

NATIONAL INSTITUTE FOR HEALTH AND CLINICAL EXCELLENCE

Centre for Clinical Practice

Review consultation document

Review of Clinical Guideline CG50 - Acutely ill patients in hospital

1. Background information

Guideline issue date: 2007

3 year review: 2010

National Collaborating Centre: Short Clinical Guidelines -Centre for Clinical Practice (NICE)

2. Consideration of the evidence

Literature search

From initial intelligence gathering and a high-level randomised control trial (RCT) search clinical areas were identified to inform the development of clinical questions for focused searches. Through this stage of the process 27 studies were identified relevant to the guideline scope. The identified studies were related to the following clinical areas within the guideline:

- Parameters for physiological track and trigger systems.
- The sensitivity and specificity of track and trigger systems.
- Clinical and cost-effectiveness of different critical care outreach services.

The latter two clinical areas are also the research recommendations in the guideline.

Four review questions were developed based on the clinical areas above, qualitative feedback from other NICE departments and the views expressed by the Guideline Development Group, for the more focused literature searches. The results of the focused searches are summarised in the table below. All references identified through the initial intelligence gathering, high-level RCT search and the focused searches can be viewed in [Appendix I](#).

Clinical area 1: Parameters for physiological track and trigger system

Clinical question	Summary of evidence	Relevance to guideline recommendations
Can physiological track and trigger correctly identify patients who are either deteriorating or at risk of deteriorating? Are there any parameters in addition to those considered in the guideline (heart rate, respiratory rate, systolic BP, levels of consciousness, oxygen saturation and temperature)?	Through the focused search seven studies relevant to the clinical question were identified. Serum lactate measurement appeared to be one of the potential parameters in addition to those already considered in the guideline. However, the current body of evidence does not seem to be conclusive about its predictive accuracy and generalisability.	No conclusive evidence was identified that would invalidate current guideline recommendations.

Clinical area 2: The sensitivity and specificity of track and trigger system		
Clinical question	Summary of evidence	Relevance to guideline recommendations
<p>What is the sensitivity and specificity of track and trigger systems?</p>	<p>Through the focused search twelve studies relevant to the clinical question were identified.</p> <p>The utility of aggregate weighted multiple parameters track and trigger system was one of the principle emergent themes, and studies including a systematic review of literature suggest that physiological parameters can be used. Among the evidence reviewed, there were still wide variations in sensitivity and specificity of different types of single or multiple parameters track and trigger systems, and currently there is still no direct comparative study on the accuracy of different systems. In conclusion, there is still insufficient evidence to warrant an update.</p>	<p>No conclusive evidence was identified that would invalidate current guideline recommendations.</p>

Clinical area 3: Clinical and cost effectiveness of different critical care outreach services.		
Clinical question	Summary of evidence	Relevance to guideline recommendations
Does provision of critical care outreach service improve the outcome for patients who are at risk of deteriorating and/or deteriorating in hospital settings?	<p>Through the focused search twenty six studies relevant to the clinical question were identified.</p> <p>Literature was identified evaluating the effectiveness of response strategies such as critical care outreach services and Medical Emergency Team (MET). However, all new evidence was still inconclusive in terms of its effectiveness, and there was still no evidence on direct comparisons of different service configurations of response strategies.</p>	No conclusive evidence was identified that would invalidate current guideline recommendations.

Clinical question	Summary of evidence	Relevance to guideline recommendations
<p>What is the cost effectiveness of critical care outreach service to improve the outcome for patients who are at risk of deteriorating and/or deteriorating in hospital settings?</p>	<p>No relevant literature identified</p>	<p>No evidence was identified that would invalidate current guideline recommendations.</p>

In conclusion, no identified new evidence contradicts current guideline recommendations.

Guideline Development Group and National Collaborating Centre perspective

A questionnaire was distributed to GDG members and guideline development team to consult them on the need for an update of the guideline. Two GDG members responded highlighting implementation issues. There appears to have been a variation in uptake of the recommendations in various settings, with some recommendations being implemented more thoroughly than others.

The scope of Guideline was considered to be adequate in its exclusions.

Both respondents stated that there is insufficient variation in current practice supported by adequate evidence at this time to warrant an update of the current guideline.

Implementation and post publication feedback

No new evidence was identified through post publication enquiries or implementation feedback that would indicate a need to update the guideline.

Relationship to other NICE guidance

The following NICE guidance is related to CG50:

Guidance	Review date
CG83: Rehabilitation after critical illness, 2009	Expected review date: TBC.

Anti-discrimination and equalities considerations

No evidence was identified to indicate that the guideline scope does not comply with anti-discrimination and equalities legislation. The original scope is inclusive of all adult patients in hospital, including patients in the Emergency Department and those in transition.

Conclusion

Through the process no additional areas were identified which were not covered in the original guideline scope or would indicate a significant change in clinical practice. There are no factors described above which would invalidate or change the direction of current guideline recommendations. The Acutely ill patients in hospital guideline should not be updated at this time.

3. Review recommendation

The guideline should not be considered for update at this time.

The guideline will be reviewed again according to current processes.

Centre for Clinical Practice
8 November 2010

Appendix I

Andrews, F.J. & Nolan, J.P. 2006. Critical care in the emergency department: monitoring the critically ill patient. [Review] [16 refs]. *Emergency Medicine Journal*, 23, (7) 561-564

Aneman, A. & Parr, M. 2006. Medical emergency teams: a role for expanding intensive care?. [Review] [65 refs]. *Acta Anaesthesiologica Scandinavica*, 50, (10) 1255-1265

Arashin, K.A. 2010. Using the synergy model to guide the practice of rapid response teams. *DCCN - Dimensions of Critical Care Nursing*, 29, (3) 120-124

Armagan, E., Yilmaz, Y., Olmez, O.F., Simsek, G., & Gul, C.B. 2008. Predictive value of the modified Early Warning Score in a Turkish emergency department. *European journal of emergency medicine : official journal of the European Society for Emergency Medicine*, 15, (6) 338-340

Barbetti, J. & Lee, G. 2008. Medical emergency team: a review of the literature. [Review] [38 refs]. *Nursing in Critical Care*, 13, (2) 80-85

Baxter, A.D., Cardinal, P., Hooper, J., & Patel, R. 2008. Medical emergency teams at The Ottawa Hospital: the first two years. *Canadian Journal of Anaesthesia*, 55, (4) 223-231

Bell, M.B., Konrad, D., Granath, F., Ekbom, A., & Martling, C.R. 2006. Prevalence and sensitivity of MET-criteria in a Scandinavian University Hospital. *Resuscitation*, 70, (1) 66-73

Boniatti, M.M., Azzolini, N., da Fonseca, D.L., Ribeiro, B.S., de Oliveira, V.M., Castilho, R.K., Raymundi, M.G., Coelho, R.S., & Filho, E.M. 2010. Prognostic value of the calling criteria in patients receiving a medical emergency team review. *Resuscitation*, 81, (6) 667-670

Brabrand, M., Folkestad, L., Clausen, N.G., Knudsen, T., & Hallas, J. 2010. Risk scoring systems for adults admitted to the emergency department: a systematic review. [Review] [26 refs]. *Scandinavian Journal of Trauma, Resuscitation & Emergency Medicine*, 18, 8

Buist, M., Harrison, J., Abaloz, E., & Van, D.S. 2007. Six year audit of cardiac arrests and medical emergency team calls in an Australian outer metropolitan teaching hospital. *BMJ*, 335, (7631) 1210-1212

Casamento, A.J., Dunlop, C., Jones, D.A., & Duke, G. 2008. Improving the documentation of medical emergency team reviews. *Critical Care & Resuscitation*, 10, (1) 29

CG 50 Acutely Ill patients in Hospital Review Proposal for consultation

Cei, M., Bartolomei, C., & Mumoli, N. 2009. In-hospital mortality and morbidity of elderly medical patients can be predicted at admission by the Modified Early Warning Score: a prospective study. *International Journal of Clinical Practice*, 63, (4) 591-595

Chan, P.S., Khalid, A., Longmore, L.S., Berg, R.A., Kosiborod, M., & Spertus, J.A. 2008. Hospital-wide code rates and mortality before and after implementation of a rapid response team. *JAMA*, 300, (21) 2506-2513

Chan, P.S., Jain, R., Nallmothu, B.K., Berg, R.A., & Sasson, C. 2010. Rapid Response Teams: A Systematic Review and Meta-analysis. [Review] [43 refs]. *Archives of Internal Medicine*, 170, (1) 18-26

Chen, J., Flabouris, A., Bellomo, R., Hillman, K., Finfer, S., & MERIT Study Investigators for the Simpson Centre and the ANZICS Clinical Trials Group 2008. The Medical Emergency Team System and not-for-resuscitation orders: results from the MERIT study. *Resuscitation*, 79, (3) 391-397

Chen, J., Hillman, K., Bellomo, R., Flabouris, A., Finfer, S., Cretikos, M., MERIT Study Investigators for the Simpson Centre, & ANZICS Clinical Trials Group 2009. The impact of introducing medical emergency team system on the documentations of vital signs. *Resuscitation*, 80, (1) 35-43

Chen, J., Flabouris, A., Bellomo, R., Hillman, K., & Finfer, S. 2009. Baseline hospital performance and the impact of medical emergency teams: modelling vs. conventional subgroup analysis. *Trials*, 10, (pp 117)

Chen, J., Bellomo, R., Flabouris, A., Hillman, K., Finfer, S., MERIT Study Investigators for the Simpson Centre, & ANZICS Clinical Trials Group 2009. The relationship between early emergency team calls and serious adverse events. *Critical Care Medicine*, 37, (1) 148-153

Cuthbertson, B.H., Boroujerdi, M., McKie, L., Aucott, L., & Prescott, G. 2007. Can physiological variables and early warning scoring systems allow early recognition of the deteriorating surgical patient? *Critical Care Medicine*, 35, (2) 402-409

Cuthbertson, B.H. 2007. The impact of critical care outreach: is there one?. [Review] [10 refs]. *Critical Care (London, England)*, 11, (6) 179

Cuthbertson, B.H. 2008. Optimising early warning scoring systems. *Resuscitation*, 77, (2) 153-154

Duckitt, R.W., Buxton-Thomas, R., Walker, J., Cheek, E., Bewick, V., Venn, R., & Forni, L.G. 2007. Worthing physiological scoring system: derivation and validation of a physiological early-warning system for medical admissions. An observational, population-based single-centre study. *British Journal of Anaesthesia*, 98, (6) 769-774

Endacott, R., Elliott, S., & Chaboyer, W. 2009. An integrative review and meta-synthesis of the scope and impact of intensive care liaison and outreach services. [Review] [41 refs]. *Journal of Clinical Nursing*, 18, (23) 3225-3236

Esmonde, L., McDonnell, A., Ball, C., Waskett, C., Morgan, R., Rashidian, A., Bray, K., Adam, S., & Harvey, S. 2006. Investigating the effectiveness of critical care outreach services: a systematic review. [Review] [48 refs]. *Intensive Care Medicine*, 32, (11) 1713-1721

Gao, H., Harrison, D.A., Parry, G.J., Daly, K., Subbe, C.P., & Rowan, K. 2007. The impact of the introduction of critical care outreach services in England: a multicentre interrupted time-series analysis. *Critical Care (London, England)*, 11, (5) R113

Gao, H., McDonnell, A., Harrison, D.A., Moore, T., Adam, S., Daly, K., Esmonde, L., Goldhill, D.R., Parry, G.J., Rashidian, A., Subbe, C.P., & Harvey, S. 2007. Systematic review and evaluation of physiological track and trigger warning systems for identifying at-risk patients on the ward. *Intensive Care Medicine*, 33, (4) 667-679

Groarke, J.D., Gallagher, J., Stack, J., Aftab, A., Dwyer, C., McGovern, R., & Courtney, G. 2008. Use of an admission early warning score to predict patient morbidity and mortality and treatment success. *Emergency Medicine Journal*, 25, (12) 803-806

Gutierrez, G., Comignani, P., Huespe, L., Hurtado, F.J., Dubin, A., Jha, V., Arzani, Y., Lazzeri, S., Sosa, L., Riva, J., Kohn, W., Suarez, D., Lacuesta, G., Olmos, D., Mizdraji, C., & Ojeda, A. 2008. Central venous to mixed venous blood oxygen and lactate gradients are associated with outcome in critically ill patients. *Intensive Care Medicine*, 34, (9) 1662-1668

Harrison, D.A., Gao, H., Welch, C.A., & Rowan, K.M. 2010. The effects of critical care outreach services before and after critical care: a matched-cohort analysis. *Journal of Critical Care*, 25, (2) 196-204

Harrison, G.A., Jacques, T., McLaws, M.L., & Kilborn, G. 2006. Combinations of early signs of critical illness predict in-hospital death-the SOCCER study (signs of critical conditions and emergency responses). *Resuscitation*, 71, (3) 327-334

Jansen, J.O. & Cuthbertson, B.H. 2010. Detecting critical illness outside the ICU: the role of track and trigger systems. *Current Opinion in Critical Care*, 16, (3) 184-190

Jansen, T.C., van, B.J., & Bakker, J. 2009. Blood lactate monitoring in critically ill patients: A systematic health technology assessment. *Critical Care Medicine*, 37, (10) 2827-2839

Jones, D. & Bellomo, R. 2006. Introduction of a rapid response system: why we are glad we MET. *Critical Care (London, England)*, 10, (1) 121

CG 50 Acutely Ill patients in Hospital Review Proposal for consultation

Jones, D., George, C., Hart, G.K., Bellomo, R., & Martin, J. 2008. Introduction of medical emergency teams in Australia and New Zealand: a multi-centre study. *Critical Care (London, England)*, 12, (2) R46

Jones, L., King, L., & Wilson, C. 2009. A literature review: factors that impact on nurses' effective use of the Medical Emergency Team (MET). [Review] [62 refs]. *Journal of Clinical Nursing*, 18, (24) 3379-3390

Lam, T.S., Mak, P.S.K., Siu, W.S., Lam, M.Y., Cheung, T.F., & Rainer, T.H. 2006. Validation of a Modified Early Warning Score (MEWS) in emergency department observation ward patients. *Hong Kong Journal of Emergency Medicine*, 13, (1) 24-30

Lighthall, G.K., Parast, L.M., Rapoport, L., & Wagner, T.H. 2010. Introduction of a rapid response system at a United States veterans affairs hospital reduced cardiac arrests. *Anesthesia and Analgesia*, 111, (3) 679-686

Mansjoer, A. & George, Y.W. 2008. Pathophysiology of critical ill patients: focus on critical oxygen delivery. *Acta Medica Indonesiana*, 40, (3) 161-170

McDonnell, A., Esmonde, L., Morgan, R., Brown, R., Bray, K., Parry, G., Adam, S., Sinclair, R., Harvey, S., Mays, N., & Rowan, K. 2007. The provision of critical care outreach services in England: findings from a national survey. *Journal of Critical Care*, 22, (3) 212-218

McGaughey, J., Alderdice, F., Fowler, R., Kapila, A., Mayhew, A., & Moutray, M. 2007. 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] [50 refs]. *Cochrane Database of Systematic Reviews* (3) CD005529

Mulligan, A. 2010. Validation of a physiological track and trigger score to identify developing critical illness in haematology patients. *Intensive & Critical Care Nursing*, 26, (4) 196-206

Odell, M., Rechner, I.J., Kapila, A., Even, T., Oliver, D., Davies, C.W., Milsom, L., Forster, A., & Rudman, K. 2007. The effect of a critical care outreach service and an early warning scoring system on respiratory rate recording on the general wards. *Resuscitation*, 74, (3) 470-475

Odell, M. 2010. Are early warning scores the only way to rapidly detect and manage deterioration?. [Review] [25 refs]. *Nursing Times*, 106, (8) 24-26

Offner, P.J., Heit, J., & Roberts, R. 2007. Implementation of a rapid response team decreases cardiac arrest outside of the intensive care unit. *Journal of Trauma-Injury Infection & Critical Care*, 62, (5) 1223-1227

Pal, J.D., Victorino, G.P., Twomey, P., Liu, T.H., Bullard, M.K., & Harken, A.H. 2006. Admission serum lactate levels do not predict mortality in the acutely injured patient. *Journal of Trauma-Injury Infection & Critical Care*, 60, (3) 583-587

Pearse, R.M. 2009. Extending the role of lactate measurement into the prehospital environment. [Review] [6 refs]. *Critical Care (London, England)*, 13, (1) 115

Priestap, F.A. & Martin, C.M. 2006. Impact of intensive care unit discharge time on patient outcome. *Critical Care Medicine*, 34, (12) 2946-2951

Prytherch, D.R., Smith, G.B., Schmidt, P.E., & Featherstone, P.I. 2010. ViEWS--Towards a national early warning score for detecting adult inpatient deterioration. *Resuscitation*, 81, (8) 932-937

Ranji, S.R., Auerbach, A.D., Hurd, C.J., O'Rourke, K., & Shojania, K.G. 2007. Effects of rapid response systems on clinical outcomes: systematic review and meta-analysis. [Review] [56 refs]. *Journal of Hospital Medicine (Online)*, 2, (6) 422-432

Smith, G.B., Prytherch, D.R., Schmidt, P.E., & Featherstone, P.I. 2008. Review and performance evaluation of aggregate weighted 'track and trigger' systems. [Review] [90 refs]. *Resuscitation*, 77, (2) 170-179

Smith, G.B., Prytherch, D.R., Schmidt, P.E., Featherstone, P.I., & Higgins, B. 2008. A review, and performance evaluation, of single-parameter "track and trigger" systems. [Review] [97 refs]. *Resuscitation*, 79, (1) 11-21

Subbe, C.P., Gao, H., & Harrison, D.A. 2007. Reproducibility of physiological track-and-trigger warning systems for identifying at-risk patients on the ward. *Intensive Care Medicine*, 33, (4) 619-624

Subbe, C.P., Gauntlett, W., & Kellett, J.G. 2010. Collaborative Audit of Risk Evaluation in Medical Emergency Treatment (CARE-MET I) - an international pilot. *European Journal of Internal Medicine*, 21, (3) 222-225

Tarassenko, L., Hann, A., & Young, D. 2006. Integrated monitoring and analysis for early warning of patient deterioration. *British Journal of Anaesthesia*, 97, (1) 64-68

Tee, A., Calzavacca, P., Licari, E., Goldsmith, D., & Bellomo, R. 2008. Bench-to-bedside review: The MET syndrome--the challenges of researching and adopting medical emergency teams. [Review] [59 refs]. *Critical Care (London, England)*, 12, (1) 205

van Beest, P.A., Mulder, P.J., Oetomo, S.B., van den Broek, B., Kuiper, M.A., & Spronk, P.E. 2009. Measurement of lactate in a prehospital setting is related to outcome. *European Journal of Emergency Medicine*, 16, (6) 318-322

CG 50 Acutely Ill patients in Hospital Review Proposal for consultation

Winters, B.D., Pham, J.C., Hunt, E.A., Guallar, E., Berenholtz, S., & Pronovost, P.J. 2007. Rapid response systems: a systematic review. [Review] [34 refs]. *Critical Care Medicine*, 35, (5) 1238-1243

Winters, B.D., Pham, J.C., Hunt, E.A., Guallar, E., Berenholtz, S., & Pronovost, P.J. 2007. Rapid response systems: a systematic review. [Review] [34 refs]. *Critical Care Medicine*, 35, (5) 1238-1243

Reference by Implementation team

Stewart J, Findlay (2009) Adding insult to injury: a review of the care of patients who died in hospital with a primary diagnosis of acute kidney injury (acute renal failure). (Available from: http://www.ncepod.org.uk/2009report1/Downloads/AKI_report.pdf)

Relevant Clinical Trials (Awaiting publication)

The Prevention of Failure to Rescue" Using Early Warning Scoring (VitalCare)

Recently completed (07/2010)