

## **Published research that outlines the issues Nightingale hopes to address**

**Adverse events and potentially preventable deaths in Dutch hospitals:** results of a retrospective patient record review study. Zegers M, de Bruijne MC, Wagner C, et al. Qual Saf Health Care. 2009 Aug;18(4):297-302. doi: 10.1136/qshc.2007.025924.

*Preventable adverse events that contributed to death occurred in 4.1% of all hospital deaths. Extrapolating to a national level, between 1482 and 2032 potentially preventable deaths occurred in Dutch hospitals.*

**Preventable deaths due to problems in care in English acute hospitals:** a retrospective case record review study. Hogan H, Healey F, Neale G, et al. BMJ Qual Saf. 2012 Sep;21(9):737-45. doi: 10.1136/bmjqs-2011-001159; download from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3436096/pdf/bmjqs-2011-001159.pdf>.

*Reviewers judged 5.2% of deaths as having a 50% or greater chance of being preventable. The principal problems associated with preventable deaths were poor clinical monitoring. Extrapolating from these figures suggests there would have been 11 859 adult preventable deaths in hospitals in England.*

**Patient-safety-related hospital deaths in England: thematic analysis** of incidents reported to a national database, 2010-2012. Donaldson LJ, Panesar SS, Darzi A. PLoS Med. 2014 Jun 24;11(6):e1001667. doi: 10.1371/journal.pmed.1001667.

*These incident types were aggregated into six areas of apparent systemic failure: mismanagement of deterioration (35%), failure of prevention (26%), deficient checking and oversight (11%), dysfunctional patient flow (10%), equipment-related errors (6%), and other (12%). The most common incident types were failure to act on or recognise deterioration.*

**"Identifying the hospitalised patient in crisis"** --a consensus conference on the afferent limb of rapid response systems. DeVita MA, Smith GB, Adam SK, et al. Resuscitation. 2010 Apr;81(4):375-82. doi: 10.1016/j.resuscitation.2009.12.008.

*The major findings include: (1) vital sign aberrations predict risk, (2) monitoring patients more effectively may improve outcome, although some risk is random, (3) the workload implications of monitoring on the clinical workforce have not been explored, but are amenable to study and should be investigated, (4) the characteristics of an ideal monitoring system are identifiable, and it is possible to categorize monitoring modalities.*

**The accuracy of respiratory rate assessment by doctors** in a London teaching hospital: a cross-sectional study. Philip KE, Pack E, Cambiano V, et al. J Clin Monit Comput. 2015 Aug;29(4):455-60. doi: 10.1007/s10877-014-9621-3; download from [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4487351/pdf/10877\\_2014\\_Article\\_9621.pdf](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4487351/pdf/10877_2014_Article_9621.pdf).

*52 and 19% of doctors did not identify the respiratory rates shown as abnormal, using 'spot' and formal assessment methods respectively.*

**A controlled trial of electronic automated advisory vital signs monitoring in general hospital wards.** Bellomo R, Ackerman M, Bailey M, et al. Crit Care Med. 2012 Aug;40(8):2349-61. doi: 10.1097/CCM.0b013e318255d9a0.

*Deployment of electronic automated advisory vital signs monitors was associated with an improvement in the proportion of rapid response team-calls triggered by respiratory criteria, increased survival of patients receiving rapid response team calls, and decreased time required for vital signs measurement and recording.*

**Impact of introducing an electronic physiological surveillance system on hospital mortality.** Schmidt PE, Meredith P, Prytherch DR, et al. BMJ Qual Saf. 2015 Jan;24(1):10-20. doi: 10.1136/bmjqs-2014-003073 .

*During electronic physiological surveillance system implementation, crude mortality fell from a baseline of 7.75% to 6.42% in one hospital (estimated 397 fewer deaths), and from 7.57% to 6.15% at the second (estimated 372 fewer deaths).*

**Common laboratory tests predict imminent death in ward patients.** Loekito E, Bailey J, Bellomo R, et al. Resuscitation. 2013 Mar;84(3):280-5. doi: 10.1016/j.resuscitation.2012.07.025.

*The authors linked commonly measured laboratory tests (>2.5 million individual measurements) with event databases and assessed the ability of each laboratory variable or combination of variables together with patient age to predict imminent death. Multivariable logistic modelling achieved an AUC-ROC of 0.87 for the prediction of imminent death. Computer analysis outperformed Consultant doctors.*

**Multicenter development and validation of a risk stratification tool for ward patients.** Churpek MM, Yuen TC, Winslow C, et al. Am J Respir Crit Care Med. 2014 Sep 15;190(6):649-55. doi: 10.1164/rccm.201406-1022OC; download from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4214112/pdf/rccm.201406-1022OC.pdf>.

*Laboratory results, vital signs, and demographics were used to predict the combined outcome of cardiac arrest (CA), intensive care unit (ICU) transfer, or death on the wards. The derived model was more accurate than the Modified Early Warning Score in the validation dataset for all outcomes.*

**Machine Learning and the Profession of Medicine.** Darcy AM, Louie AK, Roberts LW. JAMA. 2016 Feb 9;315(6):551-2. doi: 10.1001/jama.2015.18421.

**EHDViz: clinical dashboard development using open-source technologies.** Badgeley MA, Shameer K, Glicksberg BS, et al. BMJ Open. 2016 Mar 24;6(3):e010579. doi: 10.1136/bmjopen-2015-010579; download from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4809078/pdf/bmjopen-2015-010579.pdf>.

*The authors describe web-based, real-time clinical dashboards for visualising heterogeneous biomedical, healthcare and wellness data.*

**Rapid-response systems as a patient safety strategy: a systematic review.** Winters BD, Weaver SJ, Pfoh ER, et al. Ann Intern Med. 2013 Mar 5;158(5 Pt 2):417-25. doi: 10.7326/0003-4819-158-5-201303051-00009.

*Evidence from a high-quality meta-analysis of 18 studies and 26 lower-quality before-and-after studies published after that meta-analysis showed that RRSs are associated with reduced rates of cardiorespiratory arrest outside of the intensive care unit and reduced mortality. Eighteen studies examining facilitators of and barriers to implementation suggested that the rate of use of RRSs could be improved.*

**The social practice of rescue: the safety implications of acute illness trajectories and patient categorisation** in medical and maternity settings. Mackintosh N, Sandall J. *Sociol Health Illn.* 2016 Feb;38(2):252-69. doi: 10.1111/1467-9566.12339; download from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4949570/pdf/SHIL-38-252.pdf>.

*The normative position in acute hospital care when a patient is seriously ill is to resuscitate and rescue. However, UK and international reports have highlighted problems with the lack of timely recognition, treatment and referral of patients whose condition is deteriorating while being cared for on hospital wards. This article explores the social practice of rescue, and the structural and cultural influences that guide the categorisation and ordering of acutely ill patients in different hospital settings. An analysis of the variation in findings between care settings and patient groups enables us to consider socio-political influences and the specifics of how staff manage trade-offs linked to the enactment of core values such as safety and equity in practice. We might consider how technology can “force” the most effective practices.*