

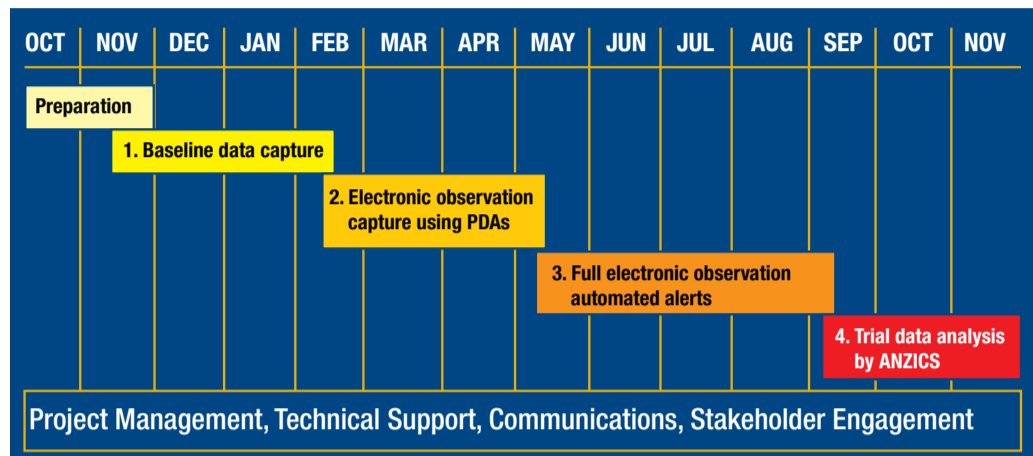
# Getting a clinical response for the unstable in-hospital medical patient

## The use of bedside electronic capture of observations and automated clinical alerts to improve compliance with a NHS Trust early warning score protocol

### The Trial Hospital

The trial was conducted at the Central Manchester University Hospitals NHS Foundation Trust (CMFT). The trial was set in the medical assessment unit (MAU) and one of four general medical wards. The CMFT has approximately 100,000 admissions per annum to 738 general and acute beds. All specialties are provided except plastic surgery and neurosurgery. The MAU admits approximately 500 patients per month. In 2006 there were 361 cardiac arrests in the trust.

### Trial Plan



### Key Sponsors:

- Dr Jane Eddleston, Clinical Director Critical Care, Division Clinical & Scientific Services, CMFT and DoH Advisor for Critical Care.
- Dr Steve Jones, Consultant, CMFT.
- Sarah Ingleby, Outreach Co-ordinator, CMFT.

### Trial Plan

The trial was organised into three phases:

1. Baseline data capture.
2. Implementation of the electronic observation capture and Early Warning Score (EWS) calculation with the traditional systems for alerting doctors (i.e. nurse call switch board to page doctors).
3. Alert phase; electronic observation capture with automated alerts to doctors.

### Results

The Patientrack hospital trial identified the following key measures for improvement:

1. EWS protocol compliance measured by the timely taking of observation data and attendance of doctors to patients within the timeframes determined by the patient EWS.
2. Patient outcomes as measured by the number of critical care bed days, hospital cardiac arrest incidence and hospital mortality.
3. Hospital length of stay.

### Clinical response

The documentation of a clinical response to a patient with a EWS>2 increased from 29% at baseline to 78% in the alert phase ( $p < 0.0001$ ). Complete compliance with the trust EWS protocol for EWS>2 could not be determined in the baseline group due to poor documentation in the medical record of attendance times. In contrast the electronic system automatically documented both the time of EWS data entry and the times of clinical response to the patient.

For the more acutely ill patients with a EWS>5 the Trust protocol states that the patient must be attended by a senior doctor (specialist registrar or above) within 30 minutes. This could not be determined at baseline due to no documentation of attendance timelines in the paper record. Overall at baseline these patients were responded to at some time in 67% of instances during the baseline phase and in 96% of instances during the alert phase ( $p < 0.0001$ ).

### Strategy for Change

Patientrack was implemented as a central web server with an underlying data repository. The web server provides a number of services that manage and monitor the data provided, managing EWS scores and alerts. A set of configurable business rules determine just how the system will react to the inputs provided. For instance, it is possible to define the rules that provide different alert and escalation processes for each clinical area. Rules can be configured to set EWS scoring, alert recipients, alert escalation and other clinical system requirements.

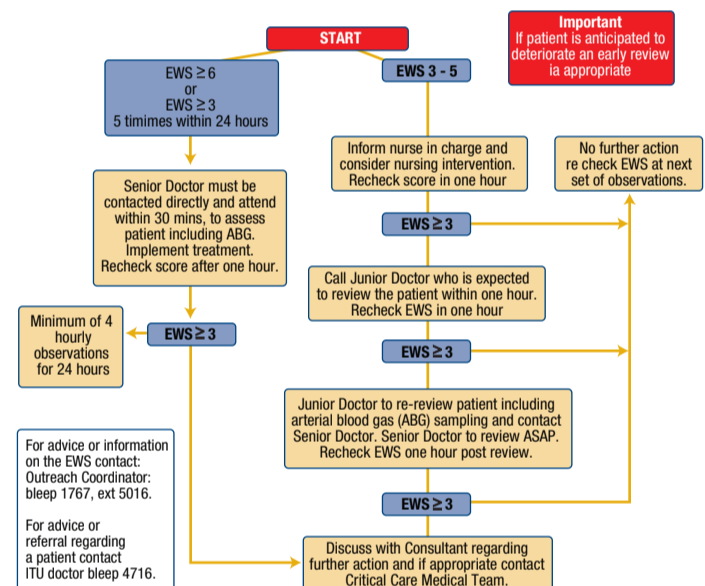
### EWS accuracy

		Actual EWS scores								
		1	2	3	4	5	6	7	8	9
Recorded EWS Scores	3	7	25	234	25	2	1	0	0	0
	4	0	5	12	130	10	2	1	0	0
	5	0	0	1	5	51	8	0	0	0
	6	0	0	0	0	1	28	2	2	0
	7	0	0	0	0	0	1	5	0	1
	8	0	0	0	0	0	0	1	5	0
	9	0	0	0	0	0	0	0	1	1

- Results show manual EWS calculation is not accurate
- Patientrack "removes the red"

Removed 21% error rate in manual EWS recording (9% of total scores were actually  $\geq 4$  but recorded as less, 12 cases where senior doctor should have attended within 30 mins were incorrectly recorded at lower score that did not trigger this response)

### Trial Hospital EWS Protocol

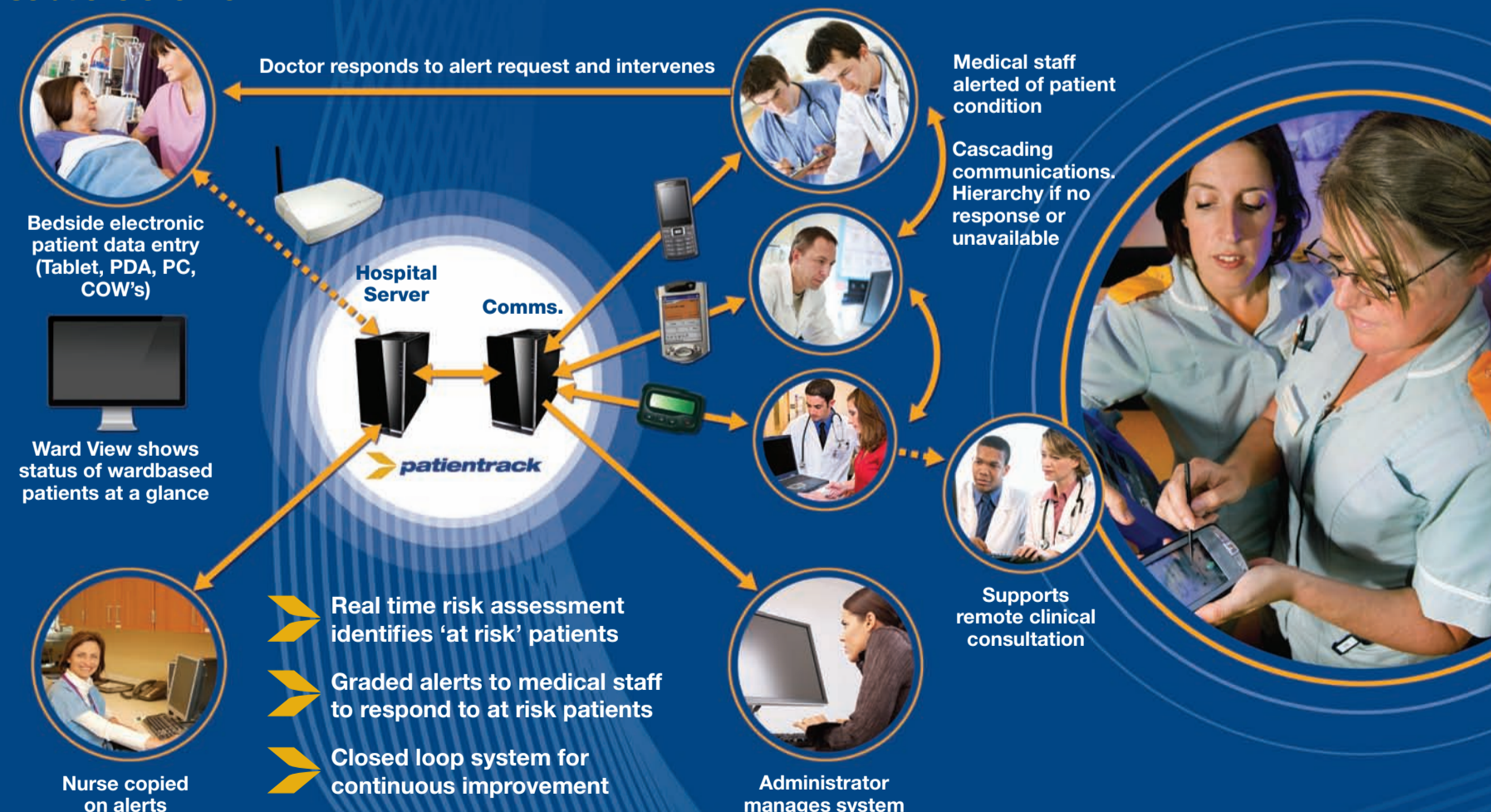


### Patient Outcomes and Hospital Length of Stay

There was a decreased number of critical care bed days (51 vs. 26), hospital mortality (9.4% vs. 7.2%) and number of cardiac arrests (3 vs. 0) during the alert phase.

There was a significant reduction in hospital length of stay during the alert phase from 9.7 days to 6.9 days ( $p < 0.001$ ).

### Solutions Overview



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