# Nurses Should Lead the RRT

John Welch (Registered Nurse)

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# Financial Disclosures

Advisor …

- Philips GmbH
- PMD Solutions

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# 89% of hospitals have a dedicated Outreach team

## - 49% have a 24/7 dedicated Outreach team

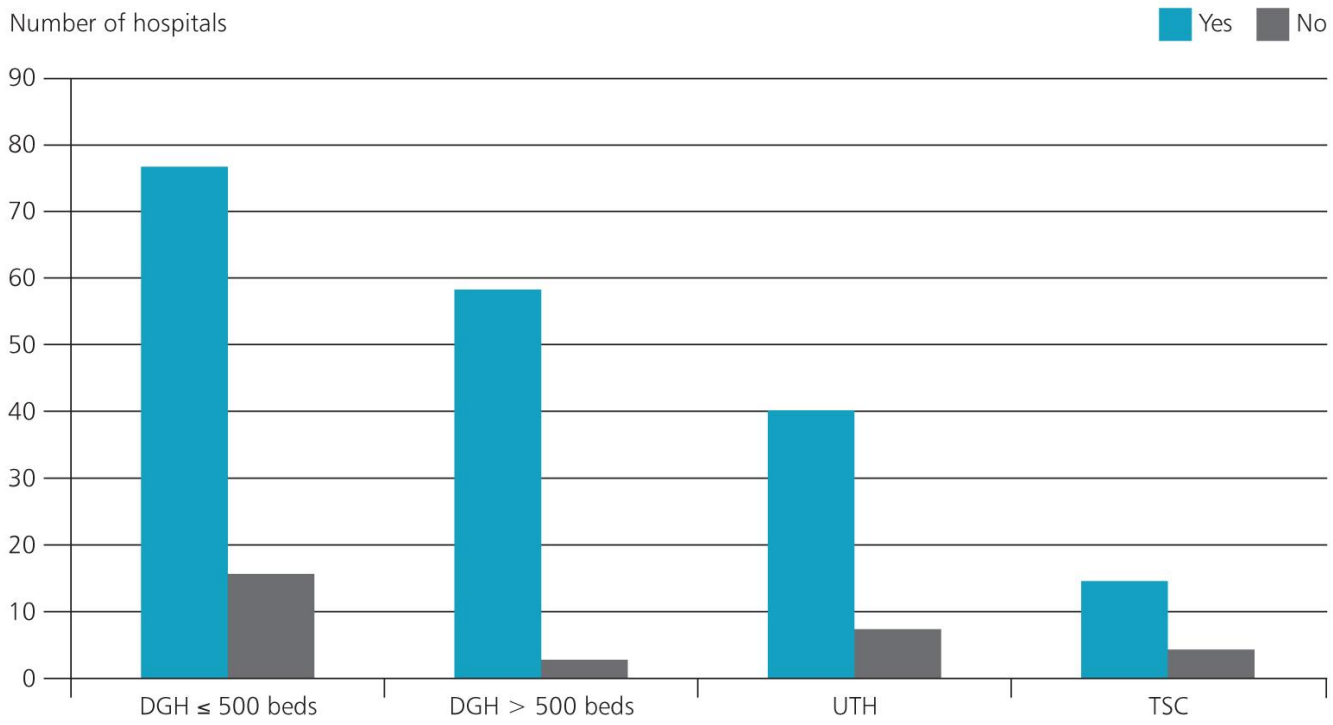


**Figure 2.2 Hospital type and presence of a Critical Care Outreach Team**

## *- 97% of teams are **nurse only***

National Confidential Enquiry into Patient Outcome and Death 'Just Say Sepsis!'. London, 2015.

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# Impact of implementation of the National Early Warning Score on patients and staff

**The National Early Warning Score (NEWS) has been criticized for increasing workload and decreasing attention to signs of deterioration. This study highlighted the significant mortality of ward patients referred to critical care, and showed that the NEWS identified high-risk patients without increasing workload or worsening outcomes.**

There is a recognized association between abnormal physiology and adverse outcomes (Kause et al, 2004; Harrison et al, 2006): patients who suffer cardiopulmonary arrest or who die in hospital generally have abnormal physiological values – known as vital signs – recorded in the preceding period, as do patients requiring transfer to the critical care unit (Kause et al, 2004; Harrison et al, 2006).

As a consequence, from 2000 onwards, most UK hospitals introduced some form of early warning scoring system based on measurement of vital signs to aid recognition of deteriorating ward patients, although there were few formal evaluations of the effects of early warning scoring on processes or outcomes. By 2008, at least 72 different early warning scoring systems had been developed (Smith et al, 2008a,b), and there were probably many more unreported versions. However, the considerable variation in practice was viewed as a potential risk to patient safety (Patterson et al, 2011), prompting the Royal College of Physicians (2012) to recommend implementation of a single National Early Warning Score (NEWS). The NEWS used parameters found in some of the previous systems (*Table 1*), with scores ascribed to vital sign measurements indicating various levels of risk of adverse outcomes added together to make a total 'aggregate weighted score'. The NEWS scores and values were derived from analysis of 35 585 acute admissions – and 198 755 observation sets – at Portsmouth Hospitals (Prytherch et al, 2010). The Royal College of Physicians (2012) also recommended minimum standards for hospital patient monitoring and the responses required for different aggregate scores.

**Table 1. Parameters used in the National Early Warning Score (NEWS)**

| |
|---|
| Respiratory rate |
| Oxygen saturations |
| Temperature |
| Systolic blood pressure |
| Pulse rate |
| Level of consciousness |
| Supplemental oxygen administration |

**Dr Scott Farenden**, Emergency Department Senior Resident Medical Officer, Department of Emergency Medicine, Sutherland Hospital, Sydney, NSW, Australia

**Dr David Gamble**, Academic FY2, Department of Obstetrics and Gynaecology, Aberdeen Royal Infirmary, NHS Grampian, Aberdeen

**Mr John Welch**, Consultant Nurse, Critical Care & Critical Care Outreach, University College London Hospitals NHS Foundation Trust, London NW1 2BU

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Withstanding support from key professional bodies, the concept of standardized early warning scoring had some critics (McGinley and Pearse, 2012; Teasdale, 2012). Many hospitals had invested considerable effort in developing and embedding their own early warning scoring systems. There were concerns that the NEWS might be too sensitive, so would unnecessarily increase patient referrals and overload clinical services (Khan and Carle, 2014). Conversely, there was anxiety that the focus on physiological parameters might prevent ward staff using what are known to be useful subjective criteria as a basis for referral (Chen et al, 2010), e.g. simply being 'worried' about a patient.

## Aims of study

The authors investigated the impact of implementing the NEWS on both patients and staff at University College Hospital, with a particular focus on patients with sepsis. A previous analysis of 644 ward patients referred to the critical care outreach service found that about half (52.7%) had a likely or very likely diagnosis of sepsis (Harris, 2013). The null hypotheses were that the implementation of NEWS at University College Hospital would not significantly change:

- Identification of deteriorating patients and subsequent requirement for critical care admission
- Identification of patients with sepsis, or the proportion of patients with sepsis deteriorating to severe sepsis and septic shock
- All-cause mortality or mortality from sepsis
- Staff workload with regards to number of referrals to critical care services, duration of follow up required following referral and admission rates to the intensive care unit.

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Farenden S, et al. Br J Hosp Med (Lond). 2017;78(3):132-136.

**Table 4. Demographics and patient outcomes**

| | Pre-NEWS (May/June 2013) | Post-NEWS (May/June 2014) | *P* value |
|---|---|---|---|
| Mean age (years) | 63.7 | 61.4 | 0.288 |
| Proportion of male patients (%) | 57.6 | 49.6 | 0.099 |
| Referrals to PERRT (per 1000 hospital admissions) | 32.8 | 36.5 | 0.260 |
| Referrals to PERRT then transferred to intensive care unit (%) | 23.0 | 23.1 | 0.992 |
| Mean NEWS at referral to PERRT | 6.39 | 6.24 | 0.627 |
| Mean NEWS at referral to PERRT of patients later transferred to critical care | 6.70 | 6.35 | 0.582 |
| Mean NEWS at referral to PERRT of patients not transferred to critical care | 6.30 | 6.20 | 0.767 |
| Mean duration of PERRT follow up (days) | 2.82 | 2.68 | 0.482 |
| Median length of intensive care unit admission (days) | 4 | 4 | – |

*NEWS = National Early Warning Score; PERRT = Patient Emergency Response & Resuscitation Team*

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As a consequence, from 2000 onwards, most UK hospitals introduced some form of early warning scoring system based on measurement of vital signs to aid recognition of deteriorating ward patients, although there were few formal evaluations of the effects of early warning scoring on processes or outcomes. By 2008, at least 72 different early warning scoring systems had been developed (Smith et al, 2008a,b), and there were probably many more unreported versions. However, the considerable variation in practice was viewed as a potential risk to patient safety (Patterson et al, 2011), prompting the Royal College of Physicians (2012) to recommend implementation of a single National Early Warning Score (NEWS). The NEWS used parameters found in some of the previous systems (*Table 1*), with scores ascribed to vital sign measurements indicating various levels of risk of adverse outcomes added together to make a total 'aggregate weighted score'. The NEWS scores and values were derived from analysis of 35 585 acute admissions – and 198 755 observation sets – at Portsmouth Hospitals (Prytherch et al, 2010). The Royal College of Physicians (2012) also recommended minimum standards for hospital patient monitoring and the responses required for different aggregate scores.

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Notwithstanding support from key professional bodies, the concept of standardized early warning scoring had some critics (McGinley and Pearse, 2012; Teasdale, 2012). Many hospitals had invested considerable effort in developing and embedding their own early warning scoring systems. There were concerns that the NEWS might be too sensitive, so would unnecessarily increase patient referrals and overload clinical services (Khan and Carle, 2014). Conversely, there was anxiety that the focus on physiological parameters might prevent ward staff using what are known to be useful subjective criteria as a basis for referral (Chen et al, 2010), e.g. simply being 'worried' about a patient.

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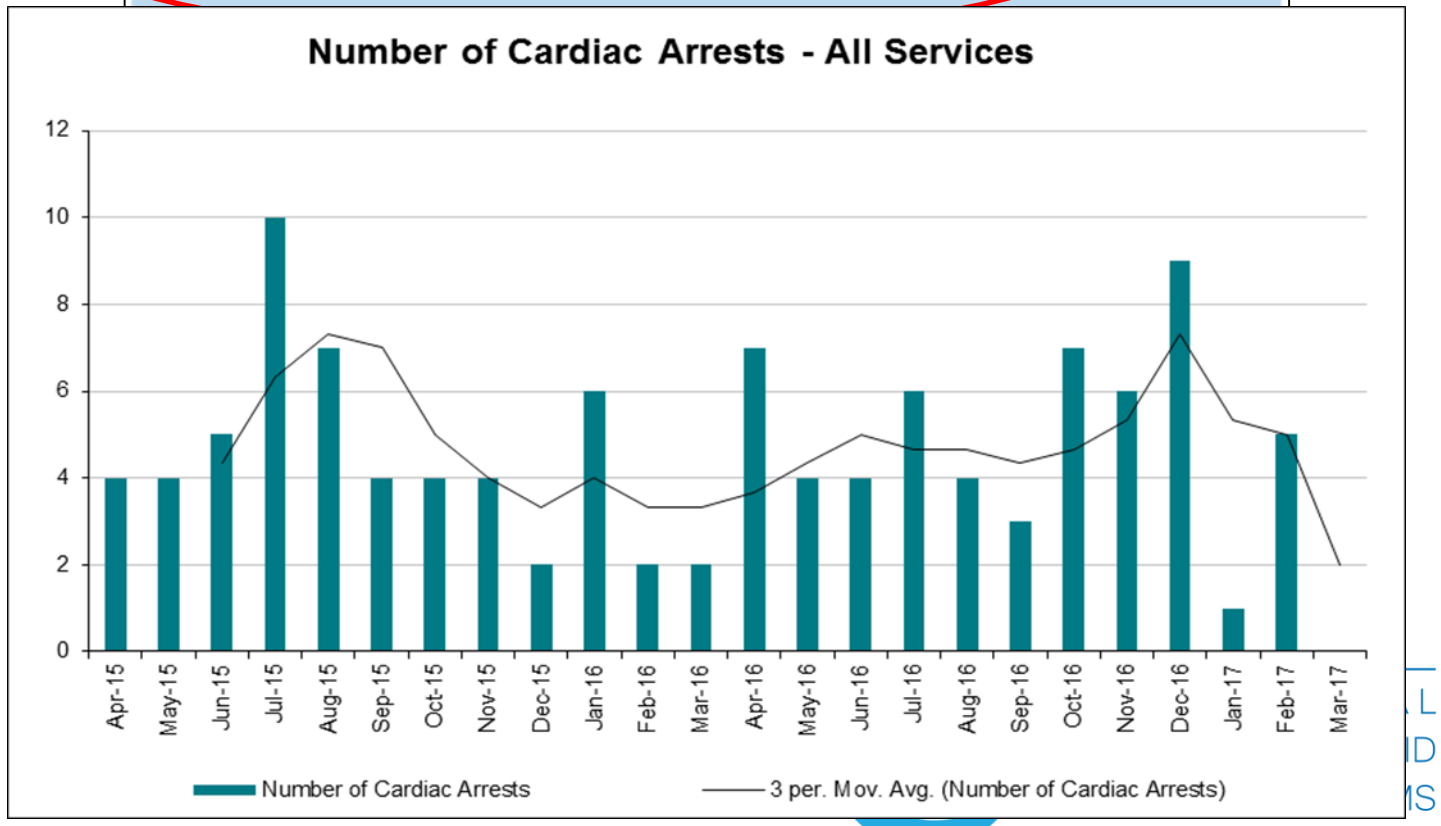
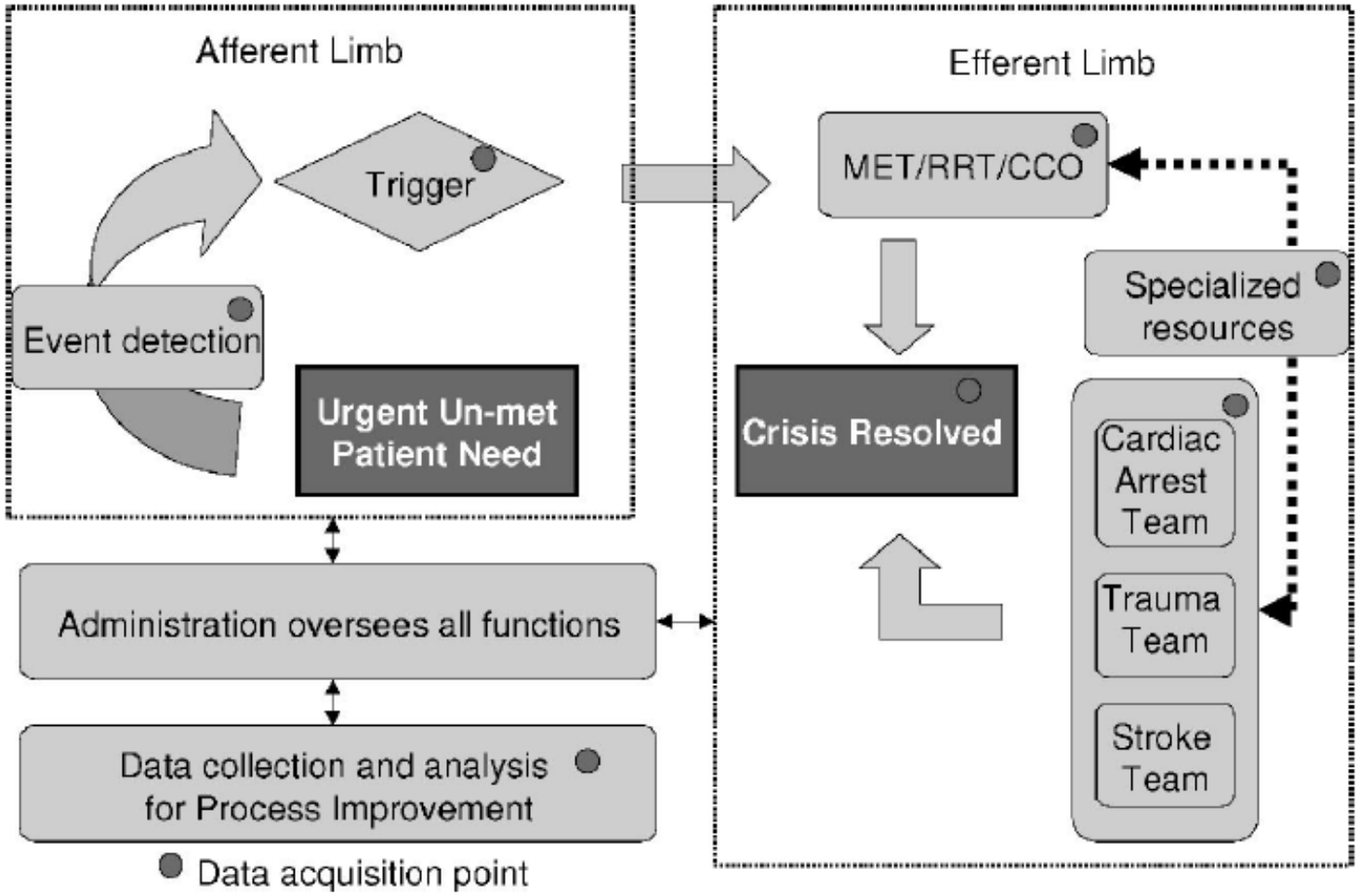


# The Rapid Response System




Devita MA, et al. Crit Care Med. 2006;34(9):2463-78.

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# Make-up of the afferent limb …

- *Nurses!*

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# *Who they gonna call?*

*Who they gonna call?*

*- <u>Are</u> they gonna call?*

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# The rapid response team paradox: Why doesn't anyone call for help?*

The medical emergency team (MET) or rapid response team (RRT) system is a system of care for clinically unstable patients in the general ward areas of hospitals. When observations at a patient's bedside breach predetermined levels of abnormality or the bedside nursing staff is worried about a patient's condition, they can call a resuscitation team to attend the patient (1). The assumption for this system of care is

Despite this rationale for MET/RRT systems and their endorsement by the

*See also p. 477.

Key Words: medical emergency team; rapid response team; resuscitation

The author is a director and shareholder of Patientrack.

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DOI: 10.1097/CCM.0B013E3181629C85



Buist M. Crit Care Med. 2008;36(2):634-5.

Marshall *et al. Implementation Science* 2011, 6:39
http://www.implementationscience.com/content/6/1/39

IMPLEMENTATION SCIENCE

STUDY PROTOCOL Open Access

# Why don't hospital staff activate the rapid response system (RRS)? How frequently is it needed and can the process be improved?

Stuart D Marshall[1,2*], Simon Kitto[3,4], William Shearer[2,5], Stuart J Wilson[6], Monica A Finnigan[5], Tamica Sturgess[5], Tonina Hore[5] and Michael D Buist [7]

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# Introduction of the medical emergency team (MET) system: a cluster-randomised controlled trial

*MERIT study investigators**

## Summary

**Background** Patients with cardiac arrests or who die in general wards have often received delayed or inadequate care. We investigated whether the medical emergency team (MET) system could reduce the incidence of cardiac arrests, unplanned admissions to intensive care units (ICU), and deaths.

**Methods** We randomised 23 hospitals in Australia to continue functioning as usual (n=11) or to introduce a MET system (n=12). The primary outcome was the composite of cardiac arrest, unexpected death, or unplanned ICU admission during the 6-month study period after MET activation. Analysis was by intention to treat.

**Findings** Introduction of the MET increased the overall calling incidence for an emergency team (3·1 *vs* 8·7 per 1000 admissions, p=0·0001). The MET was called to 30% of patients who fulfilled the calling criteria and who were subsequently admitted to the ICU. During the study, we recorded similar incidence of the composite primary outcome in the control and MET hospitals (5·86 *vs* 5·31 per 1000 admissions, p=0·640), as well as of the individual secondary outcomes (cardiac arrests, 1·64 *vs* 1·31, p=0·736; unplanned ICU admissions, 4·68 *vs* 4·19, p=0·599; and unexpected deaths, 1·18 *vs* 1·06, p=0·752). A reduction in the rate of cardiac arrests (p=0·003) and unexpected deaths (p=0·01) was seen from baseline to the study period for both groups combined.

*Lancet* 2005; 365: 2091–97

Correspondence to:
Prof Ken Hillman, University of New South Wales, Division of Critical Care, Liverpool Hospital, Locked Bag 7103, Sydney 1871, Australia
K.Hillman@unsw.edu.au

*Investigators listed at end of report

- *Even in patients who had vital signs recorded*
  *AND whose signs met calling criteria*
  *AND who subsequently needed transfer to ICU*
  *…. only 30% were referred*

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# *What's the problem?*

*Journal of Advanced Nursing*, 2000, **32**(1), 108–114 *Issues*

# Nurses' experiences of making decisions to call emergency assistance to their patients

Jane Cioffi RN AppSc(Adv Nurs) GradDipEd(Nurs) MAppSc(Nurs) PhD
*Lecturer, Faculty of Health, University of Western Sydney, Hawkesbury, New South Wales, Australia*

- "nurses … (even) with experience are hesitant about calling the MET… lack confidence"
- even if "there is something wrong …
- "are they going to think I am an idiot"?

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A Survey of Nurses' Beliefs About the Medical Emergency Team System in a Canadian Tertiary Hospital

By Sean M. Bagshaw, MD, MSc, Eugene E. Mondor, RN, Cindy Scouten, RN,

- *"reluctant to activate MET because I will be criticized if they are not that unwell"*

*Am J Crit Care. 2010;19(1):74-83.*

Literature Review

Collaboration between hospital physicians and nurses: An integrated literature review

C.J. Tang[1] Candidate Bachelor of Science (Nursing) (Honour) program,

- *73% of doctors rated quality of collaboration as high*. Only 33% of nurses agreed (Thomas et al, 2003).*
- *Doctors equated collaboration with giving orders and expecting … nurses to follow (Sirota, 2007).*

*Int Nurs Rev. 2013;60(3):291-302.*

**Defining impact of a rapid response team: qualitative study with nurses, physicians and hospital administrators**

Andrea L Benin[1,2], Christopher P Borgstrom[1], Grace Y Jenq[3], Sarah A Roumanis[1], and Leora I Horwitz[1,3]

- *"it's made more tension between nursing and housestaff.*
- *"The attending pulled me aside … to basically reprimand me."*

*BMJ Qual Saf. 2012;21(5):391-8.*

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# Are doctors on the RRS helpful?

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# *We know they're expensive*

McKinsey Center for U.S. Health System Reform

# Accounting for the cost of U.S. health care

Pre-reform trends and the impact of the recession

December 2011

Higher physician salaries compared to other OECD countries also help explain some of the spending gap. The United States would have spent $120 billion less in 2008 if U.S. physicians were compensated in the same proportion to the national average worker as their counterparts in other developed countries.[15] In 2008, the typical U.S. generalist earned about 5 times more than the average U.S. worker; specialists earned 10 times more. In other developed countries, meanwhile, generalists earned about double the income of the average worker, and specialists earned just 2.7 times the mean.[16]

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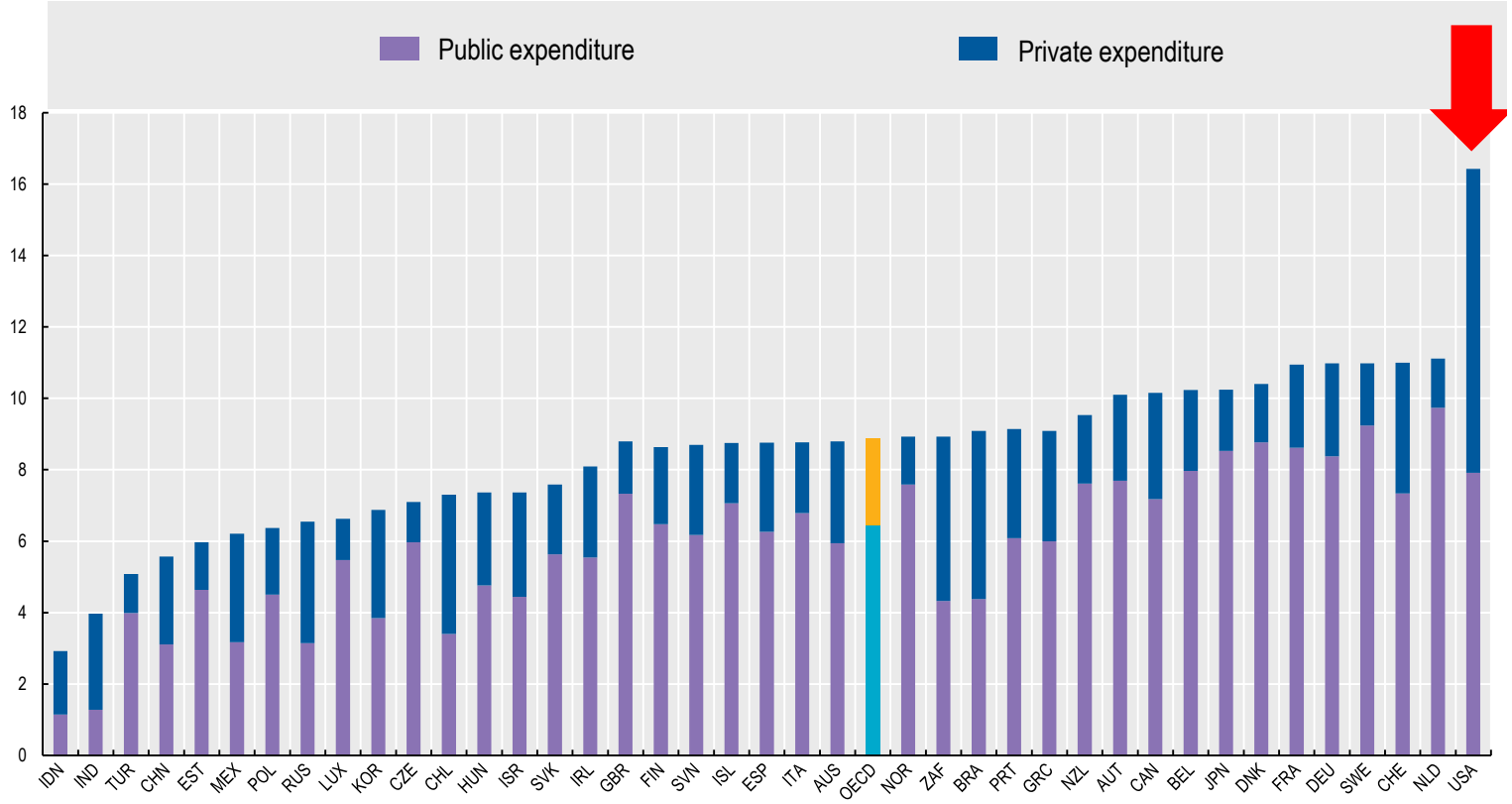
# Expenditure on health as a % of GDP




Organisation for Economic Cooperation & Development (OECD) Factbook 2015-16.

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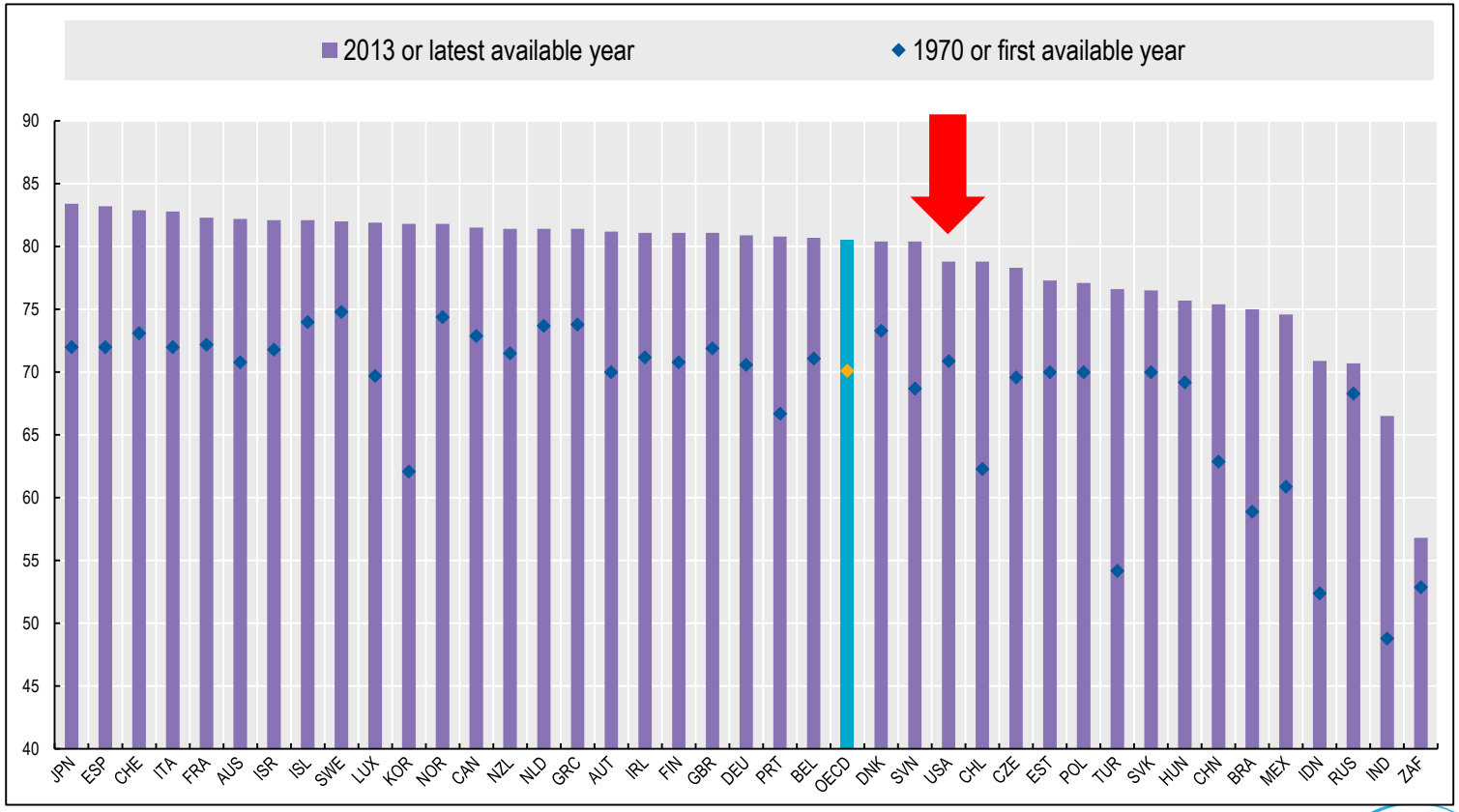
# *Are they effective?*

# Life expectancy at birth




Organisation for Economic Cooperation & Development (OECD) Factbook 2015-16.

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Annals of Internal Medicine

ARTICLE

# Association between Critical Care Physician Management and Patient Mortality in the Intensive Care Unit

*Table 4.* Expected and Actual Hospital Mortality*

| Variable | Critical Care Management† | No Critical Care Management† |
|---|---|---|

**Conclusion:** In a large sample of ICU patients in the United States, the odds of hospital mortality were higher for patients managed by critical care physicians than those who were not. Additional studies are needed to further evaluate these results and clarify the mechanisms by which they might occur.

Ann Intern Med. 2008;148(11):801-9.

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# How do the nurses do?

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# Nurse staffing, medical staffing and mortality in Intensive Care: An observational study

Elizabeth West [a,*], David N. Barron [b], David Harrison [c], Anne M[illegible]afferty

- This study shows a statistically signi[illegible]association between the number of nurses a[illegible]ors available in Intensive Care Units and pa[illegible]nances of surviving their stay in ICU and for [illegible] days after admission to hospital.

- The size of the nursing workforce in ICUs has the greatest effect on the most severely ill patients, whereas the number of doctors seems to be important across the range of patient acuity, i.e. there is no interaction effect between the size of the medical workforce and patient acuity.

**"nurses had the greatest impact on patients at high risk of death"**

Int J Nurs Stud. 2014;51(5):781-94.

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The Cochrane Library Evidence for healthcare decision-making

# Outreach and Early Warning Systems (EWS) for the prevention of Intensive Care admission and death of critically ill adult patients on general hospital wards (Review)

McGaughey J, Alderdice F, Fowler R, Kapila A, Mayhew A, Moutray M

- "review highlights the diversity and poor methodological quality of most studies investigating outreach:

- two were of good quality"

Cochrane Database Syst Rev. 2007;(3):CD005529.

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Implementing a nurse-led critical care outreach service in an acute hospital

Wendy Watson BHSc (Hons), RGN

J Clin Nurs. 2006; 15(1):105-10.

Intensive Care Med (2004) 30:1398–1404
DOI 10.1007/s00134-004-2268-7

ORIGINAL

George Priestley
Wendy Watson
Arash Rashidian
Caroline Mozley
Daphne Russell

**Introducing Critical Care Outreach: a ward-randomised trial of phased introduction in a general hospital**

**Table 3** Outcome 1: in-hospital mortality; logistic regression

| | Data set 1 (patient level) | Data set 1 (two level) | Data set 2: matched randomised (patient level) | Data set 2: matched randomised (two level) |
|---|---|---|---|---|
| No. of patients included in the analysis | 7172 patients of whom 412 died (278 were excluded because of incomplete data) | | 2792 patients of whom 149 died (111 were excluded because of incomplete data) | |
| Intercept: odds of death[a] | 0.010 | 0.010 | 0.010 | 0.010 |

- **7.1% reduction in crude hospital mortality**

two-level odds ratio: 0.52 (95% CI: 0.32-0.85)

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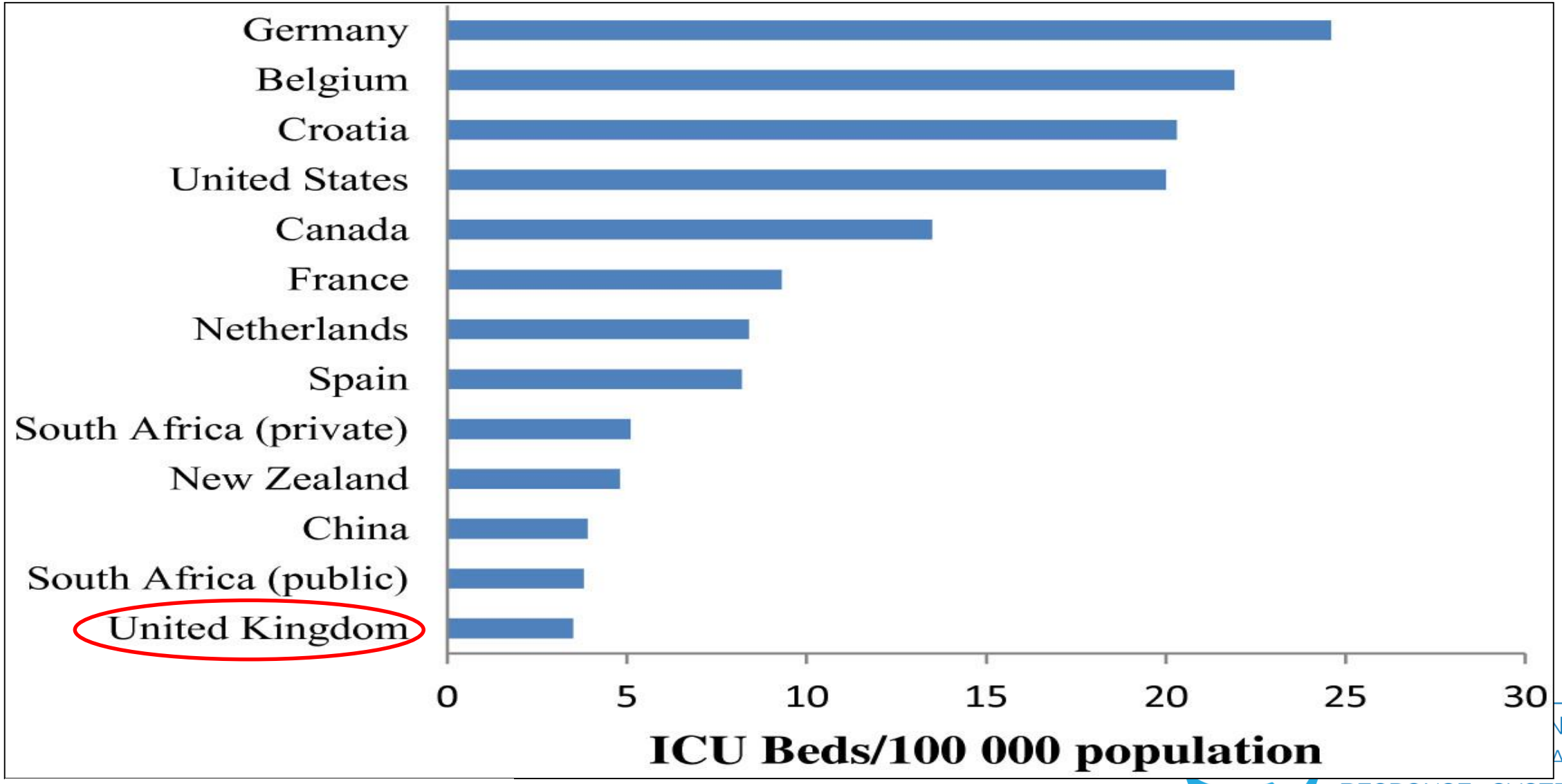
# Numbers of ICU beds across the world




Murthy S, Wunsch H. Crit Care. 2012;16(2): 218.

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Resuscitation 107 (2016) 7–12

Contents lists available at ScienceDirect

Resuscitation

journal homepage: www.elsevier.com/locate/resuscitation

# Clinical outcomes of patients seen by Rapid Response Teams: A template for benchmarking international teams☆

Jonathan Bannard-Smith[a,1], Geoffrey K. Lighthall[b,1], Christian P. Subbe[c,*,1], Lesley Durham[d,1], John Welch[e,1], Rinaldo Bellomo[a,1], Daryl A. Jones[a,1]

**Table 3**
Patient outcomes.

| Outcomes | Total | UK | Non-UK | *p*-Value |
|---|---|---|---|---|
| Number Studied | 1188 | 973 | 215 | |
| Transfer to ICU | 284 (24%) | 217 (22%) | 67 (31%) | $p = 0.008$ |
| To ICU in <4 h[a] | 146 (51%) | 97 (45%) | 49 (73%) | $p = 0.0001$ |
| NEWS score of ICU patients | 7.1 (1.4) | 6.9 (2.6) | 7.5 (3.2) | n.s. |
| Died ICU within 24 h of transfer | 23 (8.1%) | 17 (7.8%) | 6 (8.9%) | n.s. |
| Transfer to OR | 40 (3.4%) | 27 (2.8%) | 13 (6.0%) | $P = 0.044$ |
| To OR in <4 h | 15 | 9 | 6 | n.s. |
| Died within 24 h | 120 (10.1%) | 103 (8.4%) | 17 (8.4%) | n.s. |
| Died on ward within 24 h[a] | 97 (10.7%) | 86 (11.3%) | 11 (7.4%) | $p = 0.0001$ |
| Died with CPR | 7 | 5 | 2 | n.s. |
| Ward deaths with full care status[a] | 37 (38.1%) | 36 (41.9%) | 1 (9.1%) | $p = 0.03$ |
| NEWS, patients remaining on ward | 6.2 (2.8) | 6.2 (2.8) | 6.5 (2.9) | n.s |
| New limitation of care | 307 (26%) | 238 (24%) | 69 (32%) | $p = 0.029$ |
| Trigger resolution | 709 (59%) | 575 (59%) | 134 (62%) | n.s. |
| Repeat MET call | 175 (14.7%) | 138 (14.1%) | 37 (17.2%) | n.s. |

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Bannard-Smith J, et al. Resuscitation. 2016;107:7-12.

# Ward staff evaluation of nurse-led, nurse staffed Outreach

Outreach nurses stay and help when the doctors have gone …
and don’t change jobs every few months

Richardson A, et al. Nurs Crit Care. 2004;9(1);28-33.

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# Conclusion

- 80% of referrals to RRS stay on ward
  - needing more nursing
  - more monitoring (by the nurses)
  - supported by the Outreach nurses

  - *If patients need more doctoring …*

    *we can take 'em to the ICU*

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