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13 • 14 OTTOBRE

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CENTRO CONGRESSI MAGAZZINI DEL COTONE

PORTO ANTICO GENOVA

Modelli organizzativi di Rapid Response System (RRS) per prevenire l'arresto cardiaco

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13 E 14 OTTOBRE

CENTRO CONGRESSI MAGAZZINI DEL COTONE
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CONGRESSO NAZIONALE IRC

2017



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Indice

- * Dobbiamo parlare ancora di prevenzione dell'arresto cardiaco intra-H?
- * Rapid response SYSTEM: Spunti dalla letteratura
- * Spunti dalla realtà italiana
- * Conclusioni

Le premesse fondamentali prima di parlare di RRS

Gli arresti cardiaci intraospedalieri, nei reparti ordinari, accadono con frequenza significativa?
Una parte consistente di essi è prevenibile?

Si.



Segni vitali anormali & ACC

The prevalence and significance of abnormal vital signs prior to in-hospital cardiac arrest[☆]

Lars W. Andersen^{a,b,1}, Won Young Kim^{a,c,1}, Maureen Chase^a, Katherine M. Berg^d, Sharri J. Mortensen^{a,e}, Ari Moskowitz^d, Victor Novack^{a,f}, Michael N. Cocchi^{a,g}, Michael W. Donnino^{a,d,*}, for the American Heart Association's Get With the Guidelines[®] – Resuscitation Investigators² *Resuscitation 98 (2016) 112–117*

Results: 7851 patients were included. Individual vital signs were associated with in-hospital mortality. The majority of patients (59.4%) had at least one abnormal vital sign 1–4 h before the arrest and 13.4% had at least one severely abnormal sign. We found a step-wise increase in mortality with increasing number of abnormal vital signs within the abnormal (odds ratio (OR) 1.53 (CI: 1.42–1.64) and severely abnormal groups (OR 1.62 (CI: 1.38–1.90)). This remained in multivariable analysis (abnormal; OR 1.38 (CI: 1.28–1.48), and severely abnormal; OR 1.40 (CI: 1.18–1.65)).

Conclusion: Abnormal vital signs are prevalent 1–4 h before in-hospital cardiac arrest on hospital wards. In-hospital mortality increases with increasing number of pre-arrest abnormal vital signs as well as increased severity of vital sign derangements.

Arresti cardiaci intraospedalieri evitabili: dove accadono?

Incidence, location and reasons for avoidable in-hospital cardiac arrest in a district general hospital

Resuscitation 54 (2002) 115–123

Timothy J. Hodgetts^{a,*}, Gary Kenward^b, Ioannis Vlackonikolis^c, Susan Payne^b,
Nicolas Castle^b, Robert Crouch^d, Neil Ineson^b, Loua Shaikh^b

Numbers and proportions of avoidable and unavoidable cardiac arrests according to area (*critical care vs non-critical care*)

	Unavoidable	Avoidable	Total
<i>Area</i>			
Critical	22 59.5%	15 40.5%	37
Non-critical	18 22.2%	63 77.8%	81
Total	40 33.9%	78 66.1%	118

Numbers and proportions of survivors and non-survivors according to area nursed (*critical care vs non-critical care*)

	Survivor	Dead	Total
<i>Area</i>			
Critical	12 32.4%	25 67.6%	37
Non-critical	4 4.9%	77 95.1%	81
Total	16 13.6%	102 86.4%	118

La carenza di letti intensivi è severa e diffusa

Impact of delayed admission to intensive care units on mortality of critically ill patients: a cohort study

Cardoso et al. *Critical Care* 2011, **15**:R28
<http://ccforum.com/content/15/1/R28>

Lucienne TQ Cardoso, Cintia MC Grion*, Tiemi Matsuo, Elza HT Anami, Ivanil AM Kauss, Ludmila Seko, Ana M Bonametti

Refusal of Intensive Care Unit Admission Due to a Full Unit

Impact on Mortality

Am J Respir Crit Care Med Vol 185, Iss. 10, pp 1081–1087, May 15, 2012

René Robert¹, Jean Reignier², Caroline Tournoux-Facon³, Thierry Boulain⁴, Olivier Lesieur⁵, Valérie Gissot⁶, Vincent Souday⁷, Mouldi Hamrouni⁸, Cécile Chapon⁹, and Jean-Paul Gouello¹⁰, for the Association des Réanimateurs du Centre Ouest Group*

Survival of critically ill patients hospitalized in and out of intensive care units under paucity of intensive care unit beds*

Crit Care Med 2004 Vol. 32, No. 8

Elisheva Simchen, MD, MPH; Charles L. Sprung, MD; Noya Galai, PhD; Yana Zitser-Gurevich, MD, MPH; Yaron Bar-Lavi, MD; Gabriel Gurman, MD; Moti Klein, MD; Amiram Lev, MD; Leon Levi, MD; Fabio Zveibil, MD; Micha Mandel, MA; George Mnatzaganian, RN, MPH

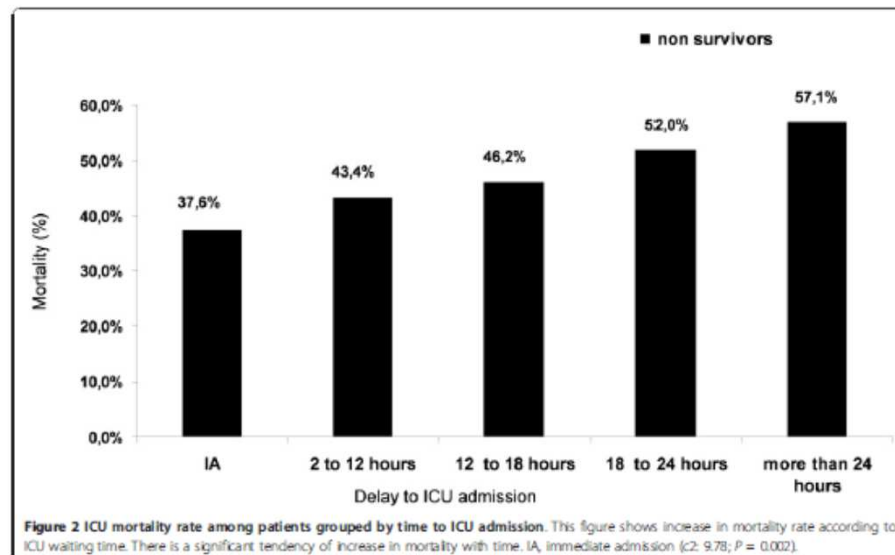
Objective: The demand for intensive care beds far exceeds their availability in many European countries. Consequently, many critically ill patients occupy hospital beds outside intensive care units, throughout the hospital. The outcome of patients who fit

...aspettare, peggiorare, arrestarsi forse...

Impact of delayed admission to intensive care units on mortality of critically ill patients: a cohort study

Lucienne TQ Cardoso, Cintia MC Grion*, Tiemi Matsuo, Elza HT Anami, Ivanil AM Kauss, Ludmila Seko, Ana M Bonametti

Cardoso et al. *Critical Care* 2011, **15**:R28
<http://ccforum.com/content/15/1/R28>

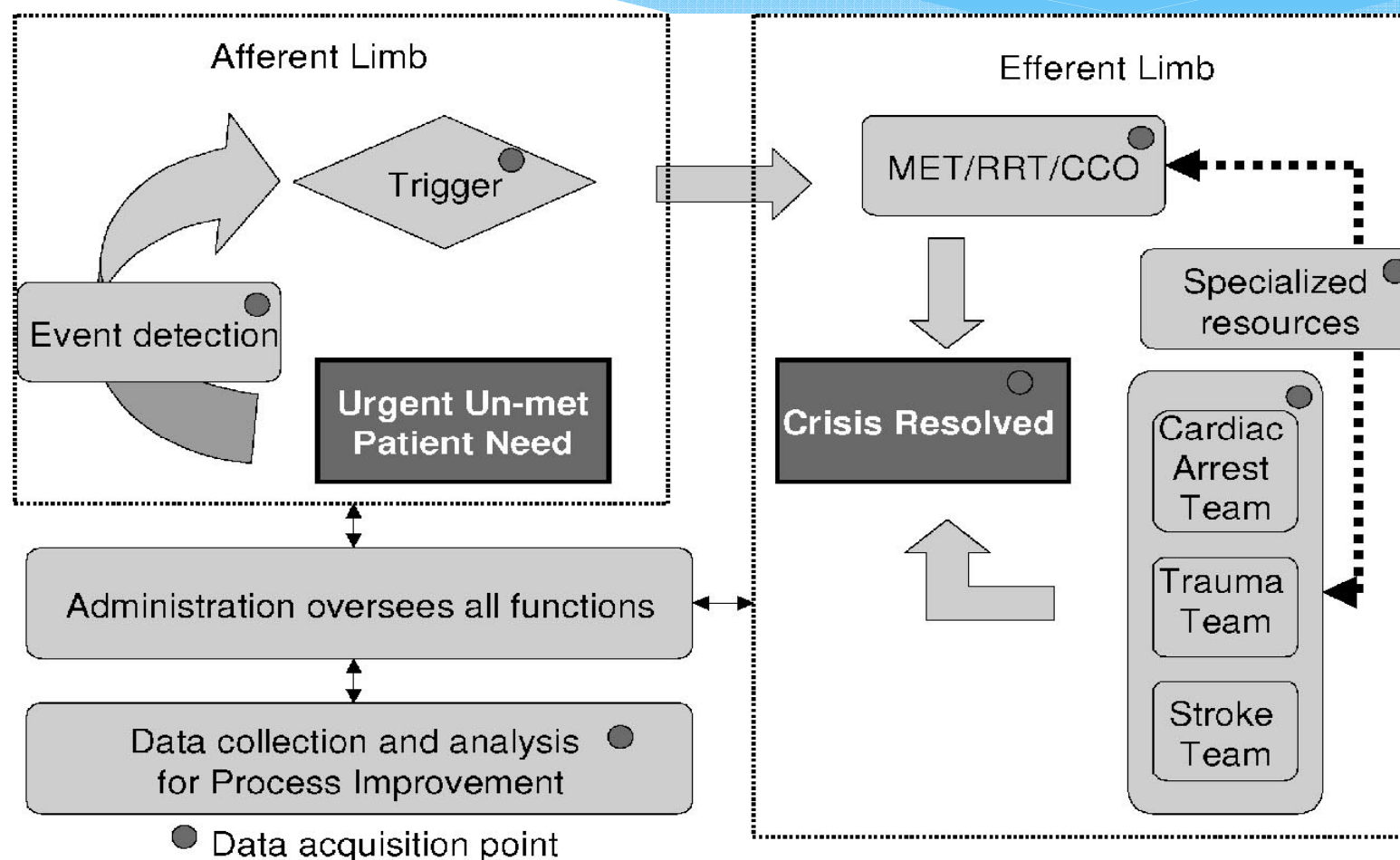


- Demands for ICU beds are increasing worldwide and delay to ICU admission is becoming a more frequent issue.
- There is an increase in mortality for each hour of delay to ICU access.
- Critically ill patients show further physiologic deterioration and an increase in organ dysfunction while waiting for an ICU bed to become available.

Una possibile risposta: il Rapid response SYSTEM

Findings of the First Consensus Conference on Medical Emergency Teams*

Crit Care Med 2006 Vol. 34, No. 9



Anche in Italia!

SIAARTI – IRC Recommendations for organizing responses to In-Hospital emergencies

G. SAVOIA ¹, G. BOSCO ², E. CERCHIARI ³, E. DE BLASIO ⁴, F. DELLA CORTE ⁵, G. GORDINI ³
F. PETRINI ⁶, G. RADESCHI ⁷, M. RAIMONDI ⁸, T. ROSAFIO ⁹, FOR SIAARTI – IRC WORKING
GROUP

MINERVA ANESTESIOLOGIA 2007;73:533-53

It is recommended that further improvement of response to emergencies on general wards is pursued, activating models of RRS (MET and/or Outreach) always accompanied by the necessary educational processes and systematic case review, utilizing uniform data collection (Level B).

Ma...funziona? È l'approccio giusto?





RRS: funziona?

Rapid-Response Systems as a Patient Safety Strategy

A Systematic Review

Ann Intern Med. 2013;158:417-425.

Bradford D. Winters, MD, PhD; Sallie J. Weaver, PhD; Elizabeth R. Pfoh, MPH; Ting Yang, PhD; Julius Cuong Pham, MD, PhD; and Sydney M. Dy, MD, MSc

In summary, we found moderate strength of evidence that RRSs improve outcomes from both a high-quality systematic review through November 2008 and the additional literature published through October 2012. Our review also identified key barriers and facilitators of effective RRS implementation, which included staff acceptance and leadership of the RRS, rates of calling the RRS, and trigger mechanisms.

Il RRS può funzionare

Rapid response systems: a systematic review and meta-analysis

Ritesh Maharaj^{1,2,3*}, Ivan Raffaele² and Julia Wendon^{1,2}



Results: Twenty-nine eligible studies were identified. The studies were analysed in groups based on adult and paediatric trials that were further sub-grouped on methodological design. There were 5 studies that were considered either cluster randomized control trial, controlled before after or interrupted time series. The remaining studies were before and after studies without a contemporaneous control. The implementation of RRS has been associated with an overall reduction in hospital mortality in both the adult (RR 0.87, 95 % CI 0.81–0.95, $p < 0.001$) and paediatric (RR=0.82 95 % CI 0.76–0.89) in-patient population. There was substantial heterogeneity in both populations. The rapid response system team was also associated with a reduction in cardiopulmonary arrests in adults (RR 0.65, 95 % CI 0.61–0.70, $p < 0.001$) and paediatric (RR=0.64 95 % CI 0.55–0.74) patients.

Conclusion: Rapid response systems were associated with a reduction in hospital mortality and cardiopulmonary arrest. Meta-regression did not identify the presence of a physician in the rapid response system to be significantly associated with a mortality reduction.

Critical Care (2015) 19:254

Effectiveness of Rapid Response Teams on Rates of In-Hospital Cardiopulmonary Arrest and Mortality: A Systematic Review and Meta-analysis

Rose S. Solomon, MPH, Gregory S. Corwin, MPH*, Dawn C. Barclay, MD, MBA, Sarah F. Quattrusi, MPH,
Michelle D. Darnenber, MPH

DATA SYNTHESIS: Our search identified 691 studies, of which 30 met criteria for inclusion in the analysis. Implementation of an RRT/MET was associated with a significant decrease in hospital mortality (relative risk [RR] = 0.88, 95% confidence interval [CI]: 0.83-0.93, I^2 = 86%, 3,478,952 admissions) and a significant decrease in the number of non-ICU cardiac arrests (RR = 0.62, 95% CI: 0.55-0.69, I^2 = 71%, 3,045,273 admissions).

CONCLUSIONS: Implementation of an RRT/MET is associated with a reduction in both hospital mortality and non-ICU cardiopulmonary arrests. *Journal of Hospital Medicine* 2016;11:438–445. © 2016 Society of Hospital Medicine

Si, funziona

Impact of an Intensivist-Led Multidisciplinary Extended Rapid Response Team on Hospital-Wide Cardiopulmonary Arrests and Mortality*

Saad Al-Qahtani, MD, FRCPC¹; Hasan M. Al-Dorzi, MD¹; Hani M. Tamim, MPH, PhD²;
Sajid Hussain, MBBS¹; Lian Fong, RN¹; Saadi Taher, MBChB, FRCP³;
Bandar Abdulmohsen Al-Knawy, MD, FRCP(C)⁴; Yaseen Arabi, MD, FCCP, FCCM¹

SUCCESS ISN'T
ABOUT HOW
MUCH *money*
YOU MAKE,
IT'S ABOUT
THE *difference*
YOU MAKE IN
PEOPLE'S LIVES.

- MICHELLE OBAMA STARTUPPOSTER



Conclusion: The implementation of rapid response team was effective in reducing cardiopulmonary arrests and total hospital mortality for ward patients, improving the outcomes of patients who needed ICU admission and reduced readmissions and mortality of patients who were discharged from the ICU. (*Crit Care Med* 2013; 41:506–517)

E sul lungo periodo? Ancora meglio!

Long term trends in medical emergency team activations and outcomes

Ruth Herod^a, Steven A. Frost^{b,c}, Michael Parr^{b,d}, Ken Hillman^{b,d,e}, Anders Aneman^{b,d,*}

Resuscitation 85 (2014) 1083–1087

Results: Activations of the MET increased between 2000 and 2012 (19 ± 3 – 30 ± 4) and there were changes in reasons for activations over time. Clinical concern (worried) was the most common (22%) trigger criterion in 2000 followed by hypotension (21%) and decreased level of consciousness (17%). In 2012, hypotension was the most common trigger (32%), followed by decreased level of consciousness (19%) and clinical concern (15%). Rates of cardiorespiratory arrest (1.4 ± 0.7 – 1.1 ± 0.4) and unplanned ICU admission (5.0 ± 1.2 – 5.9 ± 1.0) did not change between 2000 and 2012. Hospital mortality decreased from 2005 onwards (15 ± 3.4 – 12 ± 2.2).

Conclusions: MET activity progressively increased during the study period and there was a change in pattern of specific triggering criteria. The sustained decrease in hospital mortality independent of cardiac arrest and unplanned ICU admissions rates suggests patient benefit from the MET system.

Funziona, perseverando



The impact of implementing a rapid response system: A comparison of cardiopulmonary arrests and mortality among four teaching hospitals in Australia[☆]

Jack Chen^{a,*}, Lixin Ou^a, Ken Hillman^a, Arthas Flabouris^b, Rinaldo Bellomo^c,
Stephanie J. Hollis^a, Hassan Assareh^a

Resuscitation 85 (2014) 1275–1281

Results: During the 2002–2008 period, the mature RRS hospital had a greater than 50% lower IHCA rate, a 40% lower IHCA-related mortality, and 6% lower overall hospital mortality. Compared to 2008, in their first year of RRS (2009) two hospitals achieved a 22% reduction in IHCA rate, a 22% reduction in IHCA-related mortality and an 11% reduction in overall hospital mortality. During the same time, the mature RRS hospital showed no significant change in those outcomes but, in 2009, it still achieved a crude 20% lower IHCA rate, and a 14% lower overall hospital mortality rate. There was no significant difference in 1-year post-discharge mortality for survivors of IHCA over the study period.

Conclusions: Implementation of a RRS was associated with a significant reduction in IHCA, IHCA-related mortality and overall hospital mortality.

Efficacia massima nei pz a basso rischio

Impact of a standardized rapid response system on outcomes in a large healthcare jurisdiction[☆]

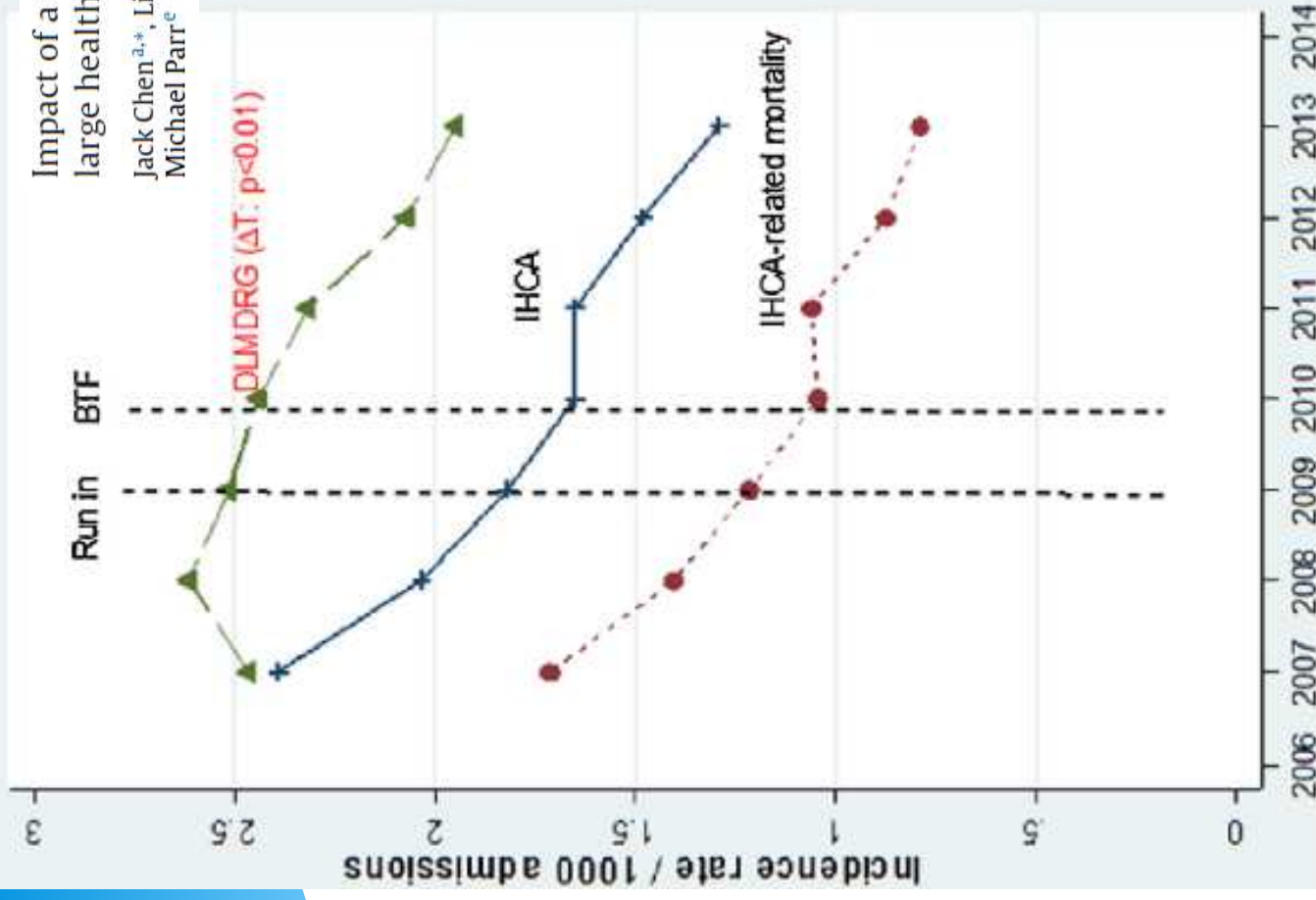
Jack Chen^{a,*}, Lixin Ou^a, Arthas Flabouris^{b,c}, Ken Hillman^a, Rinaldo Bellomo^d, Michael Parr^e

Results: Before the BTF system (2007–2009), there was a progressive decrease in mortality, cardiac arrest rates, cardiac arrests related mortality, and failure to rescue rates, but no changes in mortality rate among low mortality diagnostic related group (LMDRGs) patients. After the BTF program (2010–2013), the same trends continued for all outcomes with an overall (2013 vs 2007) 46% reduction in cardiac arrest rates; a 54% reduction in cardiac arrest related mortality rates; a 19% reduction in hospital mortality; a 35% decrease in failure to rescue rates (all P s < 0.001) over seven-years. In addition, there was a new 20% (p < 0.001) mortality reduction among LMDRG patients (2013 vs 2007).

Conclusions: The BTF program was associated with continued decrease in the overall cardiac arrests rates, deaths after cardiac arrest, hospital mortality and failure to rescue. In addition, among patients in the LMDRC group, it induced a new and significant post-intervention reduction in mortality which was never reported before.

Impact of a standardized rapid response system on outcomes in a large healthcare jurisdiction☆

Jack Chen^{a,*}, Lixin Ou^a, Arthas Flabouris^{b,c}, Ken Hillman^a, Rinaldo Bellomo^d, Michael Parr^e



Funziona anche su larga scala

Outcomes Associated With the Nationwide Introduction of Rapid Response Systems in The Netherlands*

Jeroen Ludikhuize, MD, PhD¹; Anja H. Brunsveld-Reinders, MSc²; Marcel G. W. Dijkgraaf, PhD³;

In 2008, implementation of RRS was mandated by the Dutch government (12). We took the opportunity to study the effects of this nationwide implementation of RRS on outcome

Conclusions: In this study, introduction of nationwide implementation of rapid response systems was associated with a decrease in the composite endpoint of cardiopulmonary arrests, unplanned ICU admissions, and mortality in patients in general hospital wards. These findings support the implementation of rapid response systems in hospitals to reduce severe adverse events. (Crit Care Med 2015; 43:2544–2551)

Anzitutto: il braccio afferente

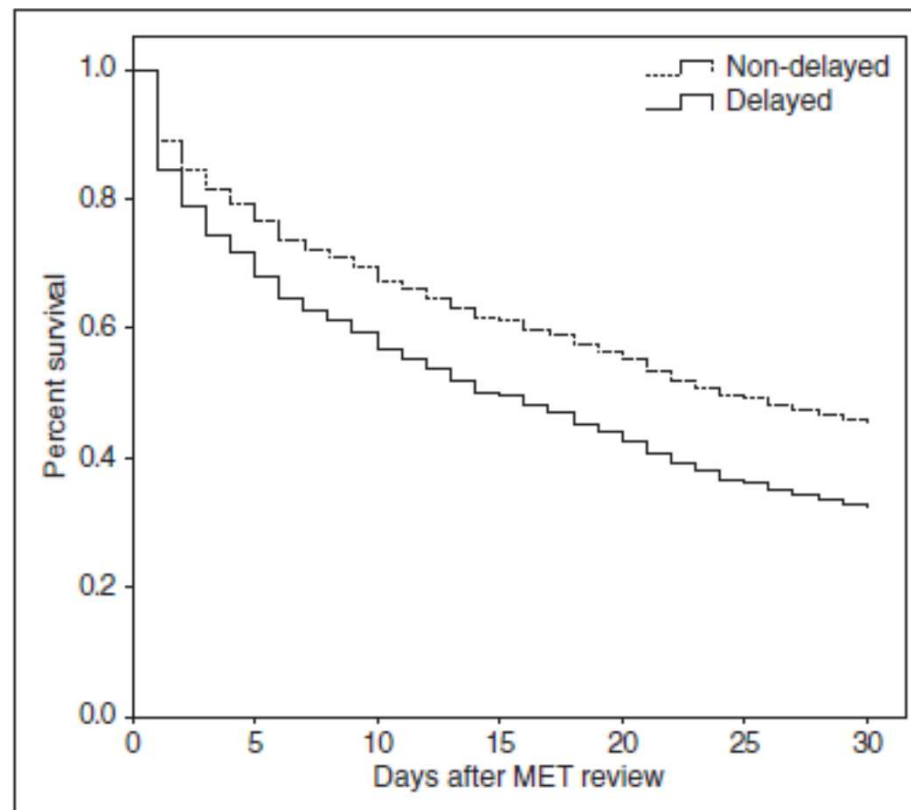
- * Migliorare le capacità di monitoraggio e reazione nei reparti di degenza
- * Formazione
- * Identificazione delle peculiarità dei reparti
- * Azioni preventive

Time to MET is... survival

Delayed Medical Emergency Team Calls and Associated Outcomes*

(*Crit Care Med* 2014; 42:26–30)

Márcio M. Boniatti, PhD, MD¹; Neusa Azzolini, MD²; Marina V. Viana, MD²; Berenice S. P. Ribeiro, MD²; Renata S. Coelho, MD²; Rodrigo K. Castilho, MD²; Márcio R. Guimarães, MD²; Lia Zorzi, MD²; Luis F. Schulz, MD²; Edison M. Rodrigues Filho, MD²



Braccio afferente



“Identifying the hospitalised patient in crisis”—A consensus conference on the afferent limb of Rapid Response Systems ☆,☆☆

Michael A. DeVita^a, Gary B. Smith^{b,c,*}, Sheila K. Adam^d, Inga Adams-Pizarro^e, Michael Buist^f, Rinaldo Bellomo^g, Robert Bonello^h, Erga Cerchiariⁱ, Barbara Farlow^j, Donna Goldsmith^k, Helen Haskell^l, Kenneth Hillman^m, Michael Howellⁿ, Marilyn Hravnak^o, Elizabeth A. Hunt^p, Andreas Hvarfner^q, John Kellett^r, Geoffrey K. Lighthall^s, Anne Lippert^t, Freddy K. Lippert^u, Razeen Mahroof^v, Jennifer S. Myers^w, Mark Rosen^x, Stuart Reynolds^y, Armando Rotondi^z, Francesca Rubulotta^A, Bradford Winters^p

conference has attempted to define (1) what constitutes monitoring, (2) the patients that should be monitored and (3) the frequency and timing of monitoring to ensure the efficiency and effectiveness of the RRS afferent limb. It is hoped that the many unanswered questions outlined will stimulate and guide research to further improve the care of our patients.

Modelli semplici per attivazione MET

Infermieri dei reparti allertano se:

■ VIE AEREE	a rischio
■ RESPIRO	Arresto respiratorio
	RR < 5/min o > 36/min
■ CIRCOLO	Arresto cardiaco
	HR < 40/min o > 140 /min
	PAS < 90mmHg
■ COSCIENZA	Improvvisa caduta GCS > 2 punti
	Convulsioni prolungate
■ ALTRO	Condizioni molto preoccupanti

Modelli complessi

The identification of risk factors for cardiac arrest and formulation of activation criteria to alert a medical emergency team

Resuscitation 54 (2002) 125–131

Timothy J. Hodgetts^{a,*}, Gary Kenward^b, Ioannis G. Vlachonikolis^c, Susan Payne^b,
Nicolas Castle^b

Activation criteria for a medical emergency team

symptoms	4	3	2	1	0	1	2	3	4
Nurse concern			NEW		N O R M A L R A N G E				
Chest pain		NEW							
AAA Pain		NEW							
SOB		NEW							
Physiology									
Pulse	<45	45 - 49	50 - 54	55 - 60		90 - 99	100 - 119	120 - 139	> 139
Temp -core (rectal/tympenic)	< 34	34.0 - 34.5	34.6 - 35.0	35.1 - 35.9			38.5 - 39.9	40.0 - 40.4	>40.4
RR (adult)	< 8	8 - 9	10 - 11			21 - 25	26 - 30	31 - 36	> 36
SpO2 (O2)	<88	88 - 91	92 - 95						
SpO2 (Air)	<85	86 - 89	90 - 93	94 - 96					
SBP (mmHg)	Falls to <90	Falls to 90 - 99	Falls to 100 - 110			Rises by 20 - 29	Rises by 30 - 40	Rises by >40	
or	Falls >40	Falls by 31 - 40	Falls by 20 - 30			Pulse pressure narrows 10	Pulse pressure narrows >10		
GCS changes	< 13		13 - 14				confused or agitated		
Urine output	< 10mls/hr for 2 hrs	< 20mls/hr for 2 hrs					> 250 mls/hr		
Biochemistry									
K+		<2.5	2.5 - 3.0				5.6 - 5.9	6.0 - 6.2	>6.2
Na+	<120	120 - 125	126 - 129			146 - 147	148 - 152	153 - 160	>160
pH	<7.21	7.21 - 7.25	7.26 - 7.30	7.31 - 7.34		7.46 - 7.48	7.49 - 7.50	7.51 - 7.60	>7.60
pCO2 (acute changes)		<3.5	3.5 - 3.9	4.0 - 4.4				6.1 - 6.9	>6.9
SBE	<-5.9	-4.9 - -5.8	-3.8 - -4.8	-3 - -3.7					
pO2 (acute change)	<9.0	9.0 - 9.4	9.5 - 9.9	10 - 11					
Creatinine						121 - 170	171 - 299	300 - 440	>440
Hb	<80	80 - 89	90 - 100						
Urea			<2	2.0 - 2.4		7.6 - 20	21 - 30	31 - 40	>40

Modelli semplificati: MEWS

Probability of deterioration

and need for care upgrade

0-2 : low 3-4 : medium > 4 : high

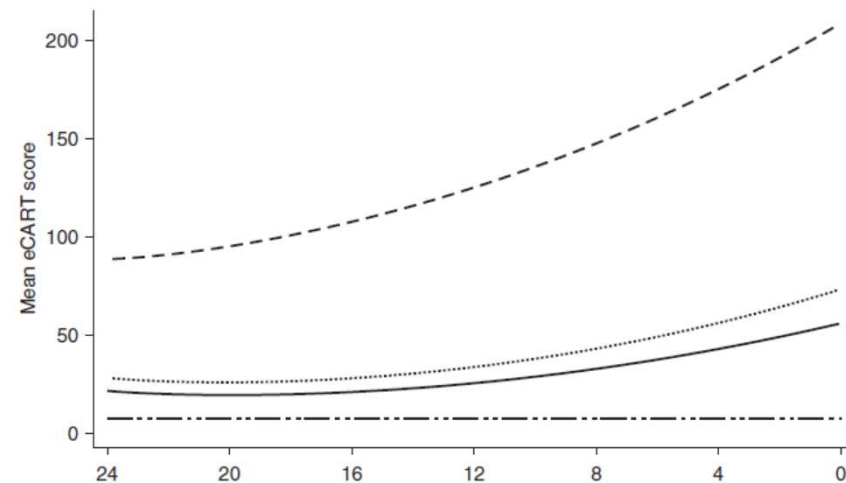
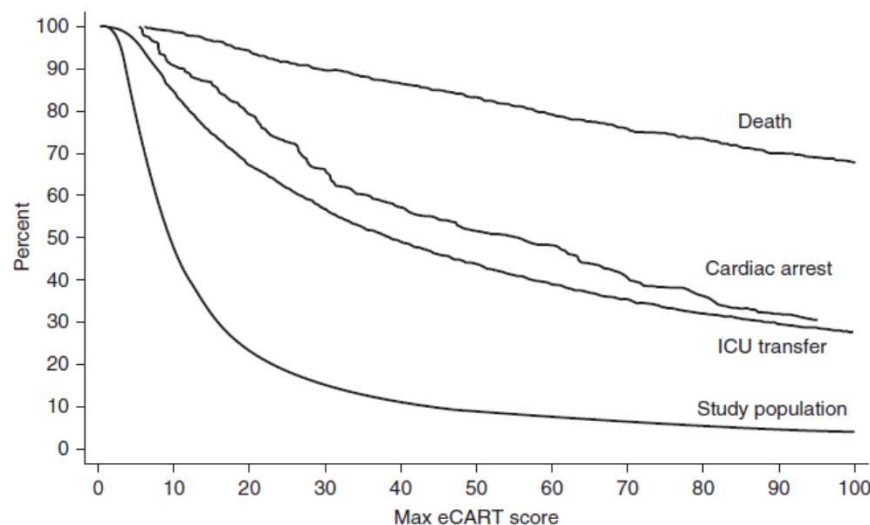
Points	3	2	1	0	1	2	3
Systolic Blood Pressure (mm Hg)	<70	71-80	81-100	101-199		>=200	
Heart Rate		<40	41-50	51-100	101-110	111-129	>=130
Resp Rate		<9		9-14	15-20	21-29	>=30
Temp (C)		<35		35-38.4		>=38.5	
Neurologic Score				Alert	Reacting to voice	Reacting to pain	Unresponsive

Modelli (troppo) complessi

Multicenter Development and Validation of a Risk Stratification Tool for Ward Patients

Matthew M. Churpek^{1,2}, Trevor C. Yuen¹, Christopher Winslow³, Ari A. Robicsek³, David O. Meltzer¹, Robert D. Gibbons², and Dana P. Edelson¹

Am J Respir Crit Care Med Vol 190, Iss 6, pp 649–655, Sep 15, 2014



Our study has several limitations. First, our risk score is complex, and so calculation is best done electronically. Paper records are

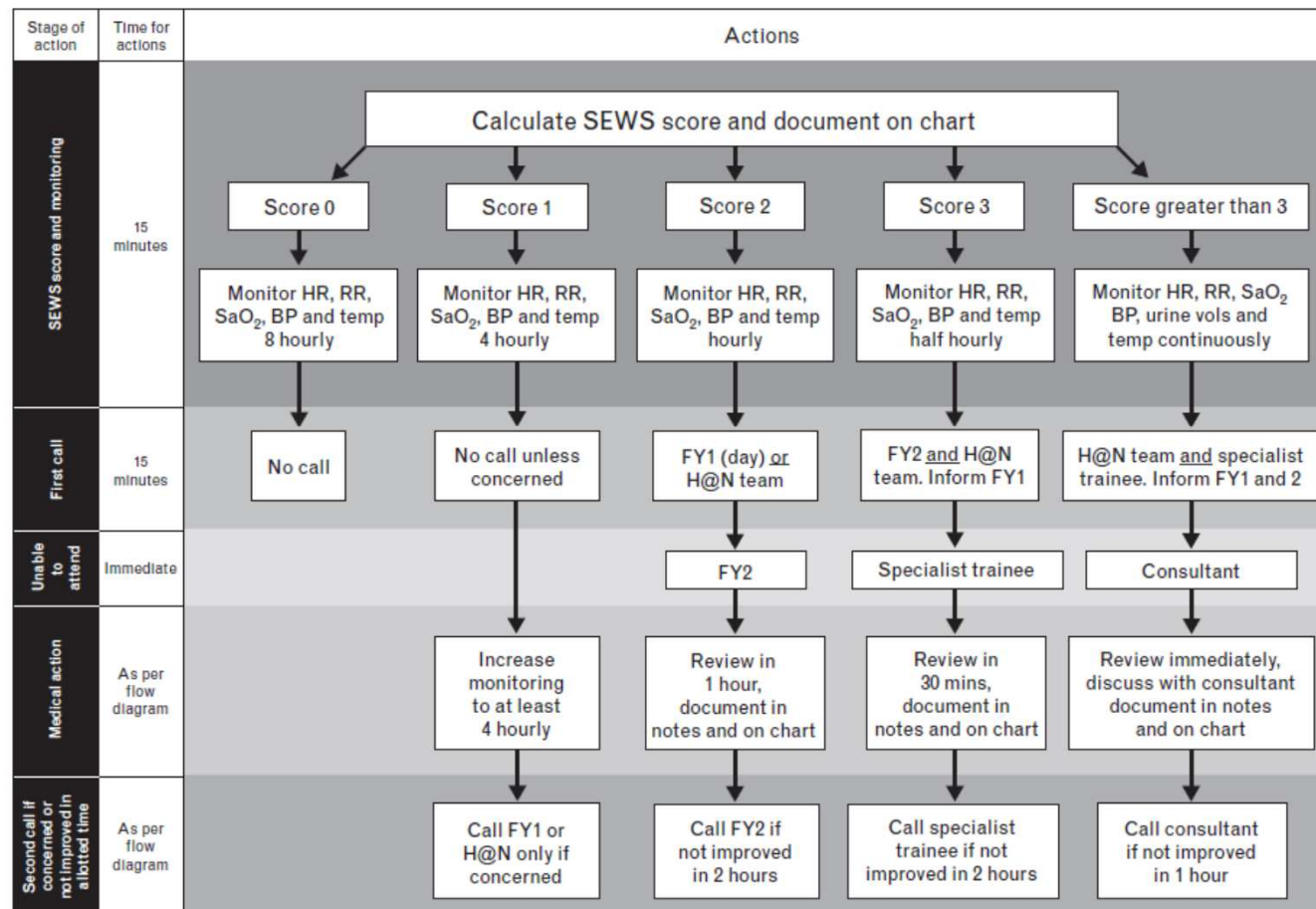
Modelli adattati al singolo centro

Detecting critical illness outside the ICU: the role of track and trigger systems

Jan O. Jansen and Brian H. Cuthbertson

Current Opinion in Critical Care 2010, 16:184–190

Figure 1 A standardized early warning system response algorithm (by BH Cuthbertson)



Modelli italiani: METal

Schema di valutazione	Airway (Vie aeree)	A	<div><div></div><div></div></div>	Assenza di coscienza Vie aeree ostruite o ad elevato rischio di ostruzione								
	Breathing (Respiro)	B	<div><div></div><div></div><div></div></div>	Arresto respiratorio Frequenza respiratoria >36 atti /minuto Improvviso distress respiratorio Improvvisa desaturazione < 90%								
	Circulation (Circolo)	C	<div><div></div><div></div><div></div></div>	Arresto cardiaco Bradicardia <40 Tachicardia >150 Improvvisa caduta pressoria (PAO max < 90 mmHg)								
	Disability (Neurologico)	D	<div><div></div></div>	Peggioramento di due punti dello score neurologico								
				<table><tr><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td>orientato</td><td>disorientato</td><td>agitato</td><td>soporoso</td></tr></table>	4	3	2	1	orientato	disorientato	agitato	soporoso
	4	3	2	1								
orientato	disorientato	agitato	soporoso									
Exposure (esposizione)	E	<div><div></div><div></div></div>	In assenza di pulsiossimetria: improvvisa insorgenza o evidente peggioramento della cianosi Evidente e significativa emorragia in atto									

un criterio rosso



oppure

due criteri gialli



M. E. T. (*Medical Emergency Team*)

Modelli... ancora imperfetti

Modified Early Warning Score Changes Prior to Cardiac Arrest in General Wards



Won Young Kim^{1☯}, Yu Jung Shin^{2☯}, Jin Mi Lee², Jin Won Huh³, Younsuck Koh³,
Chae-Man Lim³, Sang Bum Hong^{3*}

Conclusions

The MEWS itself is a simple and easy-to-use tool, which is associated with hospital mortality in the 24 hours prior to a cardiac arrest. However, 46.8% of the patients in our study had a low MEWS value even 8 hours prior to cardiac arrest and an increasing MEWS was not associated with in-hospital mortality, suggesting that there still remains a need to improve MEWS for recognizing patients at risk of cardiac arrest.

Failure culturale del braccio afferente?

What stops hospital clinical staff from following protocols? An analysis of the incidence and factors behind the failure of bedside clinical staff to activate the rapid response system in a multi-campus Australian metropolitan healthcare service

Bill Shearer,^{1,2} Stuart Marshall,^{2,3} Michael David Buist,⁴ Monica Finnigan,¹ Simon Kitto,⁵ Tonina Hore,⁶ Tamica Sturgess,⁶ Stuart Wilson,⁶ Wayne Ramsay⁶

BMJ Qual Saf 2012;**21**:569–575.



Results: The incidence of physiological instability in the acute adult population was 4.04%. Nearly half of these patients (42%) did not receive an appropriate clinical response from the staff, despite most (69.2%) recognising their patient met physiological criteria for activating the RRS, and being 'quite', or 'very' concerned about their patient (75.8%). Structured interviews with 91 staff members identified predominantly sociocultural reasons for failure to activate the RRS.



Monitorare tutti i pazienti?

The Return on Investment of Implementing a Continuous Monitoring System in General Medical-Surgical Units*

Sarah P. Slight, MPharm, PhD PGDip^{1,2}; Calvin Franz, PhD³; Michael Olugbile, MBBS, MPH¹; Harvey V. Brown, MD⁴; David W. Bates, MD, MSc^{1,5}; Eyal Zimlichman, MD, MSc^{1,6}

Conclusions: Implementation of this monitoring system was associated with a highly positive return on investment. The magnitude and timing of these expected gains to the investment costs may justify the accelerated adoption of this system across remaining inpatient non-ICU wards of the community hospital. (*Crit Care Med* 2014; 42:1862–1868)

Allertamenti automatici



Activation of a Medical Emergency Team Using an Electronic Medical Recording–Based Screening System*

Jin Won Huh, MD¹; Chae-Man Lim, MD¹; Younsuck Koh, MD¹; Jury Lee, RN²; Youn-Kyung Jung, RN²; Hyun-Suk Seo, RN²; Sang-Bum Hong, MD¹

Conclusions: We successfully managed the medical emergency team with electronic medical record–based screening criteria and a skilled intervention team. The electronic medical record–triggered group had lower ICU admission than the call-triggered group or the double-triggered group. In surgical patients, the electronic medical record–triggered group showed better outcome than other groups. (*Crit Care Med* 2014; 42:801–808)

..e passiamo al braccio efferente:

Chi deve gestire le emergenze
intra-ospedaliere?



Non è la domanda corretta...

Il problema non è chi lo fa, ma cosa sa fare

Impact of an Intensivist-Led Multidisciplinary Extended Rapid Response Team on Hospital-Wide Cardiopulmonary Arrests and Mortality*

February 2013 • Volume 41 • Number 2

Saad Al-Qahtani, MD, FRCPC¹; Hasan M. Al-Dorzi, MD²; Hani M. Iamim, MPH, PhD³;

Sajid Hussain, MBBS¹; Lian Fong, RN¹; Saadi Taher, MBChB, FRCP³;

Bandar Abdulmohsen Al-Knawy, MD, FRCP(C)⁴; Yaseen Arabi, MD, FCCP, FCCM¹

Crit Care Med. 2012 September ; 40(9): 2562–2568. doi:10.1097/CCM.0b013e318259007b.

In conclusion, the implementation of an intensivist-led extended RRT was associated with reducing cardiopulmonary arrests and mortality for the ward patients, improving the outcomes of patients who needed ICU admission, and reducing readmissions and mortality of patients who were discharged from the ICU.

Sustained effectiveness of a primary-team–based rapid response system

Michael D. Howell, MD, MPH, Long Ngo, PhD, Patricia Folcarelli, RN, PhD, Julius Yang, MD,

Conclusions—A primary-team–based implementation of a rapid response system was independently associated with reduced unexpected mortality. This system relied on the patient's usual care providers, not an intensive care unit based rapid response team, and may offer a more cost-effective approach to rapid response systems, particularly for systems with limited intensivist availability.

E infatti...

RRT/MET Team Composition

For hospital mortality, there were 14 studies^{10,20,29,31-38,40-42} of RRTs with physicians (RR = 0.88, 95% CI: 0.82-0.95) and 4 studies^{12,28,30,39} without physicians (RR = 0.85, 95% CI: 0.74-0.99). Both groups exhibited substantial heterogeneity ($I^2 = 85\%$ for both). The test for subgroup differences ($I^2 = 0\%$) indicates that team composition had no impact on hospital mortality.

Cosa deve saper fare il braccio efferente?

- Competenze per formulare una prima ipotesi
- Competenze per avviare i primi interventi
- Capacità di gestire le risorse umane e tecnologiche
- Autorevolezza per destinazione definitiva
- Capacità di interagire con paziente, familiari e curanti
- Competenze etiche (evitare ricoveri e CPR inappropriati)
- Competenze di risk management
- Conoscenza della struttura, esperienza

RRS: non solo prevenzione degli ACC

Activities of a medical emergency team twenty years after its introduction

L. Cabrini, G. Monti, G. Landoni, P. Silvani S. Colombo, S. Morero, M. Mucci,
P.C. Bergonzi, D. Mamo, A. Zangrillo

CONCLUSIONS

A MET can progressively perform different kinds of activities. In our experience 40.8 % of interventions were represented by side-activities and 41.5 % by follow-up visits of critically ill patients. Cardiac arrest only accounted for 1.5 % of the activity.

The beneficial effects on the Hospital system provided by the MET can be grossly underestimated when evaluating only in-hospital cardiac arrest rates.

Attività complementari frequenti per i RRT italiani

- * Follow up post ICU
- * Visite post operatorie
- * Terapia del dolore
- * Consulenze varie
- * Trasporti intra ed extra ospedalieri
- * Altro

Competenze non tecniche per il MET

Identifying non-technical skills and barriers for improvement of teamwork in cardiac arrest teams[☆]

Peter Oluf Andersen^{a,b,*}, Michael Kammer Jensen^a, Anne Lippert Resuscitation 81 (2010) 695–702

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Results: A framework with five categories relating to NTSs was identified: leadership, communication, mutual performance monitoring, maintenance of standards and guidelines and task management. Important barriers that were identified were inexperienced team leaders, task overload and hierarchic structure in the teams' inability to maintain focus on chest compressions.

... e deve avere forti competenze etiche

Ethical issues associated with in-hospital emergency from the Medical Emergency Team's perspective: a national survey

Luca CABRINI, Alberto GIANNINI, Margherita PINTAUDI, Federico SEMERARO, Giulio RADESCHI, Sara BORGA, Giovanni LANDONI, Herbert TROIANO, Marco LUCHETTI, Tommaso PELLIS, Giuseppe RISTAGNO, Giulio MINOJA, Davide MAZZON, Daniela ALAMPI

Minerva Anestesiol Jan 2016

Quindi:

- * Il MET deve avere notevoli competenze cliniche, dovendo applicare rapidamente percorsi diagnostici e terapeutici di patologie anche molto differenti.
- * Deve possedere abilità manuali
- * Deve conoscere a fondo la realtà organizzativa e logistica in cui opera
- * Deve saper gestire le risorse al meglio, umane e non umane, dell'ospedale e del territorio
- * E servono anche competenze relazionali, etiche, medico-legali, ...

Migliorare il MET: formazione!



I sistemi di controllo e miglioramento della qualità del RRS

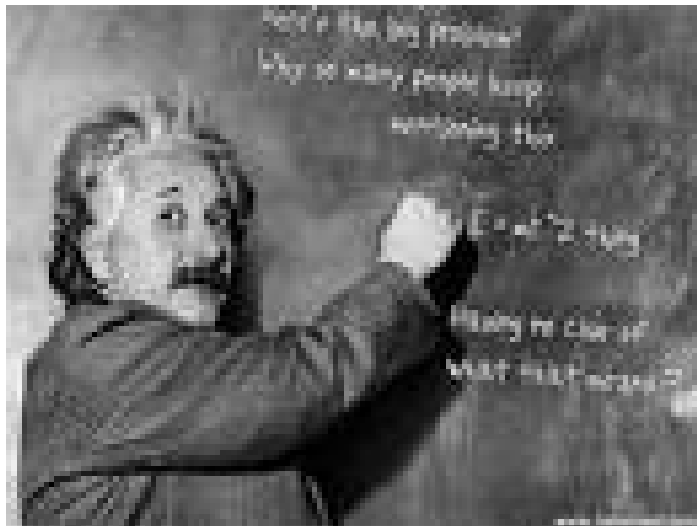
Governance/administrative structure

- Implement and sustain the service
- Education/training of staff
- Interpret response team effectiveness data to manage resources
- Ensure ongoing training/education



Governance and Administrative Structure. We recommend a formal overall governance and administrative structure to oversee the planning, implementation, and maintenance phases for RRS. As the RRS is developed and implemented, the focus and issues often change. It is strongly recommended that there be an RRS coordinator responsible for all aspects of the program, including competency maintenance, equipment maintenance, data collection and analysis, QI, and patient safety. This requires a formal committee

Quali indicatori?



Quality management and benchmarking in emergency medicine

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Current Opinion in Anesthesiology 2008, 21:233–239

Purpose of review

Being critical in terms of time and complexity, emergency medicine is exposed to an emerging imperative for quality improvement strategies. We review current concepts and recent advances in the management of quality in emergency medicine.

Recent findings

There is a strong interdependence between quality of emergency healthcare provision and the education of emergency healthcare providers. Introduction of emergency medical residencies and highly qualified triage liaison physicians helps prevent the overcrowding of emergency departments, accelerate access to emergency medical care and improve patient satisfaction. New advances in detecting and reducing patient management errors include the collection of healthcare provider complaints and the classification of unpreventable and preventable deaths of patients within 1 week of admission via the emergency department. Medical record review and video recording have revealed that frequent patient management problems relate to shortcomings in the diagnostic process, clinical tasks, patient factors, and poor teamwork. Communication skills and patient data/documentation systems may effectively resolve these problems.

Summary

According to the available evidence, more performance improvement strategies need to be tested to delineate which process changes would be most effective in improving patient outcome in emergency medicine.

Keywords

benchmarking, emergency medicine, quality control, quality management

Intermezzo. Survey SIAARTI 2017: i RRS reali in Italia

- * Survey indirizzata solo agli anestesisti-rianimatori
- * 351 risposte
- * Tempo medio di arrivo: 5,2 min
- * Numero unico per le urgenze: SI 76%
- * Disponibilità h24: SI 96%
- * Risposta anche in caso di deterioramento clinico: NO 13%

II RRT

Composizione:

- * Anestesista + infermiere: 55%
- * Solo anestesista: 42%
- * Altre figure: 3%

Provenienza:

- * dalla Rianimazione, lasciata scoperta: SI 38%
- * è dedicato alle urgenze, incluse quelle chirurgiche: SI 40%
- * la provenienza dipende dal giorno e dall'ora: SI 28%

Criteri e dati

- * Chi chiama: infermiere di reparto 67%
- * Criteri di allertamento:

- * Nessuno: 66%
- * Multipli o aggregati: 26%
- * Singolo: 8%

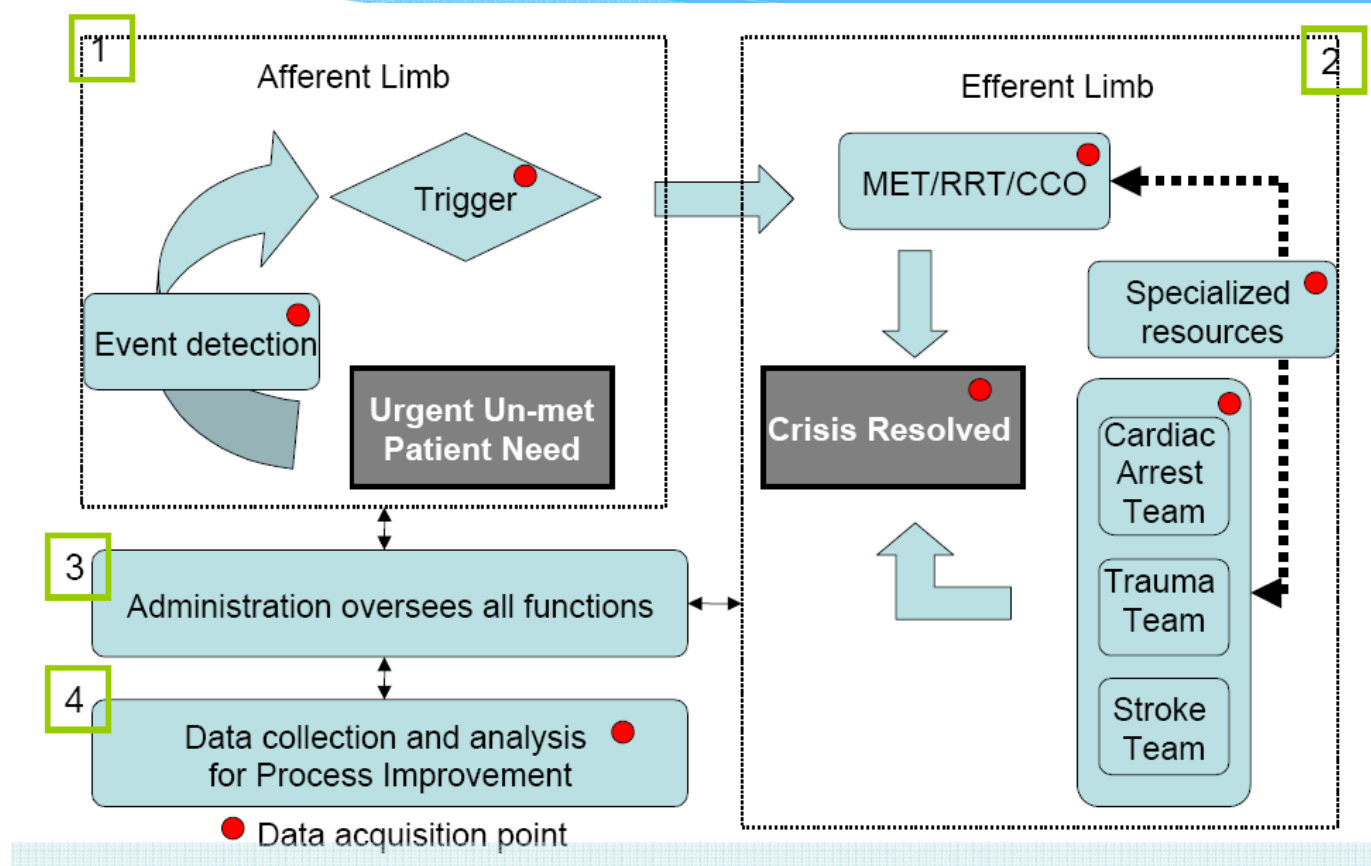
Scheda di monitoraggio con soglie trigger: NO 84%

Protocollo con reazioni in base a criteri: NO 77%

Raccolta dati sulle urgenze intra-H: NO 59%

Disponibilità a raccogliere dati supplementari: NO 51%

Il RRS: prendersi cura dell'Ospedale



Curare l'ospedale

- * Identificare le criticità

- * Proporre soluzioni

...per rendere il RRS più possibile superfluo

Il RRS funziona se tutte le sue parti funzionano, e solo se può intervenire sul funzionamento dell'ospedale

Do either early warning systems or emergency response teams improve hospital patient survival? A systematic review[☆]

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Resuscitation 84 (2013) 1652–1667

Conclusions: Much of the available evidence is of poor quality. It is clear that a 'whole system' approach should be adopted and that AWSS appear to be more effective than single parameter systems. The response to deterioration appears most effective when a clinician with critical care skills leads it. The need for service improvement differs between health care systems.

Using Medical Emergency Teams to detect preventable adverse events

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Critical Care 2009, **13**:R126 (doi:10.1186/cc7983)

Methods For four weeks we collected standard information on consecutive MET calls. Within a week of the MET call, a multidisciplinary team reviewed the information and rated the cause of the outcome using a previously developed rating scale. We classified the type and severity of the preventable adverse event.

required weekly meetings, which lasted less than an hour and could be performed remotely using telephone conferencing.

This task was not onerous for the physicians participating in the program and was seen as part of their professional obligations of monitoring the effectiveness of the hospital system.

Proactive rounding by the rapid response team reduces inpatient cardiac arrests[☆]

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Resuscitation 84 (2013) 1668–1673

5. Conclusion

Our data implies that PR is a useful and effective strategy for reducing code rates and code mortality on the inpatient wards. Even more importantly however, is that our study demonstrates proactivity and innovation as an overall approach to inpatient cardiac arrests. Having experienced staff available to round on potentially sick patients on the general ward allows for earlier identification of clinical deterioration and thus early intervention and transfer to HLC. Innovation stems from a dedicated managerial team who routinely evaluates trends in the code data and creatively seeks ways to prevent cardiac arrest from occurring. Effective implementation of RRTs can only occur by studying and adapting to the inpatient cardiac arrest population at each institution, not simply by following a successful model.

Rethinking Rapid Response Teams

Eugene Litvak; Peter J. Pronovost

JAMA. 2010;304(12):1375-1376 (doi:10.1001/jama.2010.1385)

Researchers should seek to identify and mitigate risks borne by patients admitted to an incorrect hospital unit. For the majority of patients whose condition deteriorates while receiving inadequate care in an improper unit, efforts should be made to ensure that they receive adequate care in the proper unit, to move away from taking credit for rescuing patients who experience triage errors, to focus on patient flow, and to provide each patient with the right care at the right time, not more and not less.

Il RRS non deve coprire i difetti dell'ospedale, li deve anzi affrontare

Ann Intern Med. 2013 March 5; 158(5 0 2): 417–425. doi:10.7326/0003-4819-158-5-201303051-00009.

Rapid-Response Systems as a Patient Safety Strategy:

A Systematic Review

Bradford D. Winters, MD, PhD, Sallie J. Weaver, PhD, Elizabeth R. Pfoh, MPH, Ting Yang, PhD, Julius Cuong Pham, MD, PhD, and Sydney M. Dy, MD, MSc

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Rapid-response systems have been described as a “band-aid” for a failed model of managing patients in the general ward in hospitals (69). Although this intervention is beginning to help many hospitals increase recognition of patient deterioration and reduce preventable deaths, they are unlikely to more universally improve these outcomes until we address the culture and system defects that contribute to the root of the problem. For now, RRSs seem to be the best option.

quindi, cosa sappiamo?

- * Non sappiamo (o meglio: io non so)
 - * Quali criteri di allertamento siano i migliori
 - * Quale siano la migliore composizione (e formazione) del MET
 - * Quale sia la miglior modalità di gestione del RRS
 - * Quali siano i migliori indicatori
- * Sappiamo
 - * Che avere un RRS è utile
 - * Che richiede tempo per raggiungere la massima efficacia
 - * Che richiede formazione
 - * Che va affiancato da misure logistiche e organizzative

In conclusione



- 1) Gli arresti cardiaci intraospedalieri accadono con frequenza significativa e sono spesso prevenibili? SI
- 2) Un Sistema di Risposta Rapida può essere efficace? SI
- 3) Quali caratteristiche rendono un RRS efficace? Il corretto funzionamento sia del braccio afferente che del braccio efferente, ed una supervisione che intenda migliorare l'ospedale.

Take home message:

- * *Prevenire è infinitamente...*
 - * *Più efficace che massaggiare*
 - * *Più efficace che defibrillare*
 - * *Più efficace dell'adrenalina*
 - * *Più efficace dell'ipotermia terapeutica*
 - * *Più economico*
 - * *Più giusto*

...ma per ora continuiamo ad addestrarci!



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