

Impact of a standardised patient observation and multi-tiered escalation response chart and new calling criteria on adverse patient outcomes

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Background

- Vital sign measurement and documentation core component of patient care
- Abnormal vital signs common prior to adverse events
- Thought possible to change outcome by timely recognition and response to the deteriorating patient
- Observation chart development around these concepts
- Chart introduction has occurred in the absence of strong evidence of clinical efficacy

Background – chart development

- Observation charts were examined and found to have many usability problems
- Charts redesigned with the sole aim of supporting the detection of deterioration
- Track, trigger and response systems have been incorporated into new charts
 - Tracking - graphing and monitoring of observations
 - Triggers - thresholds that 'trigger' a response
 - Responses - increased observations, nursing review, home team review or MET call
- Evidence of benefit

Intervention

- New chart
- 2 new tiers of escalation
- Altered calling criteria for MET calls
- Policy for monitoring frequency

Date													Rapid Detection and Response Adult Observation Chart (MR59A)		<small>MR5 patient use only</small> UIR Number: _____ Surname: _____ Given name: _____ Second given name: _____ D.O.B: ____/____/____ Sex: _____	
Time													Hospital: _____			
Respiratory Rate (breaths/min)	Write ≥ 30											Write ≥ 30			Medical Emergency Response (MER) Call Response Criteria <ul style="list-style-type: none"> Respiratory or cardiac arrest Threatened airway Significant bleeding Any observations in a purple zone Unexpected or uncontrolled seizure Unattended MDT review You are worried about the patient Actions Required ASAP <ul style="list-style-type: none"> Place emergency call and specify location Initiate basic/advanced life support Notify senior doctor responsible for patient Increase frequency of observations post intervention 	
	31-30											31-30				
	25-30											25-30				
	21-25											21-25				
	16-20											16-20				
	11-15											11-15				
O ₂ Saturation (%)	Write ≤ 7											Write ≤ 7				
	≥ 80											≥ 80				
	95-97											95-97				
O ₂ Flow Rate (L/min)	Write value											Write value				
	≥ 7											≥ 7				
Delivery Method/Air	1-4											1-4				
Blood Pressure (mmHg)	Write ≥ 220											Write ≥ 220			Multi Disciplinary Team (MDT) Review <small>(minimum of registered nurse and medical doctor - check for modifications)</small> Response Criteria <ul style="list-style-type: none"> Unrelieved chest pain Any observations in a red zone Urine output <30mL/hr over 4 hours from patient with IDC or patient has not voided for over 12 hours You are worried about the patient Actions Required <ul style="list-style-type: none"> MDT to review patient within 30 minutes (Country Hospitals refer to local guidelines) Increase frequency of observations If MDT not attended within 30 minutes escalate to MER <p>* 3 or more observations in the red zone, escalate to MER</p>	
	210s											210s				
	200s											200s				
	190s											190s				
	180s											180s				
	170s											170s				
	160s											160s				
	150s											150s				
	140s											140s				
	130s											130s				
	120s											120s				
	110s											110s				
	100s											100s				
	90s											90s				
	80s											80s				
	70s											70s				
60s											60s					
50s											50s					
Pulse Rate (beats/min)	Write ≤ 40											Write ≤ 40				
	140s											140s				
	130s											130s				
	120s											120s				
	110s											110s				
	100s											100s				
	90s											90s				
	80s											80s				
	70s											70s				
	60s											60s				
Temperature (°C)	Write ≥ 39.1											Write ≥ 39.1			RN Review and Notify Shift Coordinator Response Criteria <ul style="list-style-type: none"> Any observations in a yellow zone New or unexplained behavioural change You are worried about the patient Actions Required <ul style="list-style-type: none"> Registered nurse must review the patient Increase frequency of observations Manage anxiety, pain and review O₂ requirements <p>* 3 or more observations in the yellow zone, escalate to MDT Review</p>	
	38.6 - 39.0											38.6 - 39.0				
	38.1 - 38.5											38.1 - 38.5				
	37.6 - 38.0											37.6 - 38.0				
	37.1 - 37.5											37.1 - 37.5				
	36.6 - 37.0											36.6 - 37.0				
	36.1 - 36.5											36.1 - 36.5				
	35.6 - 36.0											35.6 - 36.0				
Consciousness/Sedation	Write ≤ 35											Write ≤ 35				
	3											3				
	2											2				
	1											1				
Pain Score At Rest (7 consecutive)	8-10											8-10				
	5-7											5-7				
Intervention	0-4											0-4				
	See chart number											See chart number				

Level of Consciousness / Sedation				
Score	Descriptor	Stimulus	Response	Duration
3	Difficult to rouse (severe respiratory depression)	Pain, shoulder squeeze, jaw thrust	Brief eye opening OR any movement OR no response	N/A
2	Easy to rouse, difficulty staying awake	Voice, light touch	Eye opening and eye contact	<10 seconds
1	Easy to rouse	Voice, light touch	Eye opening and eye contact	>10 seconds
0	Awake, alert	N/A	N/A	N/A

Aim

- To examine the impact of this new standardised observation chart on:
 - Medical Emergency Team calls
 - Intensive Care Unit admissions from the wards
 - Cardiac arrests
 - Hospital deaths

Methods

- Data linkage between MET, ICU and administrative databases
- Cardiac arrests determined from coding and MET database
- Study period August 2007 to December 2014
- Chart introduction July 2013

Interrupted time series analysis

- RCT not always practical or possible when assessing health system changes
- ITSA is an accepted alternative
- Advantages over before and after study design

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Outcome
rate

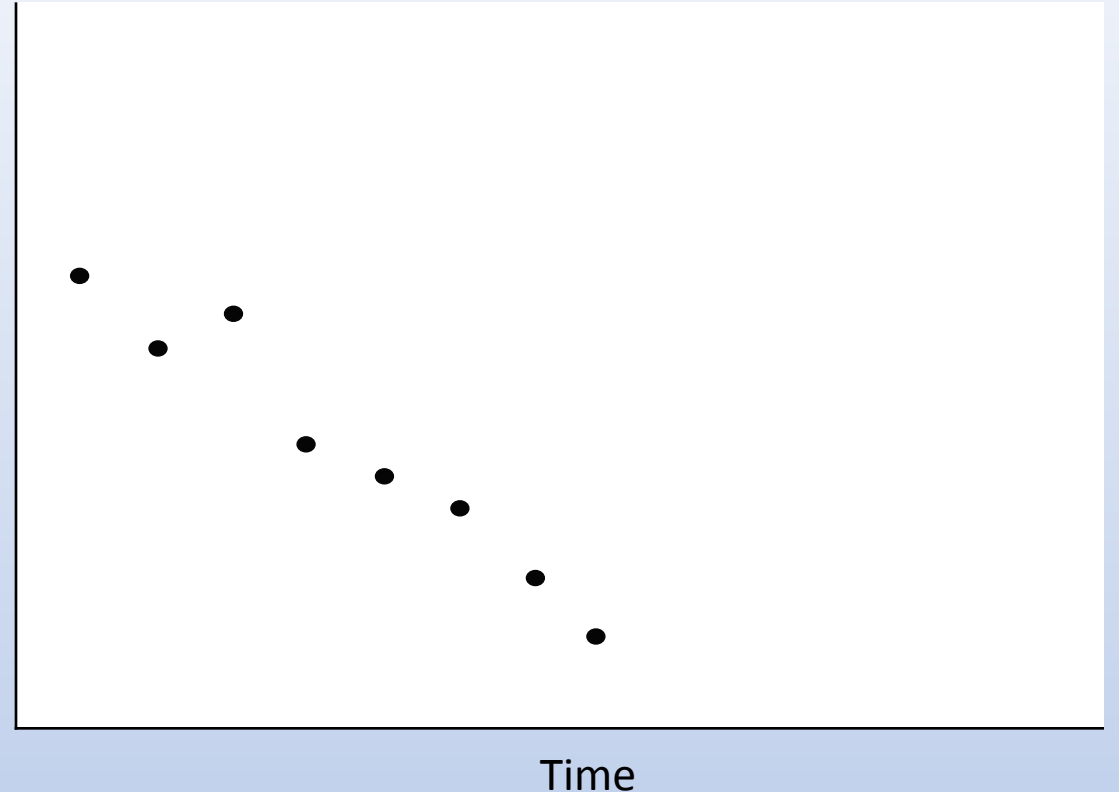
Time



Interrupted time series analysis

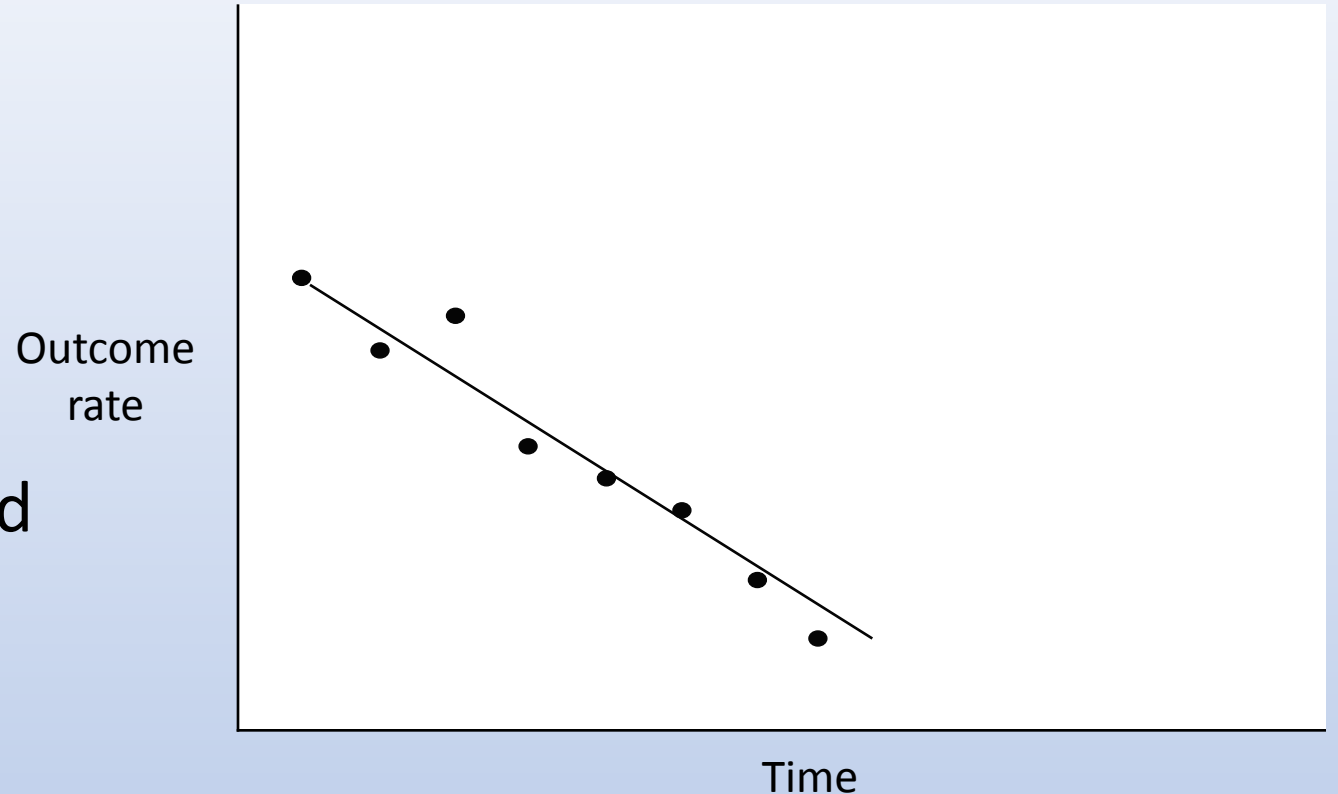
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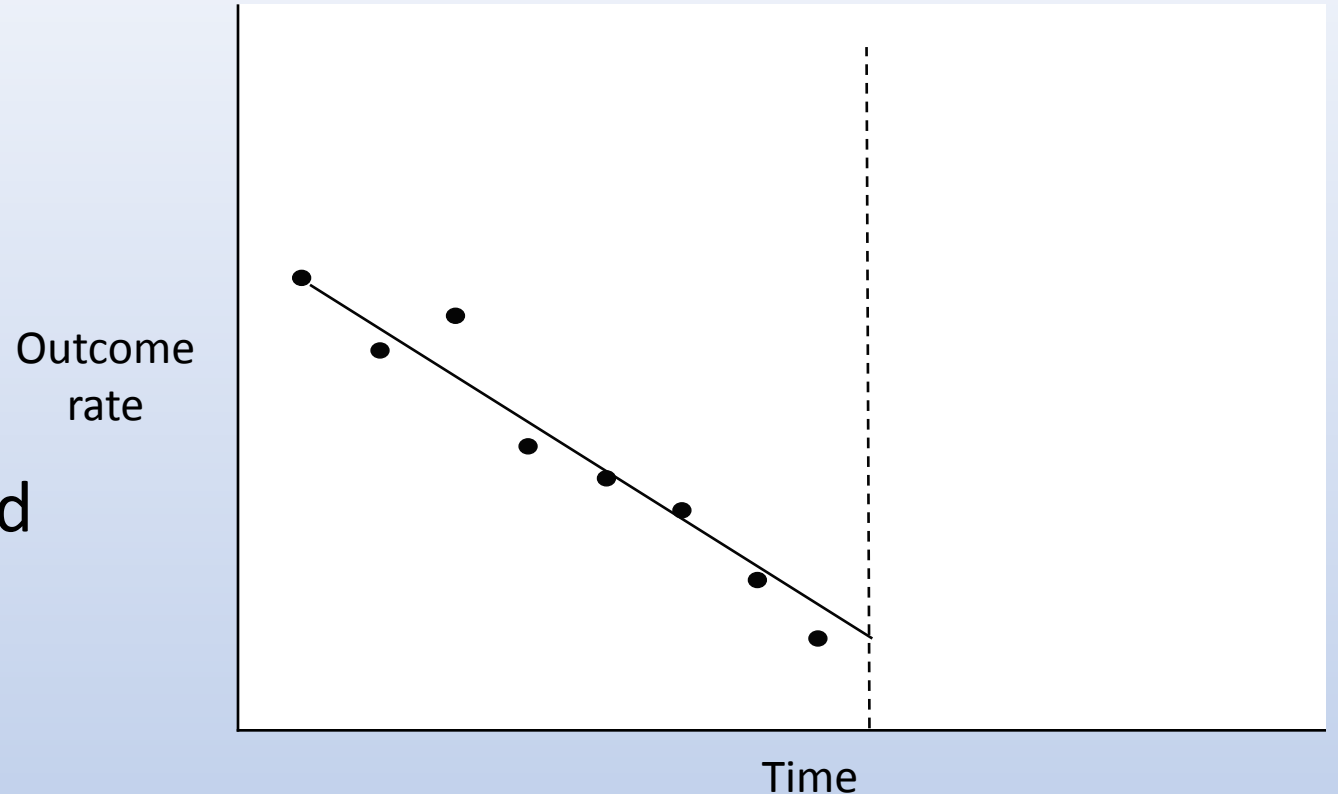
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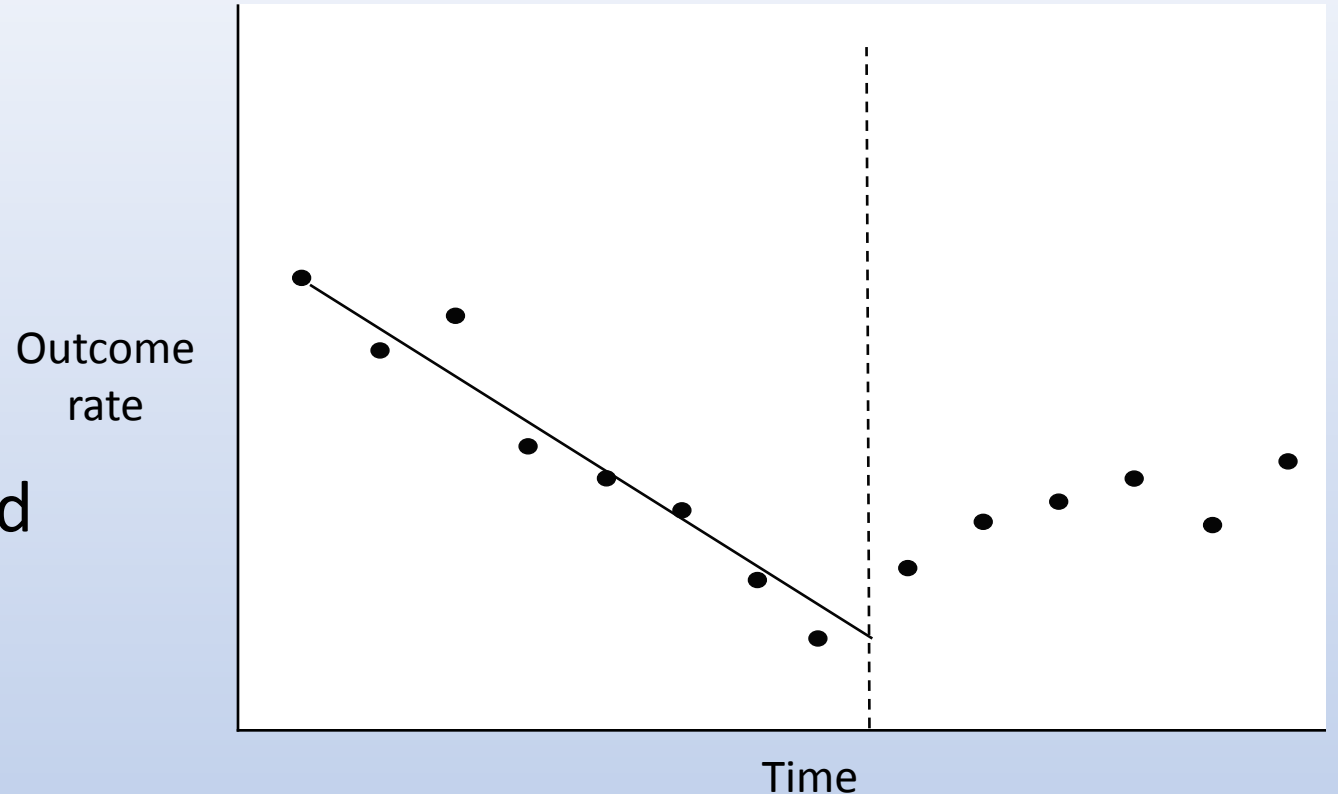
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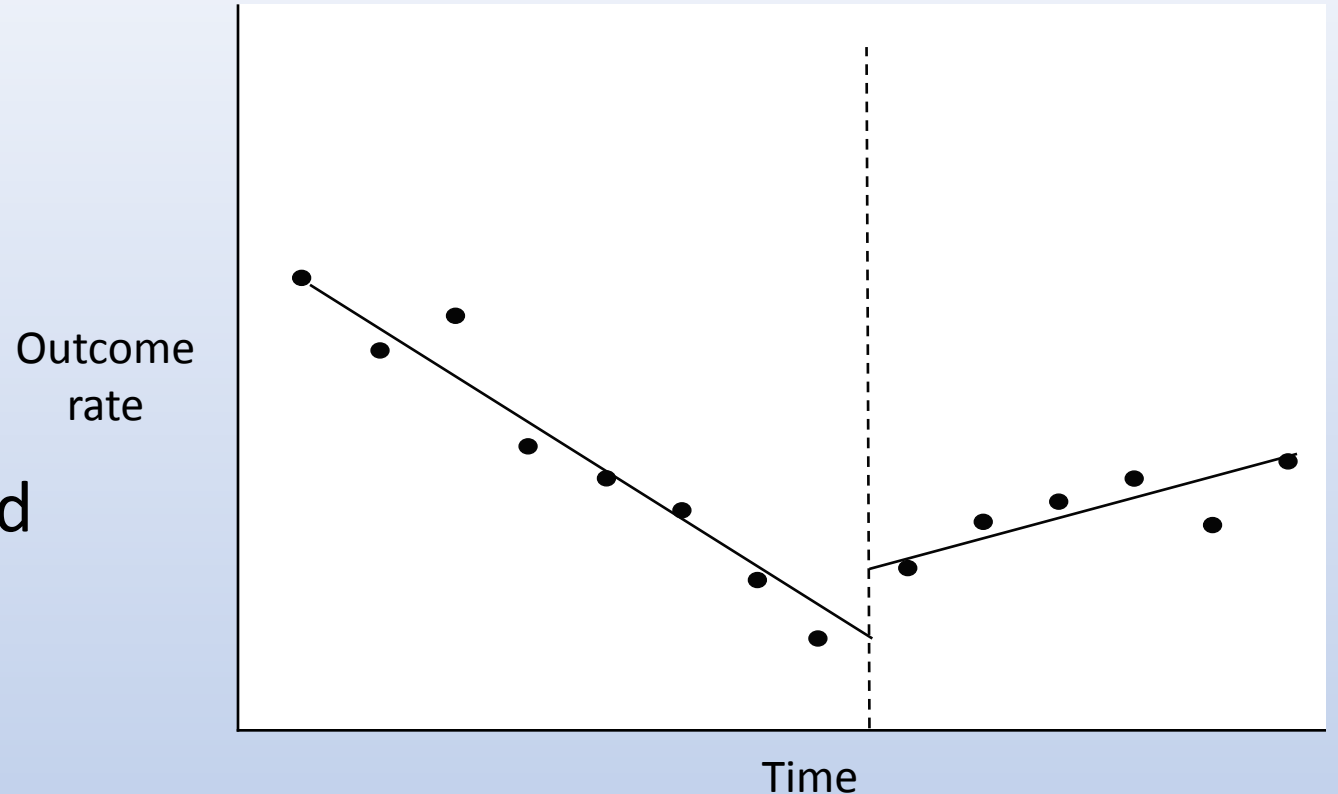
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MET calls

Pre existing trend

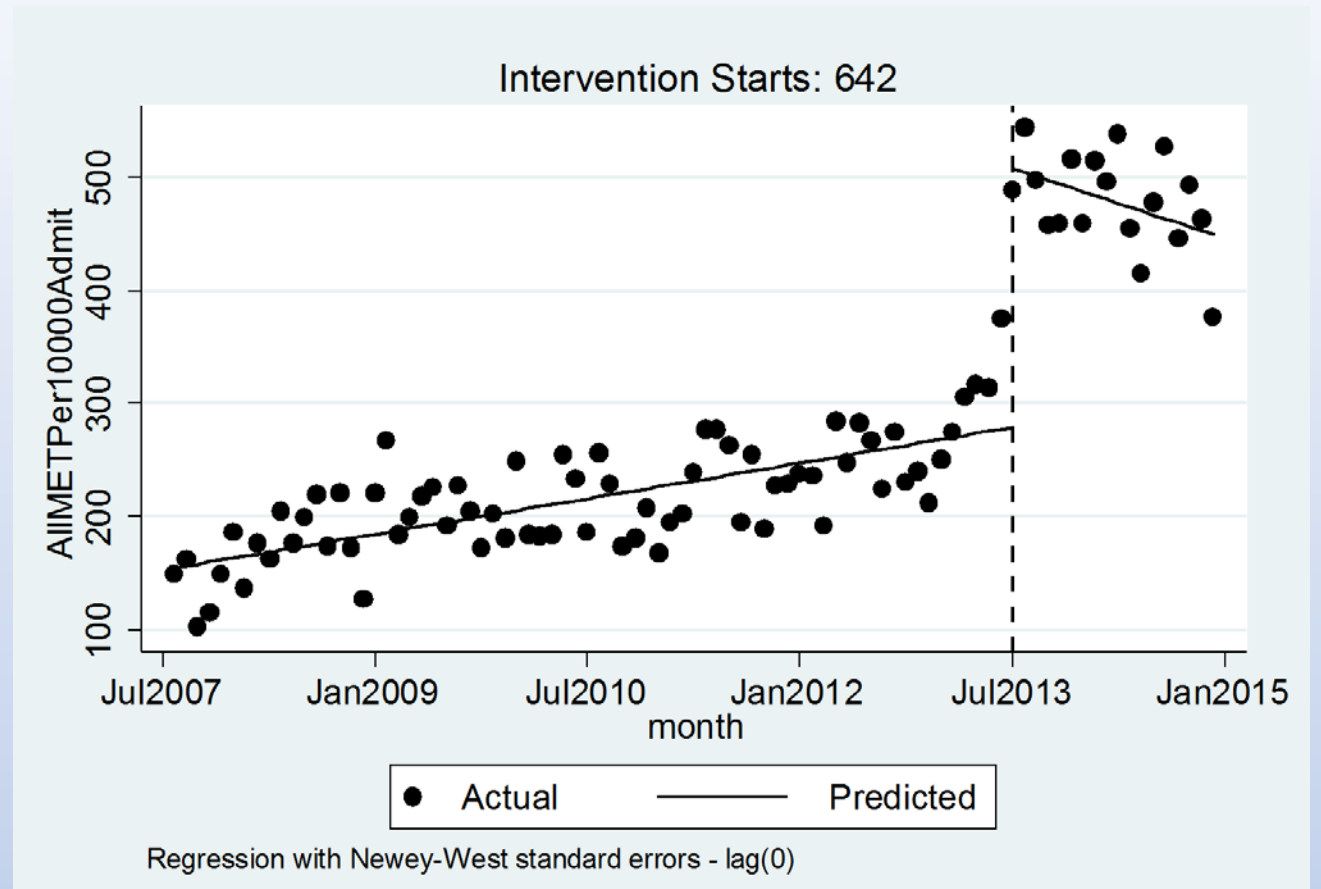
- Increasing by 1.7 calls per 10 000 admissions per month ($p < 0.01$)

Immediately following intervention

- Increase of 228 calls per 10 000 admissions per month ($p < 0.01$)

Trend following intervention

- Changed significantly ($p < 0.01$)
- No longer an increasing trend



ICU admissions from the ward

Pre existing trend

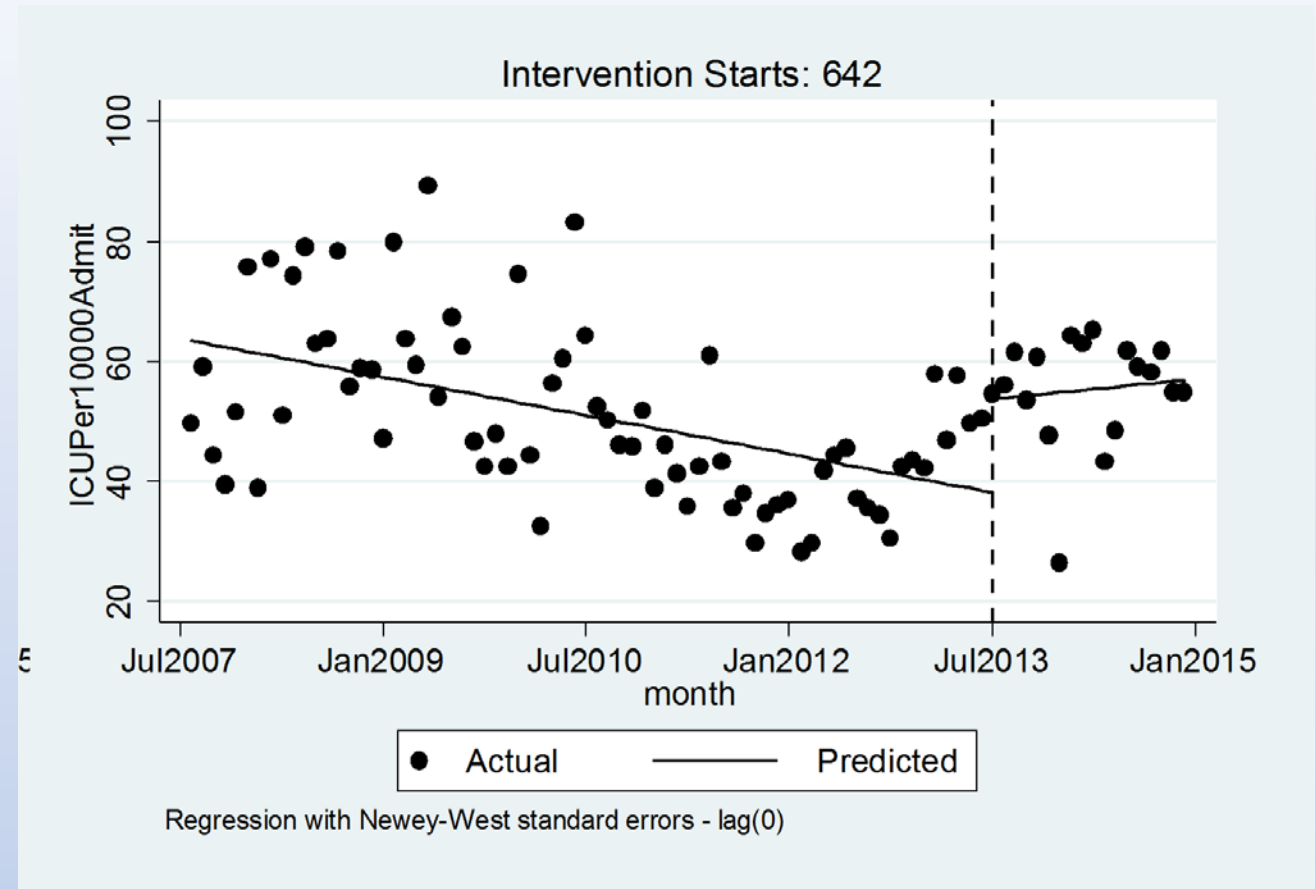
- Decreasing by .35 per 10 000 admissions per month ($p < 0.01$)

Immediately following intervention

- Increase of 15.6 per 10 000 admissions per month ($p < 0.01$)

Trend following intervention

- Changed significantly ($p = 0.03$)
- The trend post intervention is no longer decreasing



Total hospital cardiac arrests

Pre existing trend

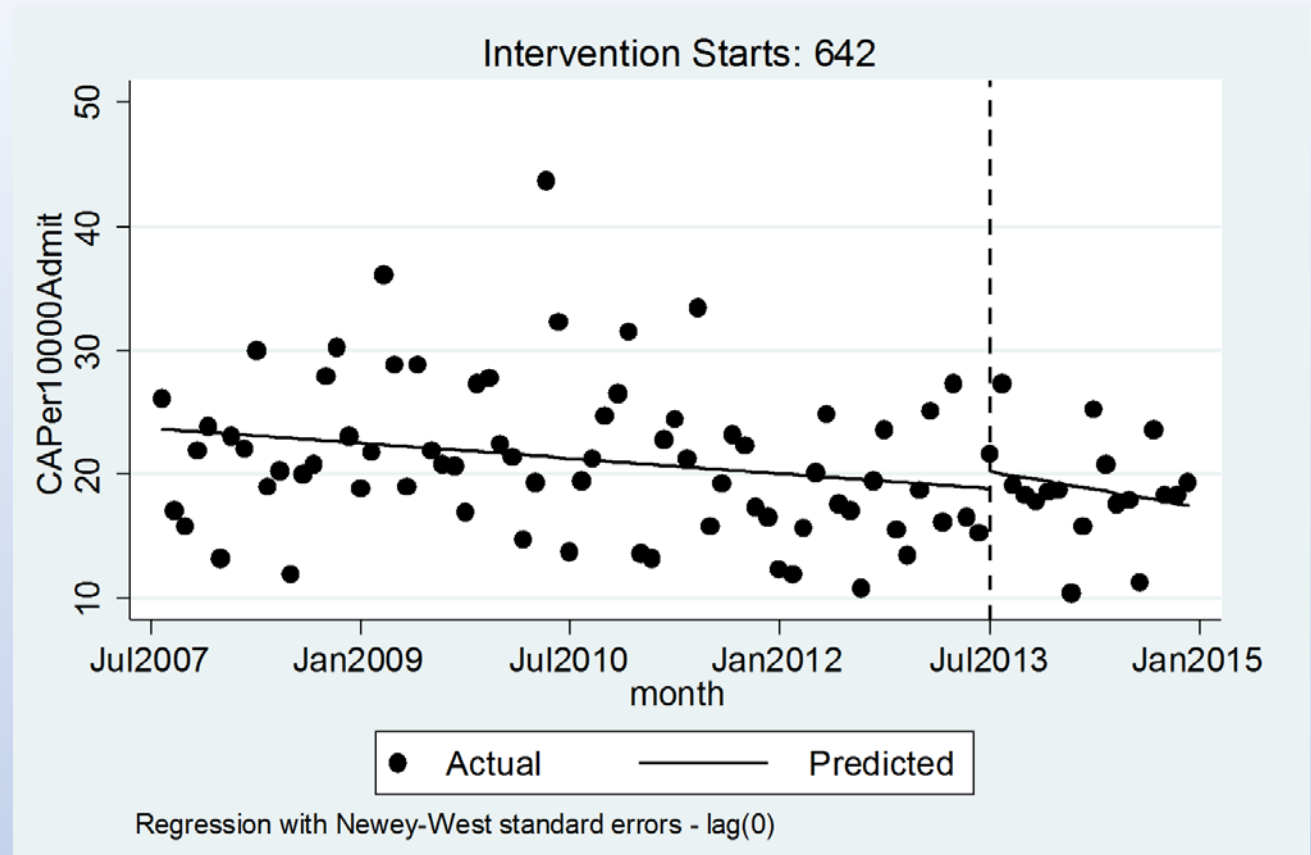
- Decreasing by .07 per 10 000 admissions per month ($p=0.01$)

Immediately following intervention

- No significant change

Trend following intervention

- No significant change



Deaths

Pre existing trend

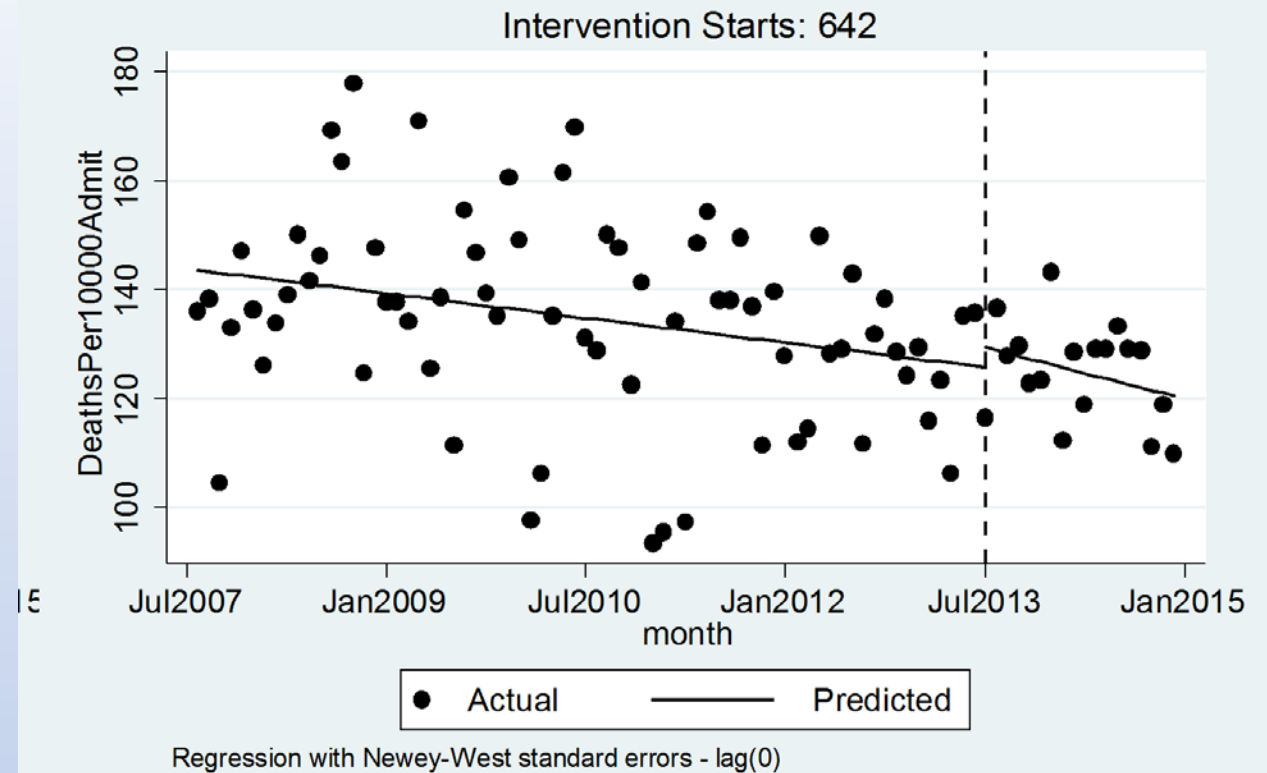
- Decreasing by .25 per 10 000 admissions per month (<0.01)

Immediately following intervention

- No significant change

Trend following intervention

- No significant change



Conclusion

The introduction of a standardised observation and response chart with new calling criteria has increased

- MET calls
- ICU admissions

With no change in

- Cardiac arrests
- Hospital mortality

Implications

- Increase in MET and ICU resource utilisation with no change in accepted performance measures
- Is there a better outcome measure?
- Is chart use counteracting chart benefit?
 - Afferent limb failure
 - Modifications
 - Observation frequency
- Alternate chart style?
- Too soon to see a change? (lag time for change in culture, behaviours and attitudes)

Future work

- Has there been a change in afferent limb failure with the introduction of the new chart?
- Do patients deteriorate in a stepwise fashion that can be detected by the triggers currently in use?
- What is the discriminatory power of the triggers for detection of patients that are going to deteriorate?

Acknowledgements

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