

# Nurse-led Critical Care Outreach

How the service has developed at  
The National Hospital (NHNN)



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# Critical Care Outreach

## *Where it all began*

- ◆ Many critically ill patients are on wards – *not just in ICU*
- ◆ Physiological deterioration often not recognised or inadequately treated<sup>1,2,3</sup>
- ◆ Patients recovering from critical illness need follow-up once discharged to the ward
- ◆ Advocated a hospital-wide approach to critical care

1. Goldhill DR, White SA, Sumner A. Physiological values and procedures in the 24 hours before ICU admission from the ward *Anaesthesia* 1999; 54: 529-34
2. McQuillan P, Pilkington S, Allan A et al Confidential inquiry into quality of care before admission to intensive care *BMJ* 1998;316:1853-58
3. NCEPOD (2005) *An Acute Problem? A report of the National Confidential Enquiry into Patient Outcome and Death*; NCEPOD London





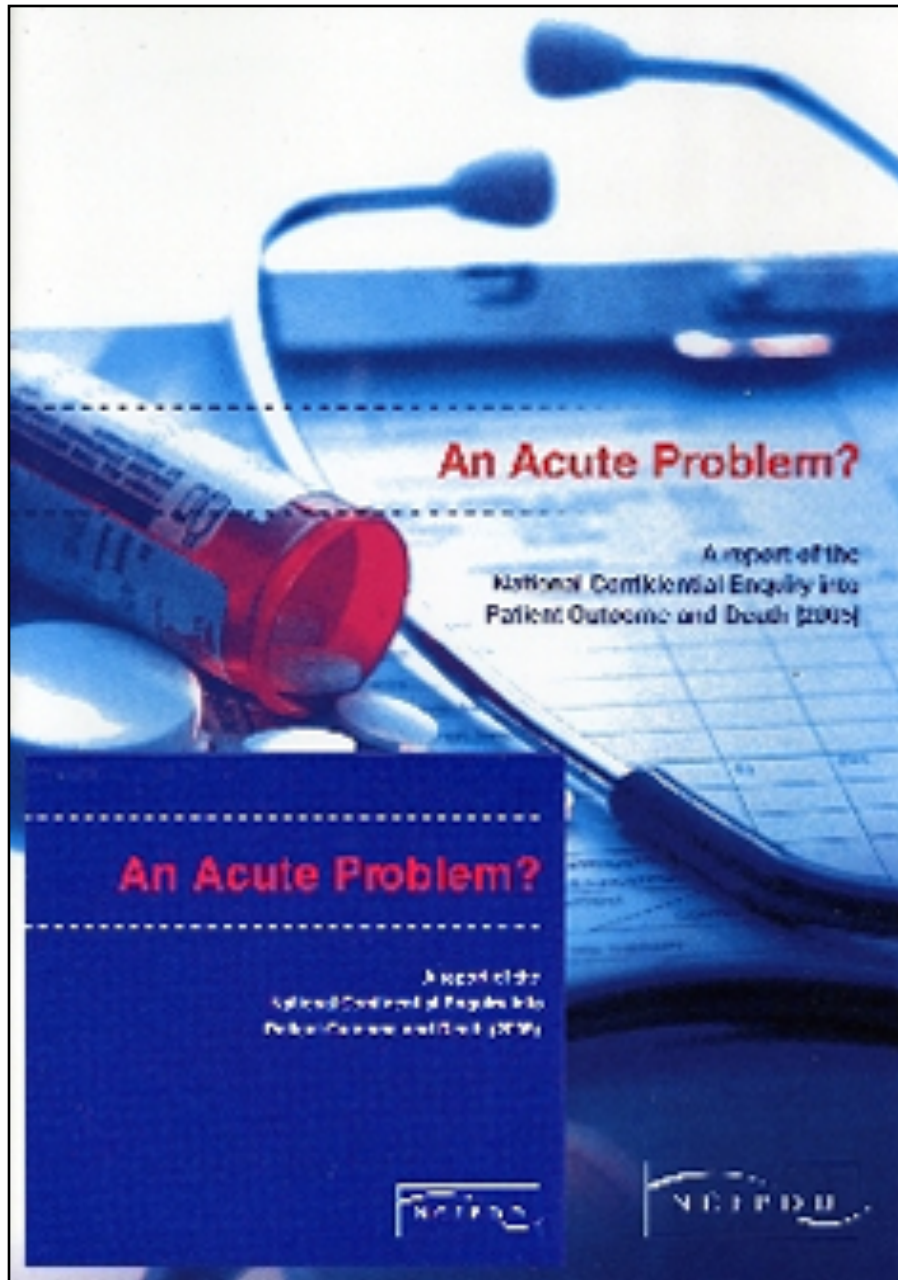
## *Comprehensive Critical Care*

A REVIEW OF ADULT CRITICAL CARE SERVICES

### **2000 Department of Health review of adult critical care services**

- ◆ Report recommended that all critical care units establish an Outreach Service





## 2005 National Confidential Enquiry into Patient Outcome and Death

- ◆ Recommended use of physiological **track and trigger** systems for inpatients throughout all UK hospitals
- ◆ Linked to **response team** skilled to assess and manage the clinical problems
- ◆ 24 hours a day / 7 days a week



# Critical Care Outreach

## *Finding the resources*

2001

- ◆ Set up Outreach service - *to comply with DoH recommendations*
  - *No additional resources, ICU nurse +/- ITU consultant made brief visits to wards*
  - *'Outreached' patients who had been discharged from ICU*
- ◆ Averted some admissions / readmissions to ICU
- ◆ Enabled earlier discharge from ICU – *discharged patients with more confidence if we could provide some 'follow-up'*
- ◆ With 'dedicated' resources we could do better



# Critical Care Outreach

## *Finding the resources*

2001

2008

- ◆ Appointed 2 nurses with sole remit for Outreach Service
  - *Intensive care experience a requirement*
- ◆ Established a Monday to Friday 9am – 5pm service
- ◆ 513 patients 'outreached' in 1<sup>st</sup> year (1,356 visits)
  - *Some patients required only 1 follow-up visit, others required visits over several days*
- ◆ *Value of outreach service was by now well recognised*



# Critical Care Outreach

## *Finding the resources*

2001

2008

2010

- ◆ Team increased to 3 nurses
- ◆ Service increased to Monday to Friday 8am – 8pm



# Critical Care Outreach

## *Finding the resources*

2001

2008

2010

2015

- ◆ Team increased to 4 nurses
- ◆ Service increased to 8am – 8pm / 7 days a week
- ◆ 993 patients 'outreached' in 2015



# Critical Care Outreach

## *Finding the resources*

2001

2008

2010

2015

2016

- ◆ Team increased to 6 nurses
- ◆ Service increased to 24 hours a day / 7 days a week



# Critical Care Outreach

## *Outreach Nurse role*

### ◆ Visit all wards each shift

- *Assess patients on 'outreach list' + any patient referred to them*
- *Advise and assist ward team with patient management*
- *Make referrals to other teams (Pain Team, Physiotherapist, Palliative Care)*
- *3 days / week Anaesthetic Consultant joins them to review 'sick' patients*

### ◆ ICU discharges

- *Join ICU ward round to check on discharges each day*
- *Support transition to ward environment*

### ◆ Key link in multidisciplinary team

- *Handover of 'sick' patients on wards to Senior Anaesthetist on duty*



# Critical Care Outreach

## *Needs an 'ALERT' system*

- ◆ Estimated 40% of deaths in acute hospitals preventable with earlier intervention
- ◆ 60-80% of in-hospital arrests show pre-monitory sign(s)
  - *Average duration of abnormal sign(s) 8 hours*
- ◆ Physiological 'track and trigger' system needed to monitor patients in acute hospital settings
- ◆ Individual hospitals created own early warning systems but lack of consistency in how deteriorating patients identified



## National Early Warning Score (NEWS)

Standardising the assessment of  
acute-illness severity in the NHS

**Clinical observation chart to be used throughout the NHS**

Report of a working party July 2012

- ◆ Systematic approach to assessing acute-illness severity
- ◆ Simple triggers for escalation of care
- ◆ Standardised NEWS training for all staff in UK



# Introduction of NEWS

## *How does NEWS work?*

- ◆ A score is allocated to 6 physiological measurements + oxygen therapy

- Respiratory rate
- Oxygen saturation
- Temperature
- Systolic blood pressure
- Pulse rate
- Level of consciousness (AVPU)

Alert  
Responds to Voice  
Responds to Pain  
Unresponsive

- ◆ The more abnormal the measurement the higher the score
- ◆ The six scores are aggregated to produce a total score
- ◆ High scores alert nursing +/- medical team to escalate care



## National Early Warning Score (NEWS)\*

PHYSIOLOGICAL PARAMETERS	3	2	1	0	1	2	3
Respiration Rate	≤8		9 - 11	12 - 20		21 - 24	≥25
Oxygen Saturations	≤91	92 - 93	94 - 95	≥96			
Any Supplemental Oxygen		Yes		No			
Temperature	≤35.0		35.1 - 36.0	36.1 - 38.0	38.1 - 39.0	≥39.1	
Systolic BP	≤90	91 - 100	101 - 110	111 - 219			≥220
Heart Rate	≤40		41 - 50	51 - 90	91 - 110	111 - 130	≥131
Level of Consciousness				A			V, P, or U

\*The NEWS initiative flowed from the Royal College of Physicians' NEWS Development and Implementation Group (NEWSDIG) report, and was jointly developed and funded in collaboration with the Royal College of Physicians and the NHS Foundation for Innovation

**Total NEWS = 6**

Please see next page for explanatory text about this chart.



Training for Innovation



## The National Early Warning Score (NEWS) thresholds and triggers

NEWS scores	Clinical risk
0	Low
Aggregate 1 – 4	
<b>RED score*</b> <b>(Individual parameter scoring 3)</b> Aggregate 5 – 6	Medium
Aggregate 7 or more	High

Please see next page for explanatory text about this chart.



## Outline clinical response to NEWS triggers

NEWS SCORE	FREQUENCY OF MONITORING	CLINICAL RESPONSE
0	Minimum 12 hourly	<ul style="list-style-type: none"> <li>Continue routine NEWS monitoring with every set of observations</li> </ul>
Total: 1-4	Minimum 4-6 hourly	<ul style="list-style-type: none"> <li>Inform registered nurse who must assess the patient;</li> <li>Registered nurse to decide if increased frequency of monitoring and / or escalation of clinical care is required;</li> </ul>
Total: 5 or more  or  3 in one parameter	Increased frequency to a minimum of 1 hourly	<ul style="list-style-type: none"> <li>Registered nurse to urgently inform the medical team caring for the patient;</li> <li>Urgent assessment by a clinician with core competencies to assess acutely ill patients;</li> <li>Clinical care in an environment with monitoring facilities;</li> </ul>
Total: 7 or more	Continuous monitoring of vital signs	<ul style="list-style-type: none"> <li>Registered nurse to <b>immediately</b> inform the medical team caring for the patient – this should be at least at Specialist Registrar level;</li> <li>Emergency assessment by a clinical team with critical care competencies, which also includes a practitioner/s with advanced airway skills;</li> <li>Consider transfer of Clinical care to a level 2 or 3 care facility, i.e. higher dependency or ITU;</li> </ul>

Please see next page for explanatory text about this chart.



NEWS KEY 0 1 2 3		NAME:	D.O.B.	ADMISSION DATE:	
DATE				DATE	
TIME				TIME	
RESP. RATE	≥25			3	≥25
	21-24			2	21-24
	12-20			1	12-20
	9-11			1	9-11
	≤8			3	≤8
SpO <sub>2</sub>	≥96			1	≥96
	94-95			2	94-95
	92-93			3	92-93
	≤91			2	≤91
Inspired O <sub>2</sub> %	%			2	%
TEMP	≥39°			2	≥39°
	38°			1	38°
	37°			1	37°
	36°			1	36°
	≤35°			3	≤35°
NEW SCORE uses Systolic BP	230			3	230
	220				220
	210				210
	200				200
	190				190
	180				180
	170				170
	160				160
	150				150
	140				140
	130				130
	120				120
	110				110
	100			1	100
	90			2	90
BLOOD PRESSURE	230				230
	220				220
	210				210
	200				200
	190				190
	180				180
	170				170
	160				160
	150				150
	140				140
	130				130
	120				120
	110				110
	100			1	100
	90			2	90

## Clinical observation chart to be used throughout the NHS

HEART RATE	140			3	140
	130				130
	120			2	120
	110				110
	100			1	100
	90				90
	80				80
	70				70
	60				60
	50			1	50
Level of Consciousness	40			3	40
	30				30
Alert				Alert	
V / P / U			3	V / P / U	
BLOOD SUGAR				Bl'd Sugar	
TOTAL NEW SCORE				TOTAL SCORE	
Additional Parameters	Pain Score			Pain Score	
Urine Output				Urine Output	
Monitoring Frequency				Monitor Freq	
Escalation Plan Y/N n/a				Escal Plan	
Initials				Initials	

National Early Warning Score: July 2012



NEWS KEY 0 1 2 3		NAME:	D.O.B.	ADMISSION DATE:	
DATE TIME				DATE TIME	
RESP. RATE	≥25			3	≥25
	21-24			2	21-24
	12-20			1	12-20
	9-11			1	9-11
	≤8			3	≤8
SpO <sub>2</sub>	≥96			1	≥96
	94-95			2	94-95
	92-93			3	92-93
	≤91			2	≤91
Inspired O <sub>2</sub> %	%	40	40		%
TEMP	≥39°			2	≥39°
	38°			1	38°
	37°			1	37°
	36°			3	36°
	≤35°			3	≤35°
NEW SCORE uses Systolic BP	230			3	230
	220			3	220
	210				210
	200				200
	190				190
	180				180
	170				170
	160				160
	150				150
	140				140
BLOOD PRESSURE	130			1	130
	120			2	120
	110			3	110
	100			3	100
	90				90
	80				80
	70				70
	60				60
	50				50
	40				40
HEART RATE	>140			3	>140
	130			2	130
	120			1	120
	110			1	110
	100			3	100
	90				90
	80				80
	70				70
	60				60
	50				50
Level of Consciousness	Alert				Alert
	V / P / U			3	V / P / U
TOTAL NEW SCORE		6	6	TOTAL SCORE	
Additional Parameters	Pain Score			Pain Score	
	Urine Output			Urine Output	
	Monitoring Frequency			Monitor Freq	
	Escalation Plan Y/N n/a			Escal Plan	
Initials				Initials	

Vital signs  
+ Level of consciousness  
+ Oxygen therapy



# Neuro-specific Alerts





# Adverse Clinical Signs in Neurological and Neurosurgical Patients in Addition to NEWS Triggers

## ADVERSE SIGN

### A & B

- Urgent airway management required if:
  - GCS drops to **8 or less**
  - New or prolonged (>5 minutes) seizure
- Oxygen saturation  $\leq 91\%$  on room air
- Respiratory rate  $\leq 8$  or  $\geq 25/\text{min}$  <sup>(1)</sup>
- Vital capacity  $< 15\text{ml/kg}$

### C

- Heart rate  $\leq 40$  or  $\geq 130/\text{min}$  <sup>(1)</sup>
- Systolic BP  $\leq 100$  or  $\geq 180\text{mmHg}$  <sup>(2)</sup>
- In SAH (with unprotected aneurysm) and acute haemorrhagic stroke systolic BP trigger is  $> 160\text{mmHg}$

### Glasgow Coma Scale

- A drop of **two** points or more requires **immediate** escalation and review
- A drop of **one** point requires escalation and review if this persists for **30 minutes**

### Seizure activity

- Non-epileptic & all neurosurgical patients
- New seizure of any form

### Patients with known epilepsy

- Seizure lasting >5 minutes
- Repeated seizure within 1 hour of 1<sup>st</sup> seizure
- Failure to be orientated in time & place within 15 minutes of seizure

### E

- Temperature  $\leq 35^\circ\text{C}$
- Temperature  $\geq 39^\circ\text{C}$
- $\text{Na}^+ < 125$  or  $> 150\text{mmol/l}$
- $\text{K}^+ > 6\text{mmol/l}$
- Glucose  $\leq 3$  or  $\geq 20\text{mmol/l}$
- Poorly controlled pain
- 'Worried about patient'
- Urine output  $< 100\text{ml}$  or  $> 1000\text{ml}$  in 4h

### Autonomic Dysreflexia

Sudden and potentially lethal surge in BP with spinal cord lesion at or above T6  
Often triggered by acute pain or noxious stimulus - patients may have low BP  
 $\therefore$  'normal' BP may represent significant rise

### Acute kidney injury

Increased risk with certain drugs / CT contrast  
 $\uparrow$  serum creatinine  $\geq 26\text{mmol/l}$  in 48 hours  
 $\downarrow$  urine output

### Acute Abdomen

Increased risk in spinal patients

## ASSESSMENT

Airway  
Breathing  
Circulation  
Disability  
Exposure  
Blood Glucose

Patient **must** be assessed **immediately** by nurse-in-charge who **must** instigate Escalation Process

Increase frequency of observations

Facilitate assessment with **monitoring** (ECG, NIBP, SpO<sub>2</sub>)

Monitoring **mandatory** prior to transferring patient to another area

### Troubleshooting tips:

If SpO<sub>2</sub> ↓

- Reposition patient and sit up if allowed
- Give oxygen therapy
- If patient has tracheostomy follow emergency procedure algorithm
- Consider saline / salbutamol nebuliser

If BP / urine output ↓

- Consider fluid bolus 100ml IV +/- repeat
- Consider bladder washout if urine output ↓

If urine output ↑ check specific gravity

If sudden ↑ in temperature consider sepsis

- Send cultures according to policy
- Consider IV fluids

### Seizure management

Seizure may be self-terminating requiring only supportive treatment

### Supportive treatment

Make environment safe  
Turn patient on side to protect airway  
Give high flow oxygen via face mask

### Drugs

Lorazepam 0.07mg/kg at  $< 2\text{mg/min}$   
- Usually **slow bolus** of 4mg into large vein, repeated if necessary after 10 minutes  
- Consider lower dose in small, frail or elderly patient  
or Diazepam IV (maximum rate of 5mg/min)  
or Midazolam IM 7.5mg or oromucosal solution either 5mg/1ml or 10mg/2ml

### Signs and Symptoms include

Pounding headache  
Flushed appearance of skin above level of lesion  
Nasal congestion

**Treatment** - must be initiated quickly

Sit patient upright  
Correct problem (e.g. blocked catheter)  
May require urgent medication to reduce BP  
Record BP every 5 min until episode resolves

## ESCALATION PROCESS

If patient triggers an Adverse Clinical Sign  
Nurse-in-charge to assess patient and follow Escalation Process

Whenever there are **serious concerns** the SpR for neurology or neurosurgery **must attend** the patient - this is in addition to the Anaesthetic SpR and Outreach Team

### MEDIUM RISK

Nurse-in-charge to assess patient and inform Neurology or Neurosurgical SHO

SHO must attend patient within **15 minutes** and document findings and plan of action in medical notes and discuss patient with SpR

If SHO fails to respond/attend within **15 minutes** contact SHO again

If no response within **5 minutes** contact SpR

If SpR does not respond within **5 minutes** contact Consultant on call

### HIGH RISK

Nurse-in-charge to assess patient and request that Neurology or Neurosurgical SHO attend **immediately**

SHO must attend patient **immediately** and document findings and plan of action in medical notes and discuss patient with Sp

If SHO fails to respond and attend **immediately** contact SHO again

If no **immediate** response contact SpR

If SpR does not respond **immediately** contact Consultant on call

A drop in GCS to 8 or less or a prolonged seizure (>5 minutes) also requires Anaesthetic SpR and Outreach Team to attend **immediately**

If urgent, 'fast bleep' (via Switchboard) the Anaesthetic SpR or other junior doctor and bleep Outreach Team and refer patient using SBAR format



Anaesthetic SpR  
1<sup>st</sup> on call Bleep 8131  
2<sup>nd</sup> on call Bleep 8011

Outreach Team  
Bleep 8277

Clinical Site Practitioner  
Bleep 8240

(1) Some patients with brain injury may have individual heart rate and respiratory rate limits set by Intensive Care Team before discharge to the ward

(2) Patients having assessment of autonomic nervous system may have different limits set for HR and systolic BP



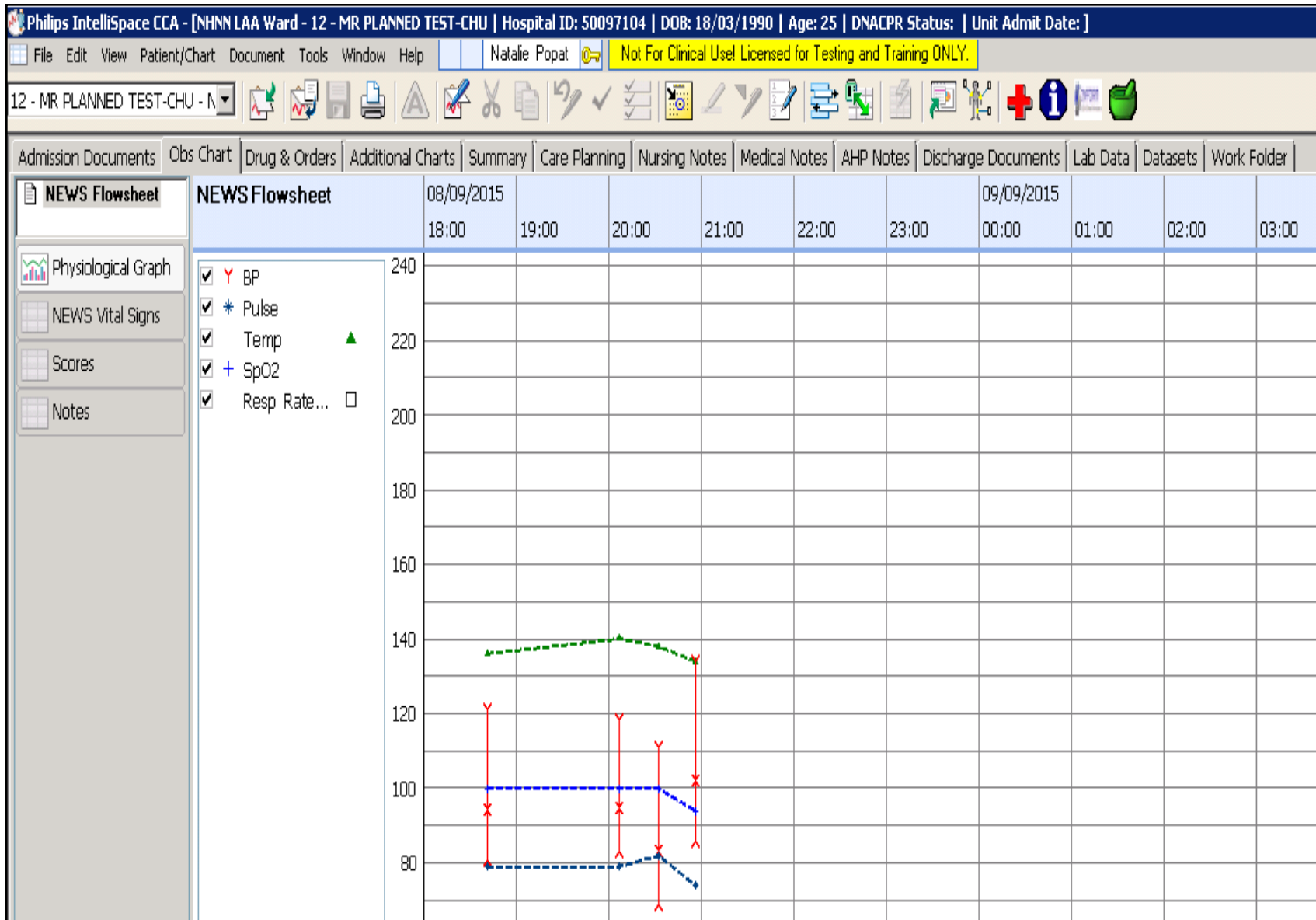
# Smart Patient Monitoring

## *An electronic 'ALERT' system*

- *Philips ICCA*









# Smart Patient Monitoring

## *An electronic 'ALERT' system*

- *Philips* ICCA



Computer

Dashboard



TEST-CHU  
Planned  
50097104  
NHS:

18-Mar-1990





Dashboard



←

NHNN LAA Ward

→




PHILIPS

Ward Dashboard Monitor

- ◆ Overview of all patients on ward
- ◆ Updated in real time (WiFi)
- ◆ Displays escalation alerts

4



Walls, David



6

9


TEST-CHU, REVERTED



11

12

TEST-CHU, PLANNED



13

14

15



# Smart Patient Monitoring

## *An electronic 'ALERT' system*

- *Philips* ICCA



TEST-CHU  
Planned  
50097104  
NHS:

18-Mar-1990





# Smart Patient Monitoring

## *An electronic 'ALERT' system*

- *Philips* ICCA



- ◆ Increased patient referrals
- ◆ No increase in ICU admissions
- ◆ More timely intervention on wards

TEST-CHU  
Planned  
50097104  
NHS:

18-Mar-1990



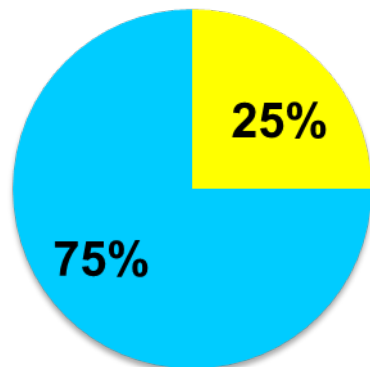
Computer

Mobile phone alerts



## Critical care nursing referrals

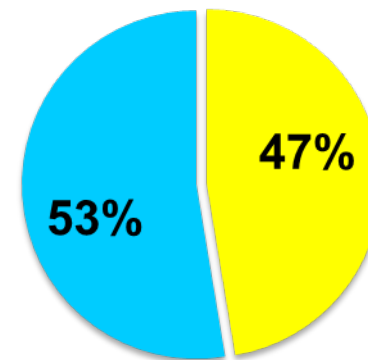
- remain on ward
- admitted to HDU/ITU



Pre pilot

## Critical care nursing referrals

- remain on ward
- admitted to HDU/ITU



Pilot study



# Summary

- ◆ Recognition and drive to improve the care of acutely ill patients in all hospital settings
- ◆ National guidelines for the establishment of dedicated teams to help to the deterioration of patients
- ◆ Individualized approach to the type of service that best suits the resources
- ◆ Introduction of a national standard for the assessment of and response to acute illness – *National Early Warning Score*

**Even if establishing a dedicated team takes several years – *it is worth the effort!***



***Key to safe care remains a  
competent nursing workforce in  
sufficient numbers to appropriately  
monitor patients***

