Intensive Care Outreach Nurse: Identifying and Responding to Deteriorating Patients

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Problem statement

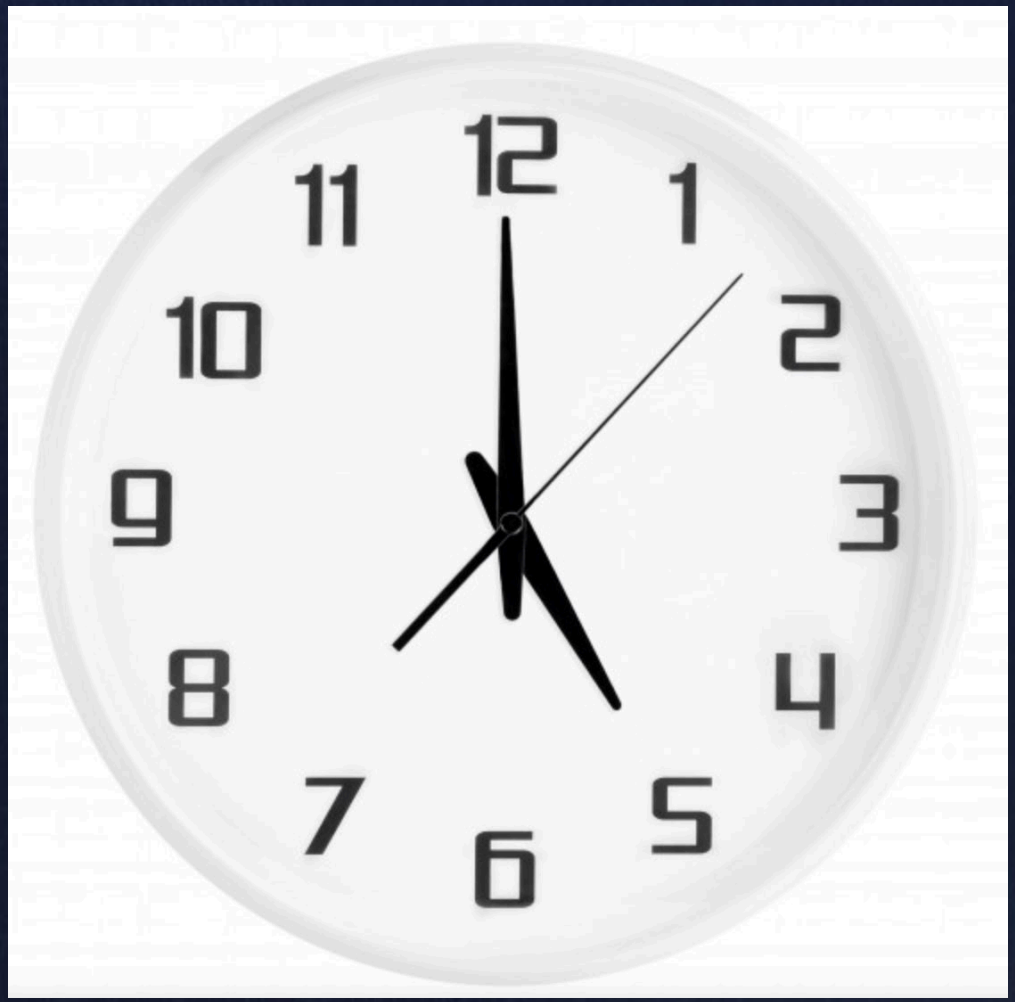
Problem

- Staff are slow to recognize or respond to physiological deterioration in ward patients despite having Modified Early Warning Scoring system (MEWS).

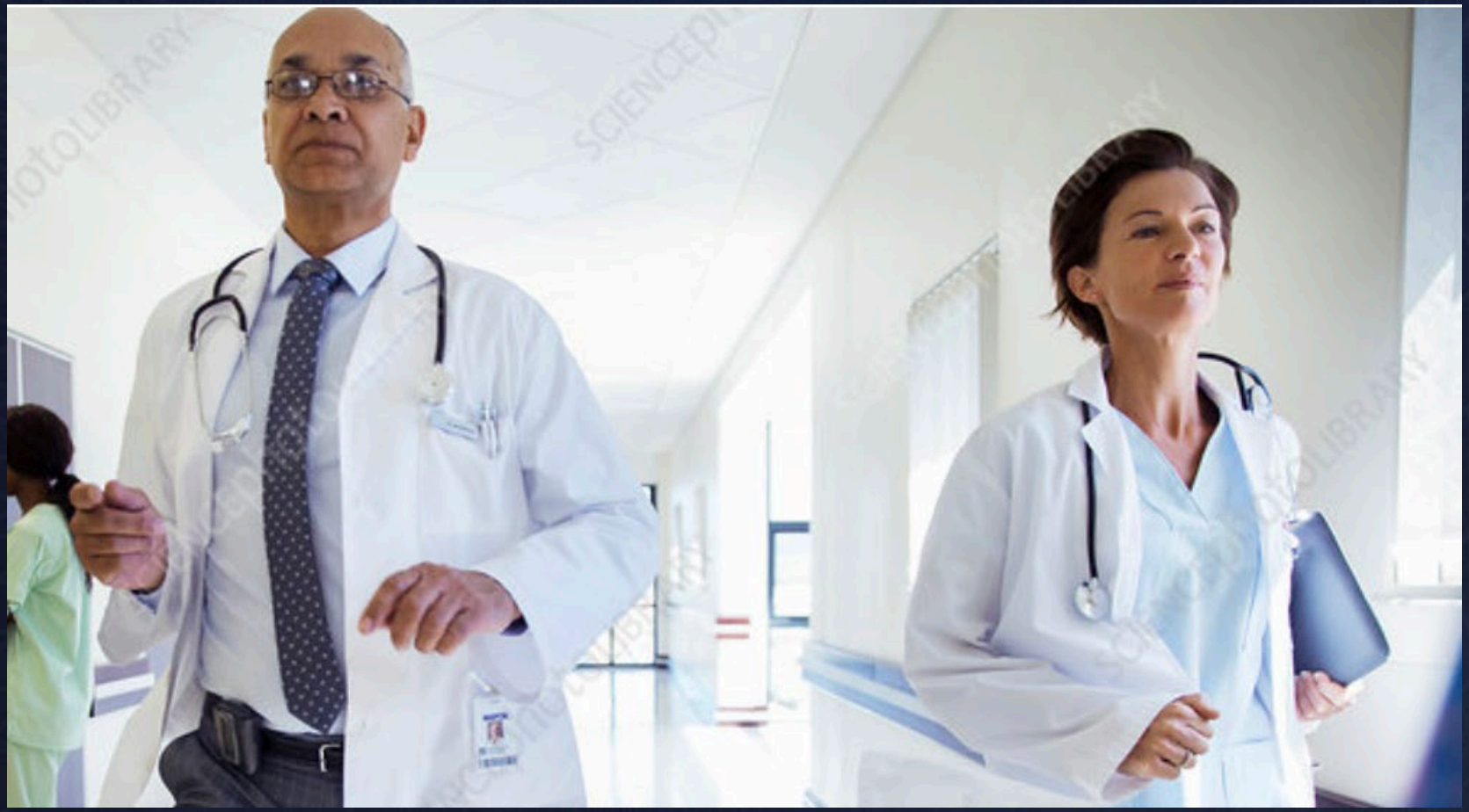
Goal

- Improve staff recognition & response to deterioration.
- Provide rapid intervention regardless of location.
- Improve patient outcomes.

Five O'clock



Seniors Leave the Hospital



Resident Medical Officer On Call

Nursing Confidence to Summon Help for Patients When Needed

- Descriptive study of 32 registered nurses
- Uncertainty – “am I doing the right thing?”
- Afraid of feeling “*like an idiot if call unnecessary*”
- “Ask more experienced RN to confirm findings or concerns first”
- Medical staff not always present, or “they are just as uncertain as I am”

Cioffi J. Nurses’ Experiences of Making decisions to call Emergency assistance to their patients. JAN, 2000; 32(1): 108-114.

Antecedents Present in the Period from 15 min to 24 hours Prior to Primary Event

	Total	UK	ANZ
Antecedents (total recorded for all events)	485	376	109
Threatened Airway	**76**	**60**	**16**
Respiratory rate < 5	20	18	2
Respiratory rate > 36	**54**	**36**	**18**
Pulse rate < 40	14	10	4
Pulse rate > 140	**45**	**33**	**12**
Systolic blood pressure < 90 mmHg	**148**	**114**	**34**
Fall of GCS by 2 points or more	**118**	**96**	**22**
Prolonged seizure activity	10	9	1

Kause J et al. 2004. A comparison of antecedents of cardiac arrest, death, emergency ICU admission in Australia, NZ & UK. Resuscitation; 62: 275-282

MET Criteria (2005 example)

MET Call Parameters
Ring 555

AIRWAY:
Threatened
BREATHING:
Respiratory Rate < 8 or > 30/min.
SpO_2 < 92% (on or off O_2)
CIRCULATION:
Heart rate < 50 or > 120/min.
Systolic BP < 90 or > 180mmHg

NEUROLOGICAL:
Seizures or falling GCS > 2points
OTHER:
Worried about patient
Parent Unit cannot attend
Urine output < 30ml/hr (2hrs) or,
> 500ml/hr (2hrs)
BGL < 3.0mmol/L or > 20.0mmol/L
Temperature: < 35.0° C or > 39.5° C
Metabolic derangement

MET Criteria

Maroondah Hospital – Medical Emergency Team

Medical Emergency Team
MET Call

DIAL

555

and state

MET Call

YOUR WARD &

the **PARENT UNIT**

AIRWAY	Threatened e.g. stridor
BREATHING 	AN ACUTE CHANGE IN BREATHING, OR: Respiratory Rate: < 8 or > 30 /min. O_2 Saturation: < 92%
CIRCULATION 	AN ACUTE CHANGE IN HR OR BP, OR: Heart Rate: < 50 or > 120/min. Systolic BP: < 90 or > 180mmHg
NEUROLOGICAL	Seizures or falling GCS > 2 points
OTHER 	• Worried about patient • Parent Unit cannot attend patient • Urine Output: < 30 mls/hr for 2 hrs > 500 mls/hr for 2 hrs • Temperature: <35.0° or > 39.5° C • BGL: < 3.0mmol/L or > 20.0mmol/L • Metabolic Derangement

D.G. 20

MARKETING MET

Early Warning Score

Observation chart for the National Early Warning Score (NEWS)

NEWS KEY: 0 1 2 3

NAME: D.O.B. ADMISSION DATE:

Parameter	Value	Score	Value
	DATE		DATE
	TIME		TIME
RESP. RATE	≥25	3	≥25
	21-24	2	21-24
	12-20		12-20
	9-11	1	9-11
	≤8	3	≤8
SpO_2	≥96		≥96
	94-95	1	94-95
	92-93	2	92-93
	≤91	3	≤91
Inspired O_2%	%	2	%
TEMP	≥39°	2	≥39°
	38°	1	38°
	37°		37°
	36°	1	36°
	≤35°	3	≤35°
BLOOD PRESSURE (NEW SCORE uses Systolic BP)	230		230
	220	3	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
	80	3	80
	70		70
	60		60
	50		50
HEART RATE	>140		140
	130	3	130
	120	2	120
	110		110
	100	1	100
	90		90
	80		80
	70		70
	60		60
	50		50
	40	1	40
	30	3	30
Level of Consciousness	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

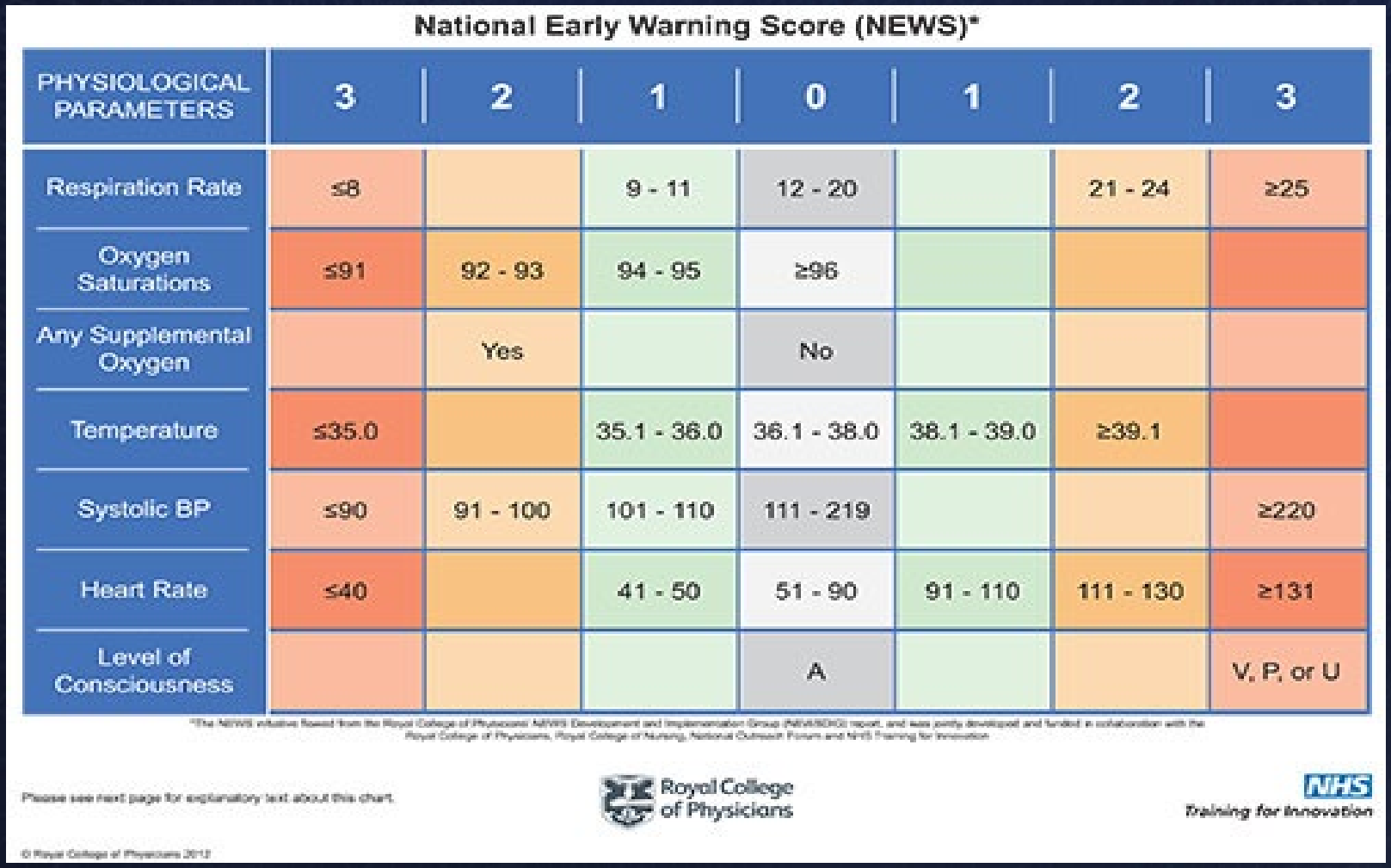
National Early Warning Score: July 2012

Please see next page for explanatory text about this chart.

Royal College of Physicians

NHS Training for Innovation

Early Warning Score



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, Royal College of Nursing, National Outreach Forum and NHS Training for Innovation

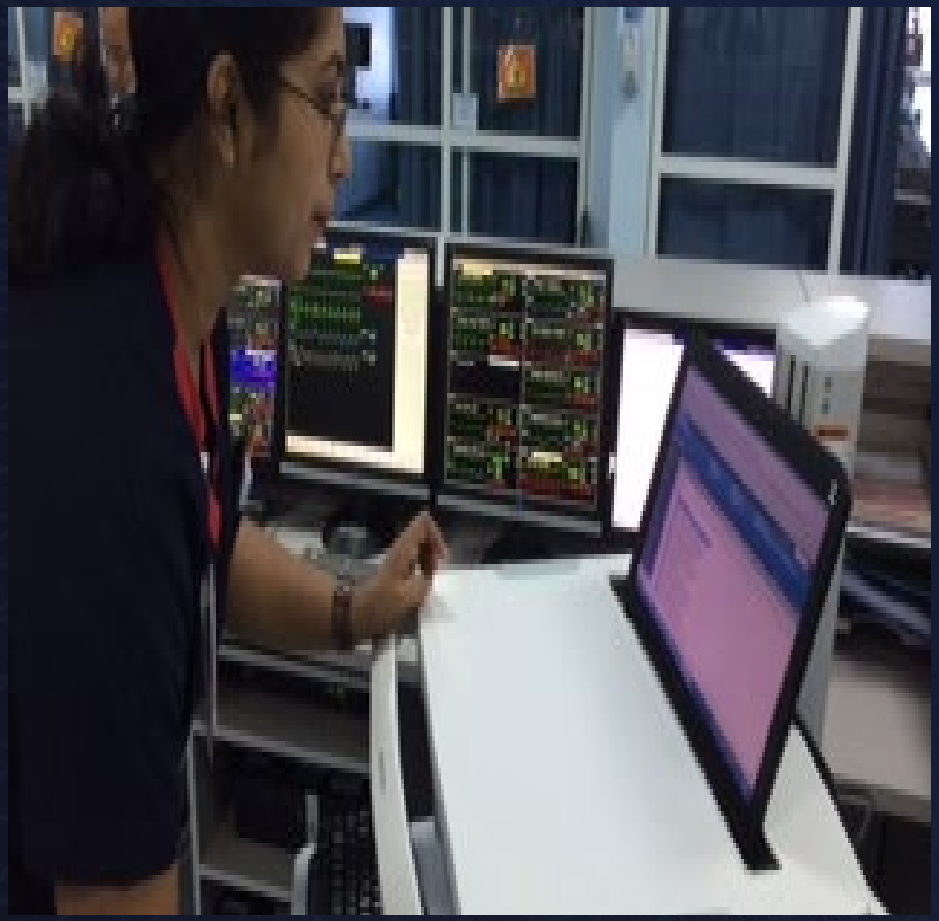
Please see next page for explanatory text about this chart.

Royal College of Physicians

NHS Training for Innovation

Royal College of Physicians. National Early Warning Score (NEWS): Standardising the assessment of acute- illness severity in the NHS. Report of a working party. London: RCP, 2012.

SEHA (Sheikh Khalifa Medical City)Abu Dhabi, Automation of EWS into an EMR.



		2/7/2015		1/7/2015			30/6/2015
		14:28 UAE	08:03 UAE	22:00 UAE	14:06 UAE	06:22 UAE	20:43 UAE
Adult Vital Signs							
MEWS Score			3	3	2	2	3
Temperature Axillary	degC		37.2 ↑	37 ↑	37 ↑	36.6	36.1
Temperature Oral	degC						
Temperature Tympanic	degC						
Peripheral Pulse Rate			92	90	94	84	85
Heart Rate Monitored							
Respiratory Rate	br/min		21 ↑	20	18	18	18
Blood Pressure			Machine	Machine		Machine	Machine
SBP/DBP Non-Invasive	mmHg		122/69	116/69	110/78	106/66	105/68
Mean Arterial Pressure, Non-Invasive	mmHg		87	85	89	79	80
SpO2	%		99	99	99	98	95
Oxygen Therapy			Nasal cannula	Nasal cannula	Nasal cannula	Nasal cannula	Nasal cannula
Oxygen Flow Rate	L/min		2	2	2	2	2
FiO2	%						
MEWS AVPU Scale			Responds to pain	Responds to pain	Responds to pain	Responds to pain	Responds to pain
MEWS Temperature Axillary Score			0	0	0	0	0
MEWS Temperature Oral Score							
MEWS Temperature Tympanic Score							
MEWS Peripheral Pulse Rate Score			0	0	0	0	0
MEWS Heart Rate Monitored Score							
MEWS Respiratory Rate Score			1	1	0	0	0
MEWS Blood Pressure Score			0	0	0	0	0
MEWS SPO2 Score			0	0	0	0	1
MEWS AVPU Score			2	2	2	2	2

Early Warning Signs

Name: TWMEDZZZ, TWMEDZZZ

Date: 16 August 2015 07:24:57 UAE

MRN: TW10-213-058

Date of Birth: [redacted]

Age: [redacted]

Location: [redacted]

Early Warning Signs Parameters :

16/08/15 07:23 Temperature Axillary = 40 C (H) [greater than 39 C] Score = 2
16/08/15 07:23 Peripheral Pulse Rate = 130 bpm (H) [greater than 130 bpm] Score = 3
16/08/15 07:23 Oxygen Saturation = 90 % (L) [between 89% and 93%] Score = 2
16/08/15 07:23 Respiratory Rate = 25 br/min (H) [between 19 - 26 br/min] Score = 1
16/08/15 07:23 Systolic Blood Pressure = 160 mmHg [between 101 - 179 mmHg] Score = 0
16/08/15 07:23 MEWS AVPU Score = 1 Score = 1

Early Warning Score = 9.00

Next steps to complete:

- Notify Charge Nurse STAT
- Activate Rapid Response Team (Adult) STAT or Activate Action Plan
- Notify responsible physician on site to attend
- Responding physician to ensure Consultant is notified

If no response in 15 minutes call code BLUE
Recommend this assessment is repeated continuously

Case Study

Simultaneous Implementation of Rapid Response System and Intensive Care Outreach Nurse (ICON) in 4 Major Teaching Hospitals in UAE

Williams G, et.al. Evaluation of an Intensive Care Outreach Nurse programme in four UAE hospitals. J Nurs Care Qual. 28 Feb 2022. DOI: 10.1097/ncq.0000000000000620 PMID: 35234173

Intensive Care Outreach Nurse (ICON)

Role: The ICON is an experienced critical care nurse who provides hospital wide supervision, support and guidance in response to the recognition of the deteriorating patient and any other clinical practice issues as they arise throughout the hospital.

Selection criteria

- Advanced clinical assessment skills
- Advanced communication skills
- Advanced problem-solving skills
- Advanced bedside teaching skills

RAPID RESPONSE SYSTEM LOOP

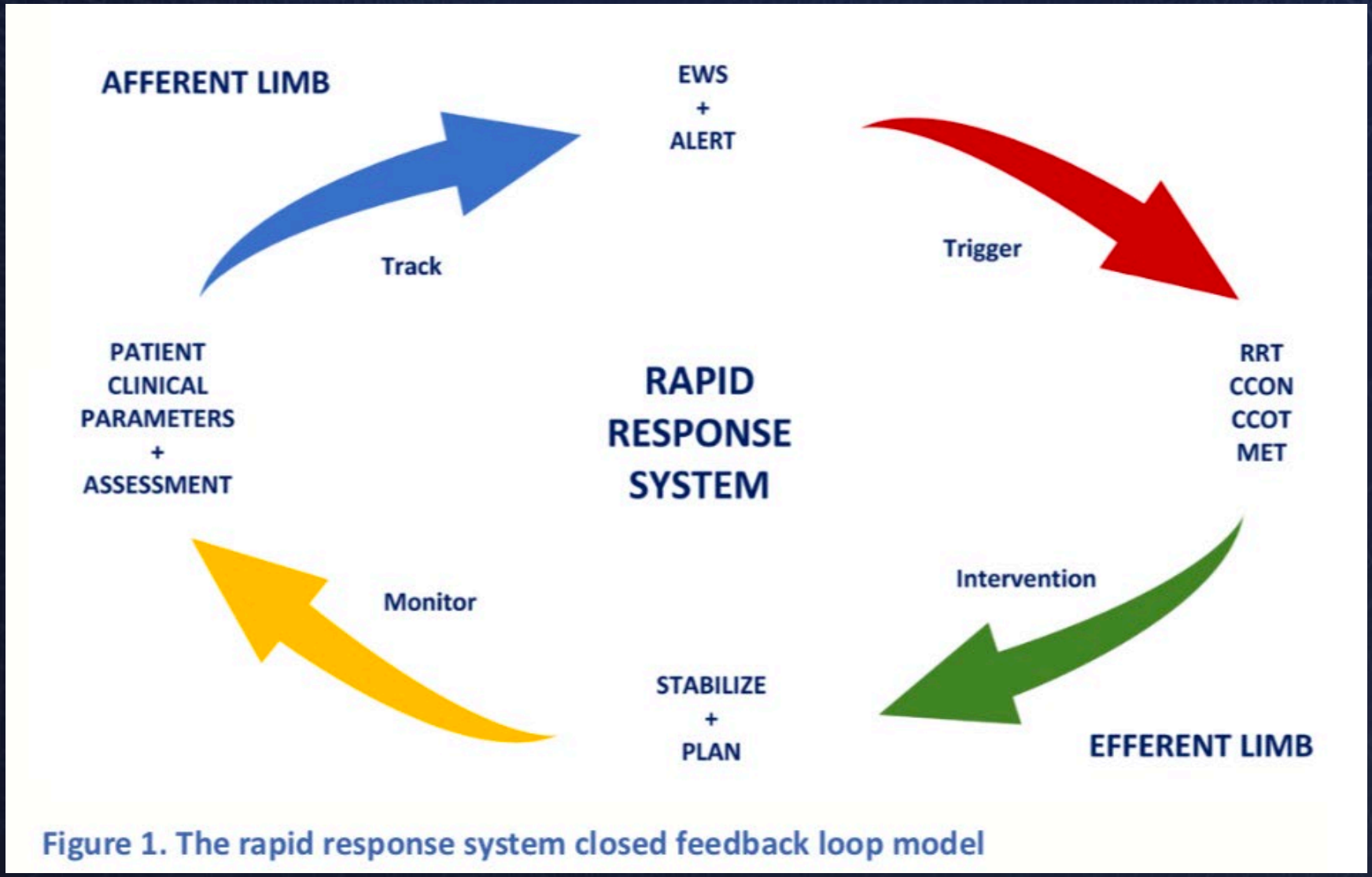


Figure 1. The rapid response system closed feedback loop model

Williams G and Alberto L. 2019. Chapter 5. Recognizing and managing the deteriorating patient: The role of Rapid Response Systems, ICU outreach nurse and medical emergency teams. In Goldsworthy S, Kleinpell R & Williams G. International Best Practices in Critical Care : WFCCN e-book: www.wfccn.org.

Getting Ready: February 2016

ICON Preparation 4-week Orientation

Shared Study Days

- System orientation days x2
- Fundamentals of Critical care Support Course: Adult & Peds 100% Pass Rate
- Pain Management course
- Managing escalating behavior

Hospital Specific Days

- Specialist Ward/Dept orientation
- Shadowing Intensivist on rounds
- Orientation to policies and procedures
- Preparation for FCCS skills tests
- Awareness sessions with ward staff and managers
- Developing data collection tools and processes
- Commence role as Evening shift only X 7 days

Refining the Expectations

Table 1. Primary Expectations of the ICON

No	Primary Expectation
1.	Provide clinical advice, assessment, action plans and where appropriate, interventions to ensure quality patient care
2.	Maintain all skills and competencies as required to maximize utility and support across a broad range of clinical environments
3.	Guide and support clinical staff managing complex situations.
4.	Provide bedside teaching, advice and guidance where appropriate.
5.	Respond to adult and pediatric cardiopulmonary/ respiratory arrests in the general wards, fires, violent situations, internal and external disasters and any other emergency situations in the hospital.
6.	Communicate effectively and professionally to all members of the multidisciplinary team.

Williams G, Rotering L, Du Plessis J, Samuel A, Maher, Crilly J. 2018. Staff perception of the Intensive Care Outreach Nurse role. J Nurs Care Qual. 34(4): 352-7.

Roles & Responsibilities of ICON

Table 2. Roles and Responsibilities of the ICON

No.	Role and Responsibilities
1.	Receive handover from outgoing ICON
2.	Liaise with Nursing Supervisor regarding concerns they may have- vulnerable patients/ wards etc.
3.	Review reports from the EMR to identify patients at risk of deterioration.
4.	Identify high risk patients in the hospital and prioritize visits/ follow ups.
5.	Review all ICU/ HDU transfers to the wards and plan to follow up on these patients
6.	Accept calls for advice and rapid response.
7.	Respond to rapid response and other codes
8.	Collect and analyze data and provide reports on a monthly basis reflecting ICON activities.
9.	Document all inputs and care provided in the patients' EMR.

Williams G, Rotering L, Du Plessis J, Samuel A, Maher, Crilly J. 2018. Staff perception of the Intensive Care Outreach Nurse role. J Nurs Care Qual. 34(4): 352-7.

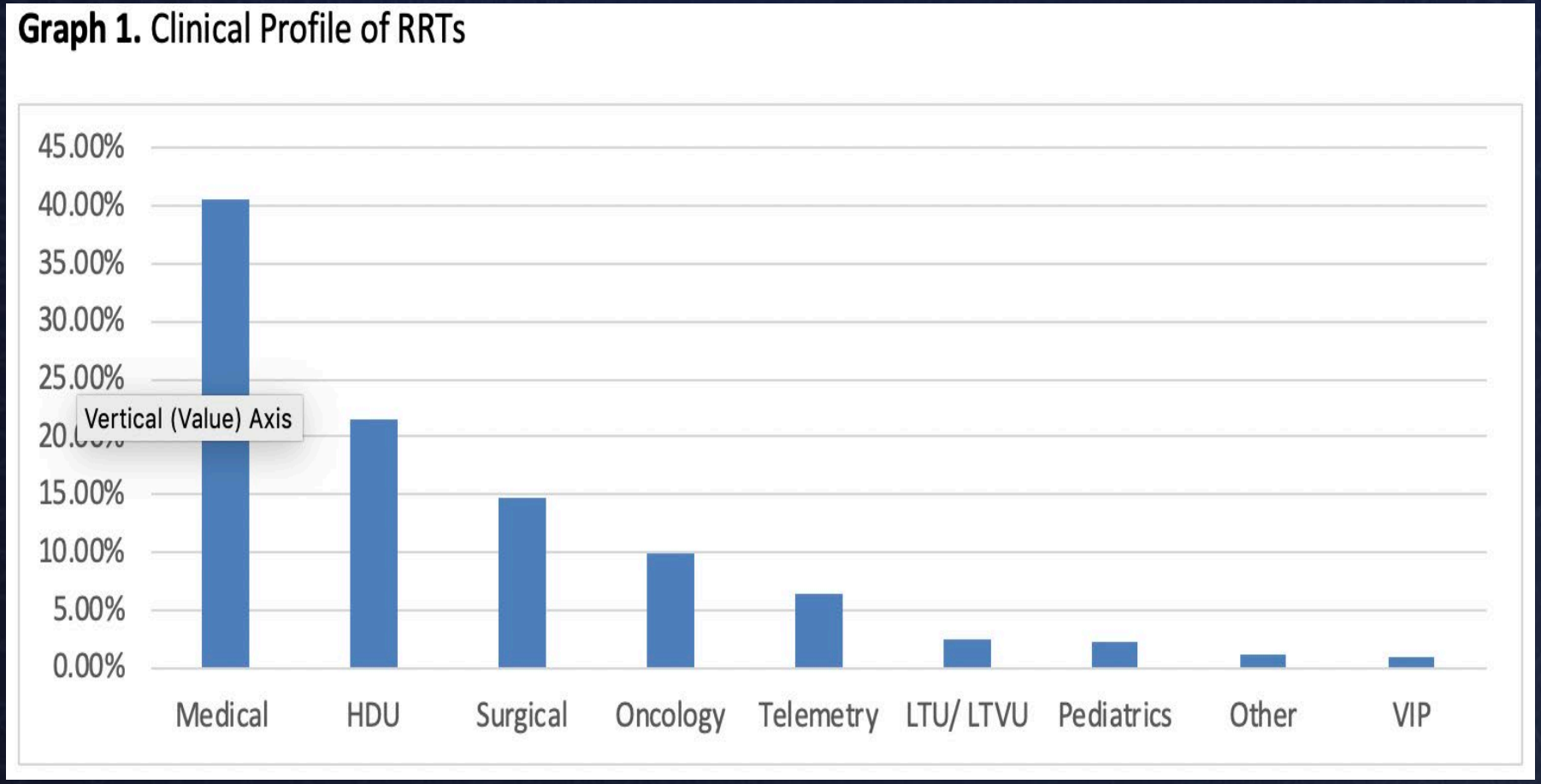
Most Important Triggers

Table 4. Most Common Triggers for RRT.

Trigger for RRT	Total number triggered	%
Respiratory Rate	10452	60.22%
Heart Rate	9134	52.63%
SPO2	4075	23.48%
Systolic BP	3736	21.53%
Temperature	3124	18%
Nurse Concern	2263	13.04%
AVPU	2171	12.51%
Pain	651	3.75%
Bleeding	59	0.34%

Williams G, Rotering L, Du Plessis J, Samuel A, Maher, Crilly J. 2018. Staff perception of the Intensive Care Outreach Nurse role. J Nurs Care Qual. 34(4): 352-7.

Most Calls for ICON



Williams G et. al. 2018. Staff perception of the Intensive Care Outreach Nurse role. J Nurs Care Qual. 34(4): 352-7.

Staff's Perception of the Intensive Care Outreach Nurse Role

A Multisite Cross-sectional Study

Ged Williams, RN, MHA, LLM, FAAN; Loralee Rotering, MSc, RN; Asha Samuel, RN, RM, MSN, MBA; Jean Du Plessis, MSc (Mgment), RN; Maher H. A. Abdel Khaleq, RN; Julia Crilly, PhD, MEmergN (Hons), RN

ABSTRACT

Background: Rapid Response Systems are emerging internationally to provide a patient-focused approach to prevent potentially avoidable deaths and serious adverse events.

Local Problem: This study focused on ward nurses in the United Arab Emirates (UAE) government hospitals who were perceived to lack the confidence and knowledge to detect and/or respond to deteriorating patients.

Method: A cross-sectional study design was used to evaluate the Intensive Care Outreach Nurse (ICON) role from the perspectives of the ICONs, their managers/educators, and ward-based physicians and nurses. ICONs are intensive care experienced nurses with additional education in the role of rapid responder to the deteriorating patient.

Interventions: An ICON role was implemented across 4 hospitals to respond to and support clinicians in the recognition and management of the deteriorating patient on general inpatient wards.

Results: ICON skills perceived as most beneficial by respondents included staff education, respiratory therapy, medication administration, and intravenous access.

Conclusions: The ICON role is able to support recognition and management of the deteriorating patients.

Keywords: clinical deterioration, medical emergency team, nurse role, rapid response team

Value Added Benefits

Table. Skills Provided by ICON Perceived as Most Beneficial[a]

ICON Skills	Ward Nurse (N = 367)	Physician/ Surgeon (N = 23)
Respiratory therapy	6 (4-6)	6 (6-7)
Staff education	6 (4-6)	6 (5-7)
IV start	5 (4-6)	6 (5-7)
Medication administration	5 (3-6)	6 (3.5-6.5)
Blood collection	5 (3-6)	6 (4-6.5)
ABG	5 (4-6)	6 (4-6.75)
ECG	5 (3-6)	6 (5-7)
SIRS investigation	4 (2-6)	6 (4-6.5)
NGT/OGT insertion	5 (3-6)	5 (3-7)
Positioning	4 (2-6)	6 (3-6)
Log roll	4 (1.25-5)	5 (3.25-6)
Dressing change	4 (1-5)	5 (3-6)
Difficult family/patient	5 (3-6)	4 (5-5.5)
Pediatric admission	4 (1-6)	4.5 (2.25-5.75)
ER trauma	4 (1-6)	4.5 (1.5-5.75)
Lumbar drain	4 (1-5)	4 (2.25-5)

Abbreviations: ABG, arterial blood gas; ECG, electrocardiograph; ER, emergency room; ICON, intensive care outreach nurse; IV, intravenous; NGT, nasogastric tube; OGT, orogastric tube; SIRS, systemic inflammatory response syndrome.

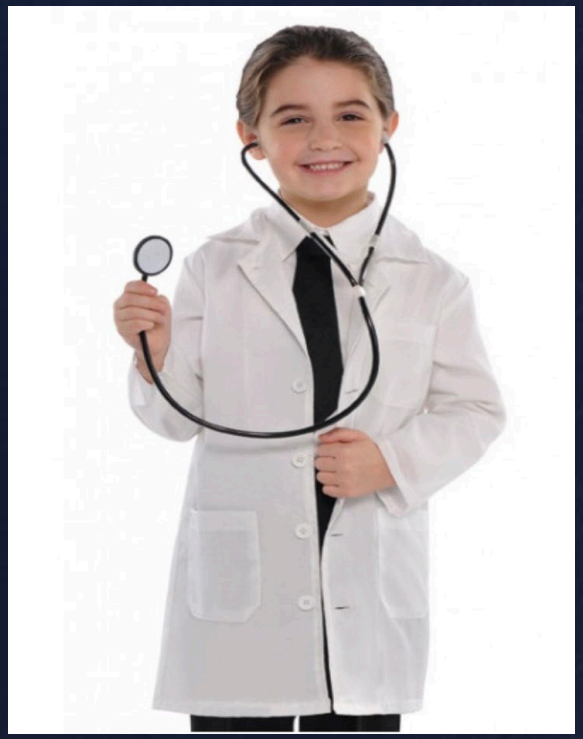
[a] *Scale of 1 to 7 (1 =* poor *and 7 =* excellent*).*

Williams G, Rotering L, Du Plessis J, Samuel A, Maher, Crilly J. 2018. Staff perception of the Intensive Care Outreach Nurse role. J Nurs Care Qual. 34(4): 352-7.

ICON Call Response
2 Years = 17355

Who Attended

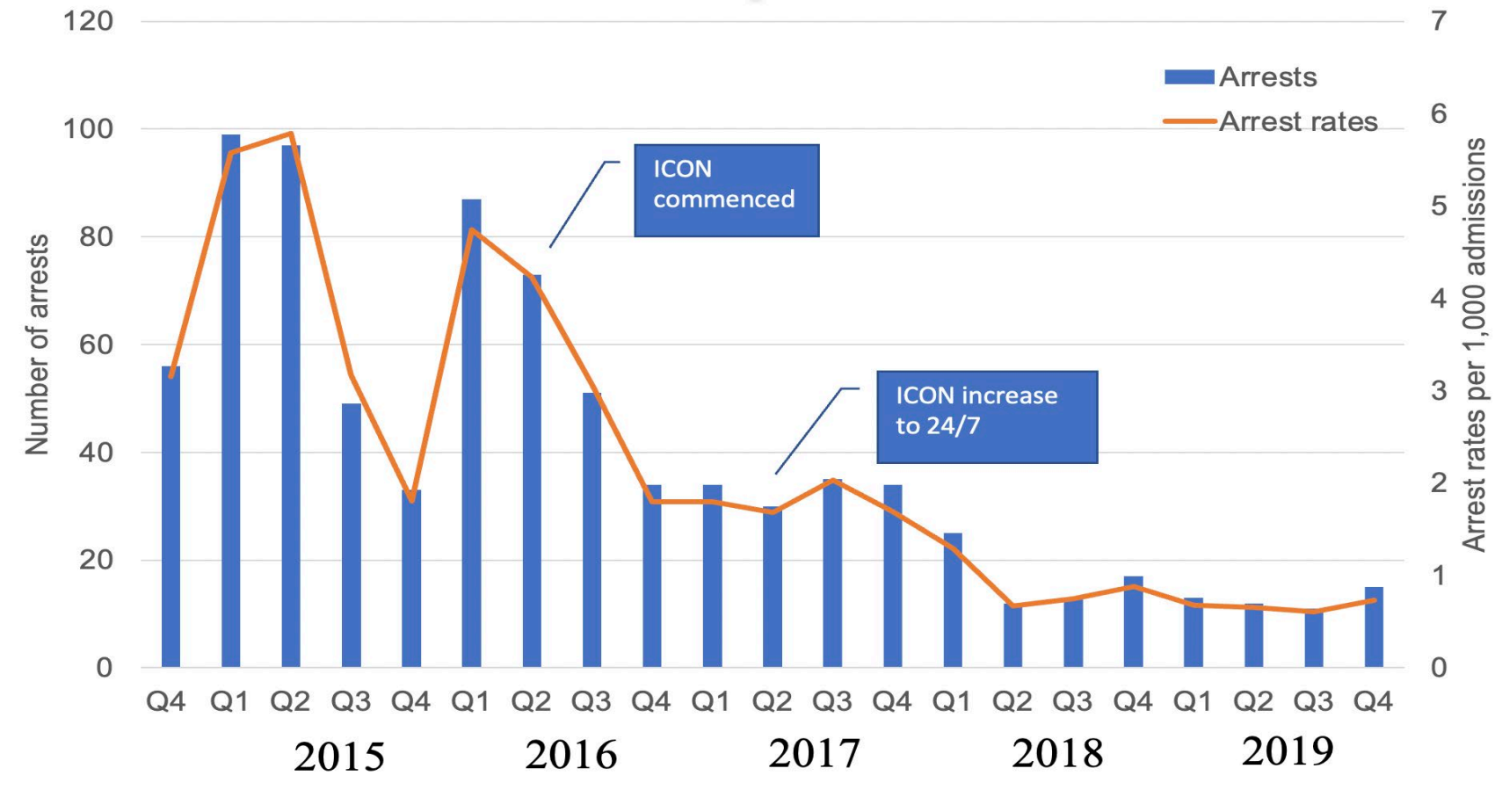
- ICON Only 4761
- On Call MD 12416
- Resp. Therapy 2916
- ICU Physician 2530
- Neurosurgery 159
- Cardiology 358
- Other Specialty 545



On Call MD ☺

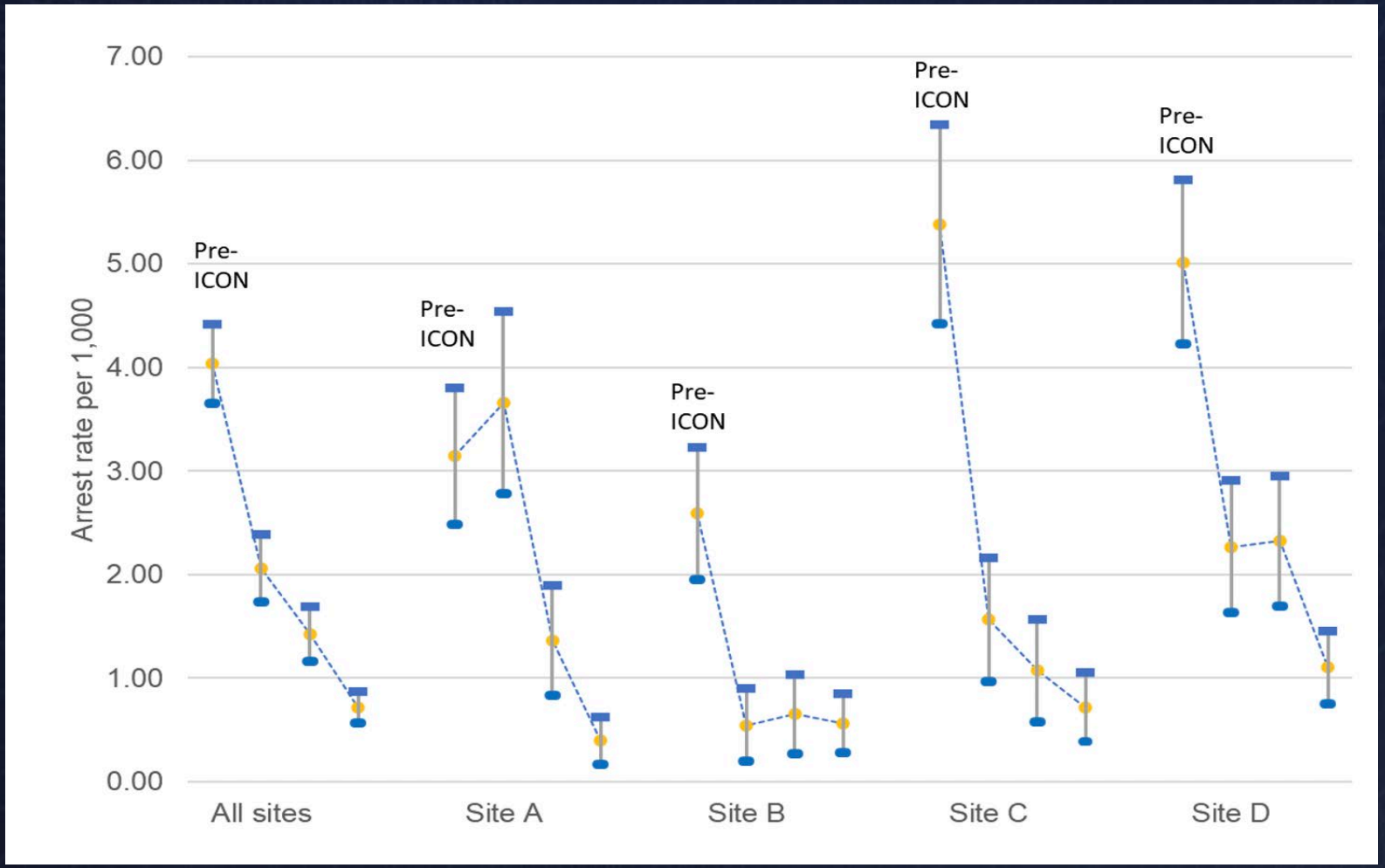
Williams G et. al. 2018. Staff perception of the Intensive Care Outreach Nurse role. J Nurs Care Qual. 34(4): 352-7.

Cardiopulmonary Arrests Outside of Critical Care Areas (all sites), and Arrest Rate per 1,000 Admissions, Q4 2014 – Q4 2019.



Williams G, et.al. Evaluation of an Intensive Care Outreach Nurse programme in four UAE hospitals. J Nurs Care Qual. 28 Feb 2022. DOI: 10.1097/ncq.0000000000000620 PMID: 35234173

Cardiopulmonary Arrest Rate Outside Critical Care Areas by Implementation Period (pre-ICON, period 1, period 2, Post-ICON Evaluation), with 95% confidence intervals around the rate.



Williams G, et.al. Evaluation of an Intensive Care Outreach Nurse programme in four UAE hospitals. J Nurs Care Qual. 28 Feb 2022. DOI: 10.1097/ncq.0000000000000620 PMID: 35234173

2 Years Later

- 24/7 coverage of whole hospital
- Modified roles being created for Pediatrics and Obstetrics
- ICONs provide themed monthly education program at ward level
- Research = Sepsis bundle compliance
- Assistance with End-of-Life care support on the wards

The Society of Critical Care Medicine Guidelines on Recognizing and Responding to Clinical Deterioration Outside the ICU: 2023

1. **Vital Sign Measurement**: Ensure timely and accurate acquisition of vital signs and urgent reporting of significant abnormalities (Good Practice Statement).
2. **Continuous Monitoring**: No recommendation for routine continuous vital sign monitoring in unselected non-ICU patients due to insufficient evidence.
3. **Education**: Suggest focused education for bedside clinicians on recognizing early clinical deterioration (Conditional Recommendation).
4. **Patient/Family Involvement**: Empower patients, families, and care partners to alert appropriate personnel about clinical deterioration and incorporate their concerns into early warning systems (Good Practice Statement and Conditional Recommendation).

Honarmand K, et al. *Crit Care Med*. 2024;52(2):314-330.

The Society of Critical Care Medicine Guidelines on Recognizing and Responding to Clinical Deterioration Outside the ICU: 2023

1. **Rapid Response Systems (RRS)**: Strongly recommend hospital-wide deployment of rapid response teams (RRT/MET) with explicit activation criteria (Strong Recommendation).
2. **RRT/MET Composition**: No specific recommendation on whether RRT/MET should be led by prescribing or non-prescribing clinicians suggest responders should have skills in eliciting patients' goals of care (Conditional Recommendation).
3. **Quality Improvement**: Quality improvement processes should be integral to the rapid response system (Good Practice Statement).

Honarmand K, et al. *Crit Care Med*. 2024;52(2):314-330.

Conclusion

ICON roles

- Reduce morbidity and mortality
- Reduce ICU admissions and readmissions
- Reduce ICU and hospital LOS
- Build confidence and strength of nurses
- Ensure doctors time is used efficiently
- Should be available in all large hospitals with vulnerable ward patients.

Zhang Q, et al Heart & Lung. 2024; 63(51-64)

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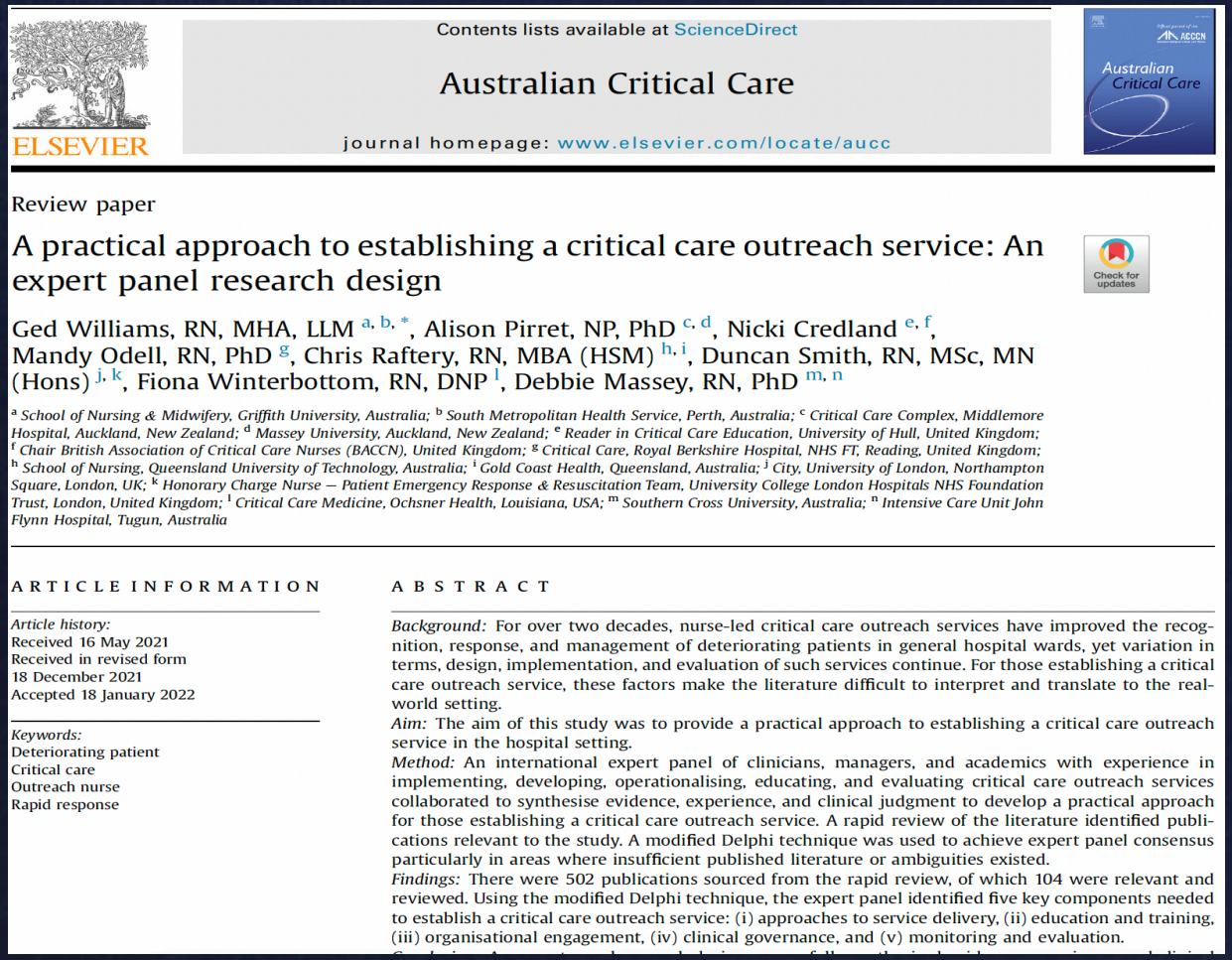
How to Implement a Rapid Response System



Contents lists available at ScienceDirect

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Review paper

A practical approach to establishing a critical care outreach service: An expert panel research design

Ged Williams, RN, MHA, LLM [a, b, *], Alison Pirret, NP, PhD [c, d], Nicki Credland [e, f], Mandy Odell, RN, PhD [g], Chris Raftery, RN, MBA (HSM) [h, i], Duncan Smith, RN, MSc, MN (Hons) [j, k], Fiona Winterbottom, RN, DNP [l], Debbie Massey, RN, PhD [m, n]

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ABSTRACT

Background: For over two decades, nurse-led critical care outreach services have improved the recognition, response, and management of deteriorating patients in general hospital wards, yet variation in terms, design, implementation, and evaluation of such services continue. For those establishing a critical care outreach service, these factors make the literature difficult to interpret and translate to the real-world setting.

Aim: The aim of this study was to provide a practical approach to establishing a critical care outreach service in the hospital setting.

Method: An international expert panel of clinicians, managers, and academics with experience in implementing, developing, operationalising, educating, and evaluating critical care outreach services collaborated to synthesise evidence, experience, and clinical judgment to develop a practical approach for those establishing a critical care outreach service. A rapid review of the literature identified publications relevant to the study. A modified Delphi technique was used to achieve expert panel consensus particularly in areas where insufficient published literature or ambiguities existed.

Findings: There were 502 publications sourced from the rapid review, of which 104 were relevant and reviewed. Using the modified Delphi technique, the expert panel identified five key components needed to establish a critical care outreach service: (i) approaches to service delivery, (ii) education and training, (iii) organisational engagement, (iv) clinical governance, and (v) monitoring and evaluation.

Williams, G. et al. 2022. A practical approach to establishing a critical care outreach service: An expert panel research design. Australian Critical Care, Volume 36(1), 151 - 158