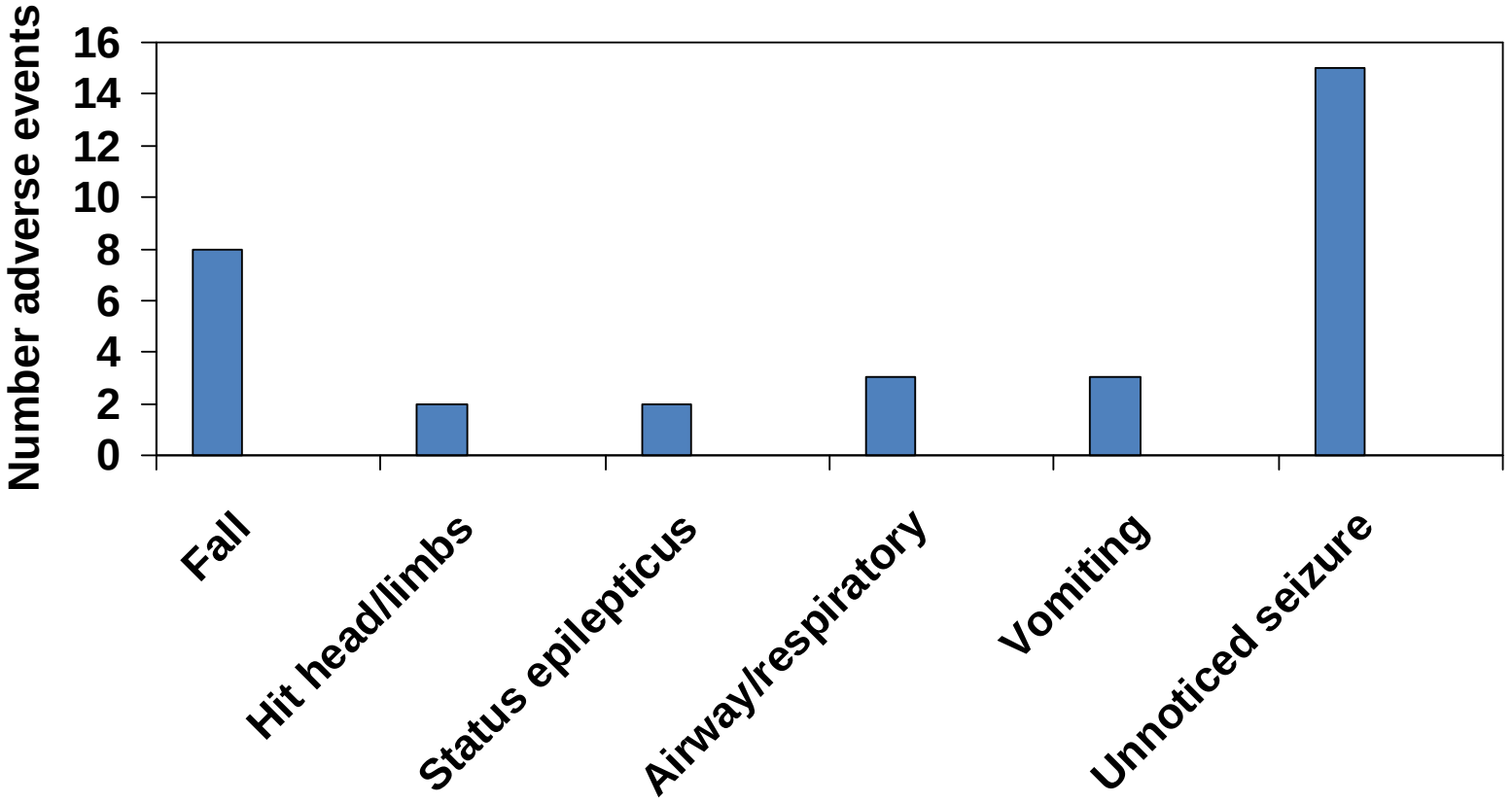






Adverse events n = 33 in 272 Seizures (12%)

Night = 52% Day = 48%



Attendance in Seizures

	% Seizures
Attended by Nurse	56
Not Attended by Nurse	44
Not Attended by Nurse but attended by Relative	22
Attended by Neither Nurse nor Relative	22

Attendance in Seizures

	% Seizures
Attended by Nurse	56
Not Attended by Nurse	44
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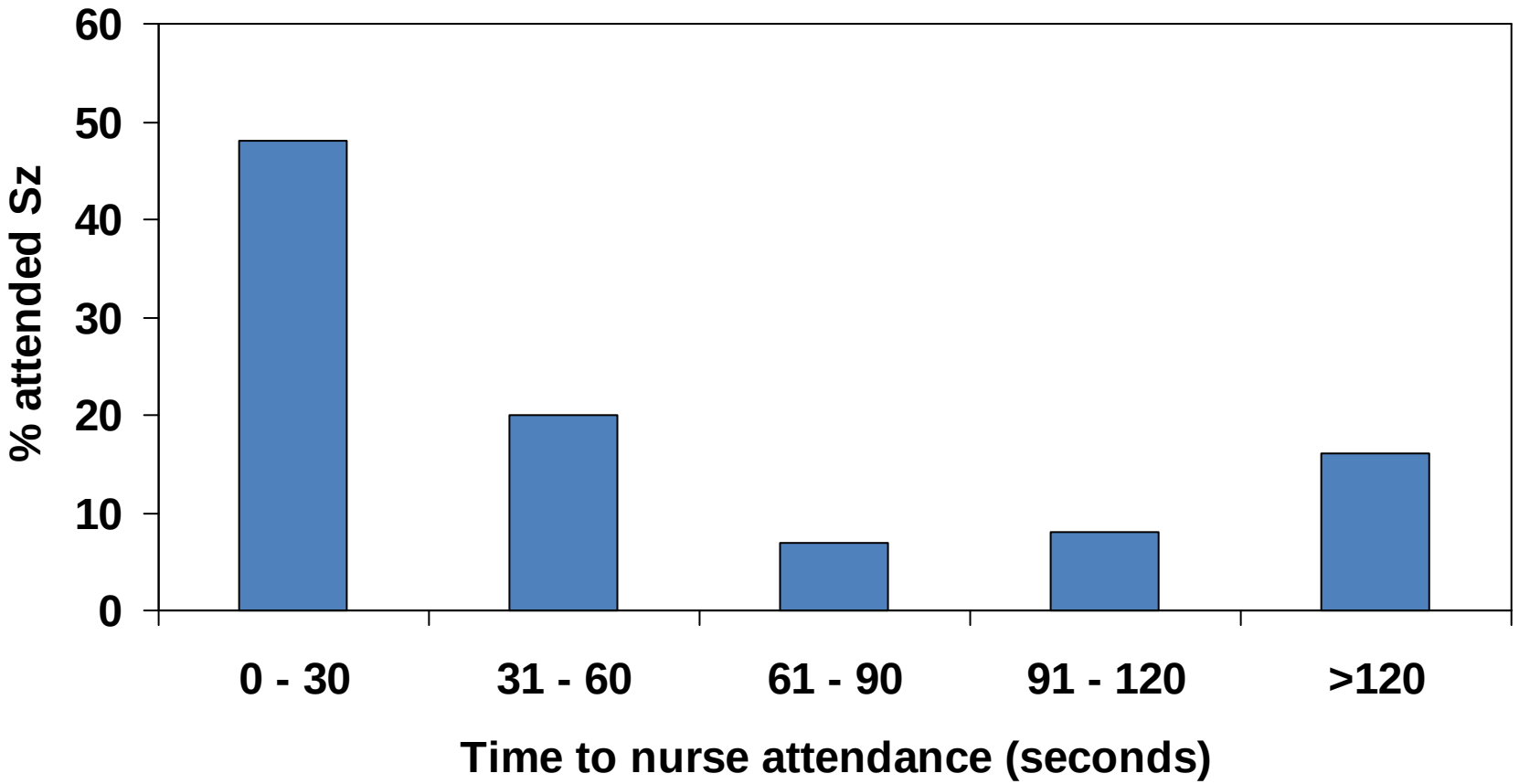
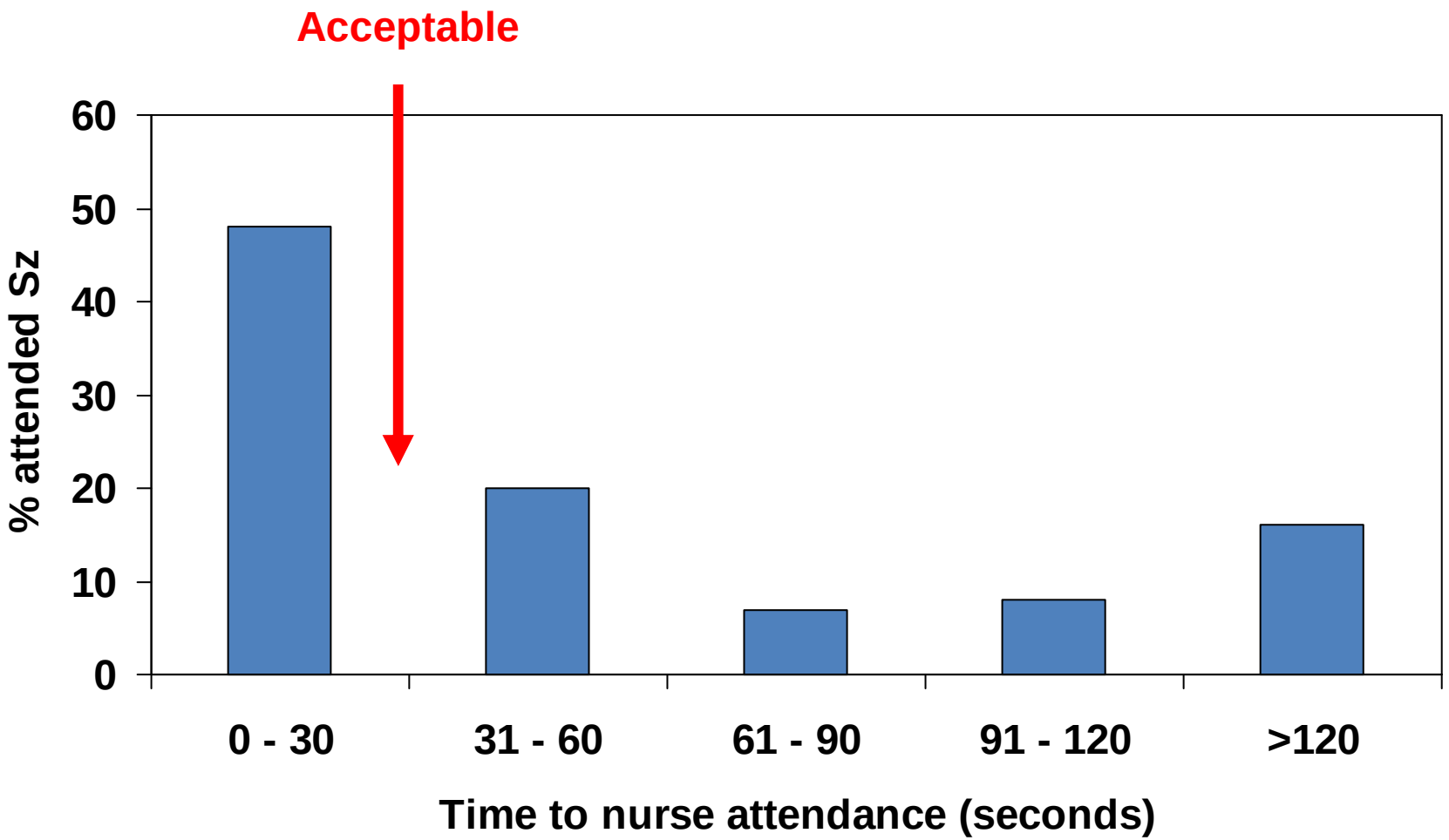
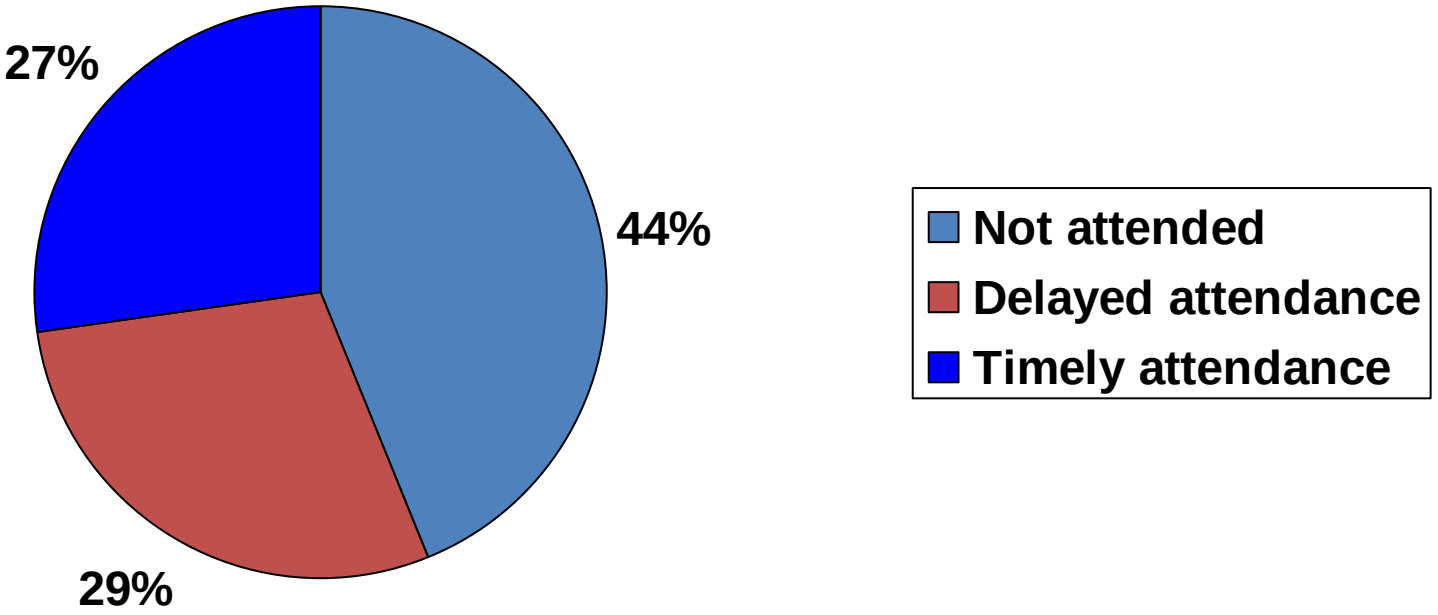
Timing of Nurse attendance (n = 153)



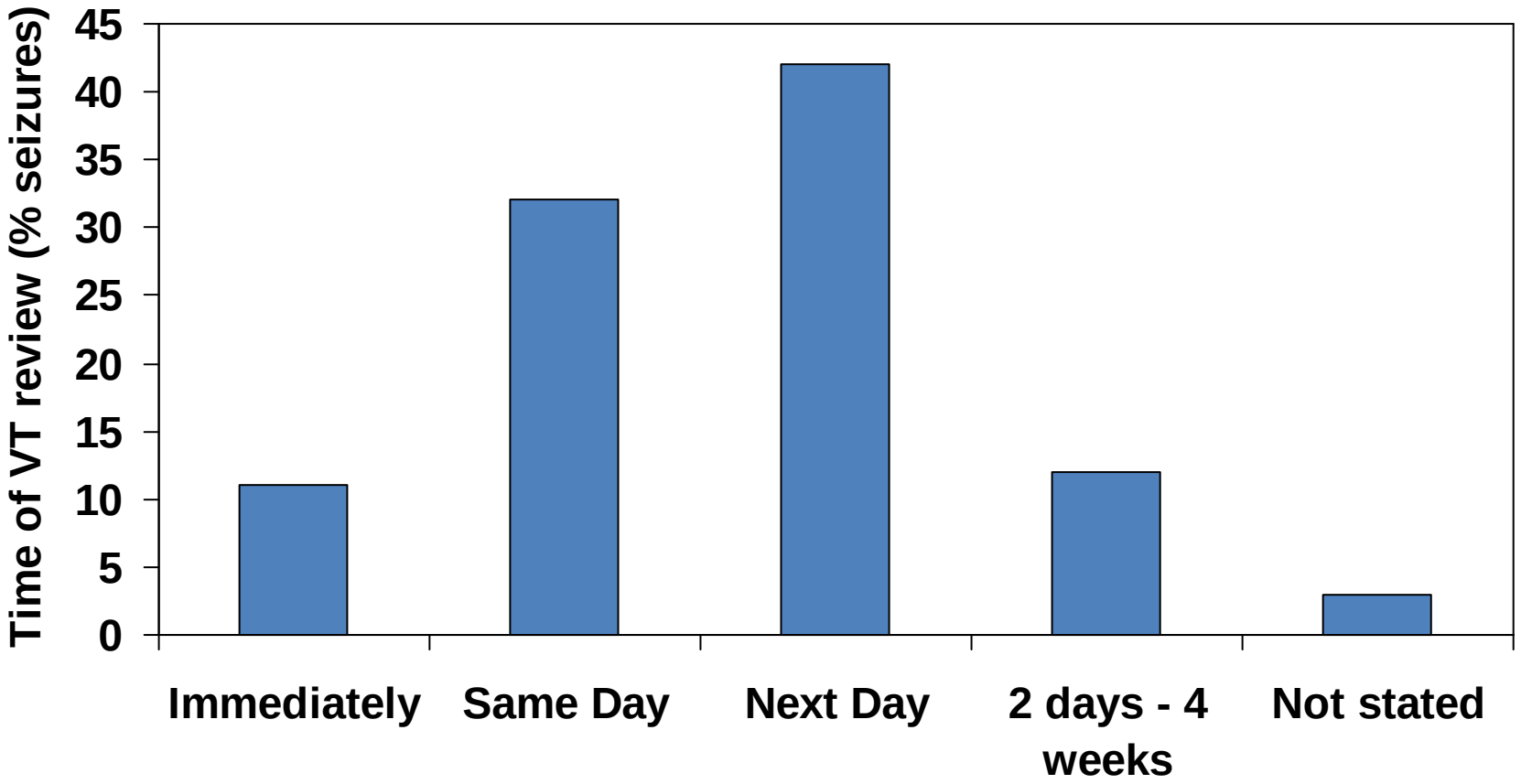
Timing of Nurse attendance (n = 153)



Nurse attendance: Summary



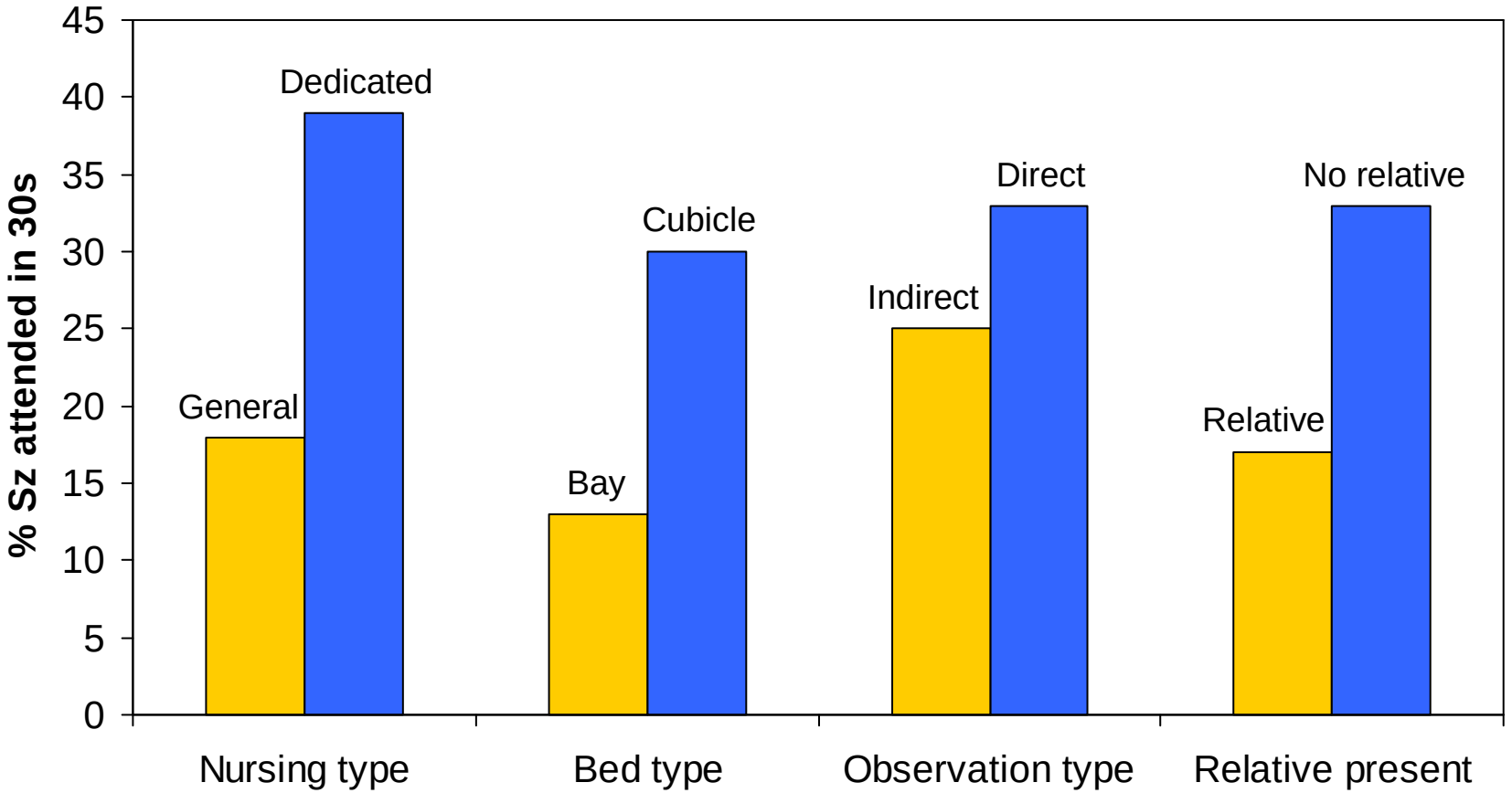
Time of VT review



Identifying factors to improve safety

- Type of nurse
- Type of bed
- Type of observation
- Relative to stay
- Nurse to patient ratio

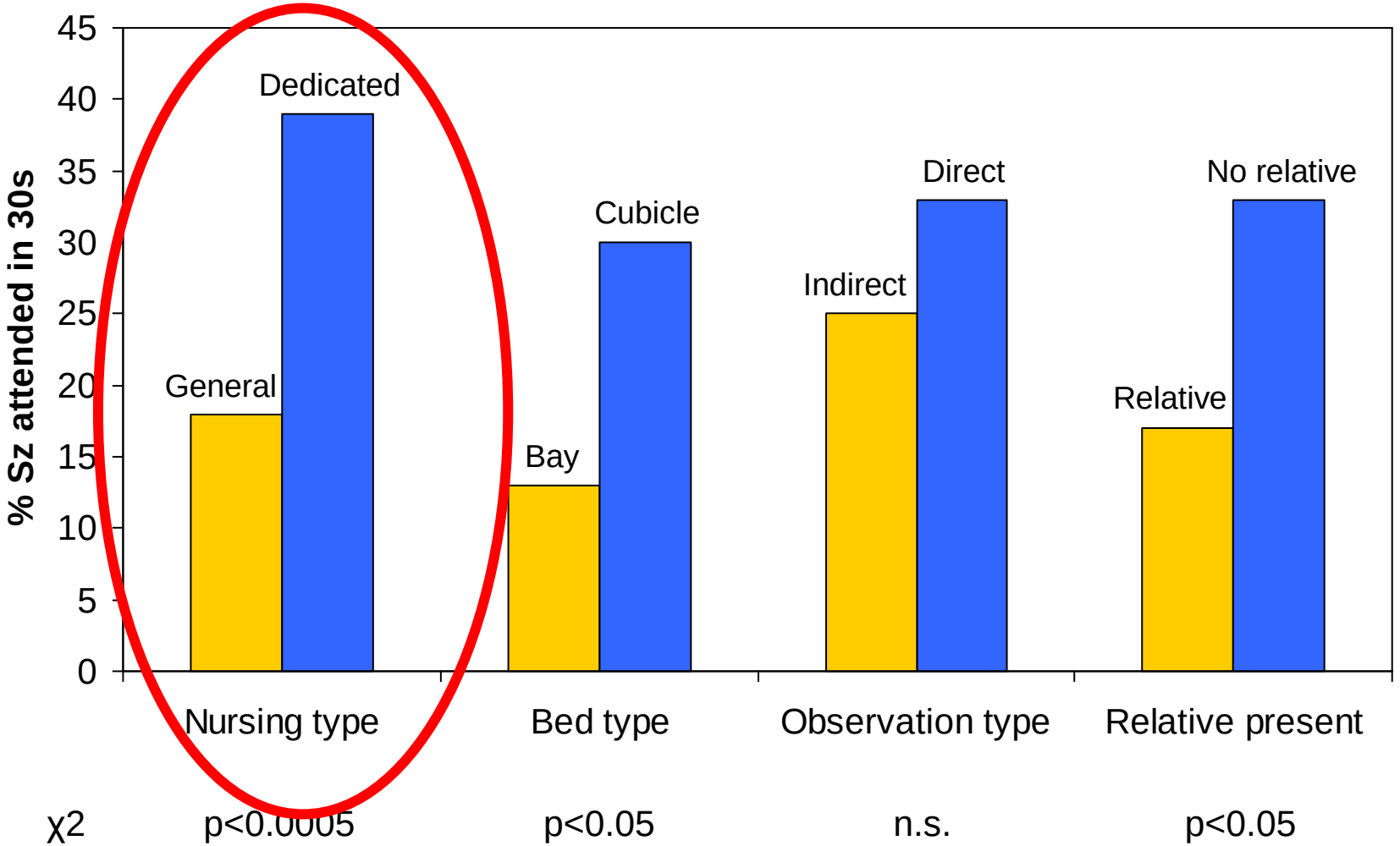
Factors affecting attendance in 30 seconds



χ2	p<0.0005	p<0.05	n.s.	p<0.05

Factors affecting attendance in 30 seconds

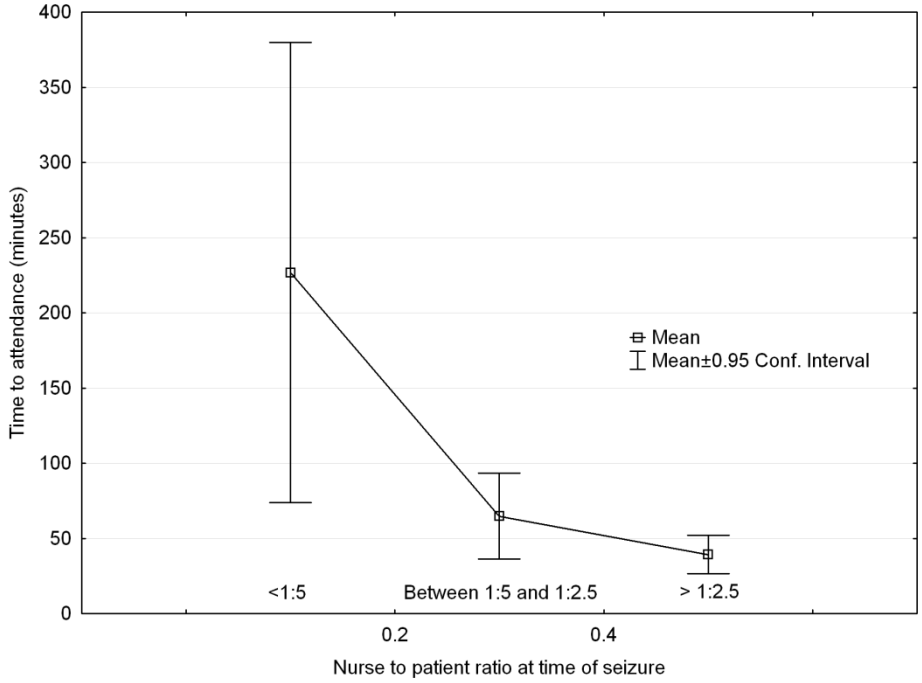
Multivariate analysis: Dedicated nursing p<0.01



χ2	p<0.0005	p<0.05	n.s.	p<0.05

Nurse to patient ratio

Nurse : Patient Ratio	% Seizures attended in 30 seconds
Low <1:5	21
Medium 1:5 – 1:2.5	29
High >1:2.5	37



Nurse to patient ratio not an independent factor in multivariate analyses

Conclusions (1): Are UK Video Telemetry Units safe?

- Over half UK VT units perceive nursing supervision to be inadequate
- Perception supported by study:
  - Half seizures not attended at all
  - Only a quarter attended within 30 seconds
- Adverse events not unusual (12%) day and night
- Delay in VT review beyond 24 hours in 12%
- ECG not displayed in 40% units

Conclusions (2):
Factors which improve VT unit safety

- Dedicated nurses improve timely attendance
- Bed type & methods of observation not important
- Presence of relative reduces timely nurse attendance
- Nurse to patient ratio: not independent factor but better attendance as ratio improves

Provisional National Standards & Guidelines

Awaiting ratification by BSCN & ANS

To include……

1. All VT units should have 24 hour surveillance by healthcare professionals (HCP).
2. The level of HCP surveillance should be similar throughout each 24 hour monitoring period as adverse events occur at a similar frequency during the day and night
3. The HCPs should be dedicated to the VT unit and not be expected to perform other duties even if telemetry beds are situated on a general ward.
4. It is not possible to specify the optimum HCP:Patient ratio for a video telemetry unit but the evidence suggests that a ratio of not less than 1:4 may be appropriate
5. The patient's heart rate should be clearly displayed to the monitoring HCP usually by ECG or alternatively by pulse oximetry, to allow prompt intervention during instances of serious ictal cardiac arrhythmias.
6. HCPs should be trained to recognise seizures and major disturbances of cardiac rhythms
7. VT studies should be reviewed by Neurophysiology staff within 24 hours to reduce consequences of unnoticed seizures
8. Whilst the presence of a relative may be beneficial to patient safety, accompanying relatives should be encouraged to alert HCPs to all seizures occurring in the VT unit

Thanks to….

- BSCN
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- Ming Lai
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