



Re-examining the essentials for improving quality and safety of hospital care

*A position statement of the Internal Medicine
Society of Australia and New Zealand*

June 2007

© IMSANZ 2007

Re-examining the essentials for improving quality and safety of hospital care

Introduction

Ten years ago the Australian Quality in Healthcare Study revealed 17% of all hospital admissions were associated with adverse healthcare-related events, the majority considered preventable.¹ Two years later saw the establishment of the Australian Council of Safety and Quality in Healthcare (ACSQ) which, to 2005, has instigated more than 20 different programs aimed at making care safer from which numerous strategies have been endorsed for widespread application by the Australian Health Ministers Council (AHMC).² But has hospital care improved? Unfortunately not as much as we would hope. Over half of 670 hospitals recently reviewed by the Australian Council of Healthcare Standards (ACHS) had inadequate quality-control systems for patient safety.³ US experience also laments slow progress towards safer care over the last five years.⁴ While much good work has been done and quality and safety is now on everyone's lips, there is a sense that at the coalface of hospital medicine not a lot has changed. Why not? And what can be done about it?

This position statement from the Internal Medicine Society of Australia and New Zealand (IMSANZ) presents an analysis of underlying factors responsible for poor quality and unsafe care, and then proceeds to offer a 20-point action plan for improving quality and safety of patient care, with the focus being on in-hospital care and from the perspective of general physicians.

Time to reconsider basic tenets

This position statement contends that present quality and safety improvement programs may be over-investing time and effort in non-core, second-order strategies which, while in themselves worthy, do not tackle the core or first-order issues that are central to making hospital care visibly safer. Many programs comprise top-down, centralised, formal structures and processes (Table 1) which target occurrences that place the hospital, as an organisation, at high legal risk, such as wrong-site surgery or egregious medication misadventure. However, while catastrophic and very preventable, these events are rare.⁵ Also, despite face validity, many of these programs, working in isolation, lack hard evidence of effectiveness in real-world settings.⁶⁻¹⁰ In contrast, common safety problems such as nosocomial infection, contrast media-induced nephropathy and pressure ulcers may be more amenable to an approach based on clinical epidemiology involving surveillance, intervention, and re-assessment.¹¹

Involvement of practising clinicians in safety enhancement tends to focus on repeated case finding, reporting and analysis of error and risk, and adhering to safety procedures of questionable efficacy devised and imposed by non-clinical personnel. It could be argued that greater dividends in patient safety could be achieved if clinicians were more actively involved in developing, implementing and monitoring effective means for preventing frequently occurring problems which have already been well characterised.¹¹ Resources and publicity may need to be redirected back towards basic determinants of good hospital care which are discussed below under 6 themes.

Clinical workforce

The 'Dr Death' scandal in Bundaberg in Queensland centres on a fraudulent, incompetent surgeon undertaking complex operations simply because he filled a vacancy and earned the hospital income by performing high-paying elective surgery.¹² The Davies report¹³ handed down on December 6, 2005 identified: i) weak penalties for practitioners misrepresenting themselves to registration boards; ii) no requirement for non-clinical managers, in circumstances of their own choosing (such as 'area of need'), to seek verification of a doctor's skills from the relevant specialty college; and iii) managers ignoring expressed concerns about professional misconduct, citing insufficient performance data on which to take action. It is uncertain whether circumstances are any better in other states and territories, or for nurses and other health disciplines.

Inquiries at Campbelltown and Camden hospitals,¹⁴ King Edward Memorial Hospital,¹⁵ and the Canberra Hospital¹⁶ all disclosed institutions trying to provide medical or surgical services with inadequate levels of staff, expertise or supervision and where these deficiencies were organisationally ignored.

Hospitals require adequate numbers of well trained, well supervised and properly credentialed health professionals, skilled in safety and quality improvement, rostered appropriate hours, paid appropriately and professionally and legislatively empowered and protected to raise concerns and challenge authority and conventions in situations where they perceive potential danger to patients. Poor staffing levels,¹⁷⁻¹⁹ inadequate supervision,²⁰ tightly constrained budgets,²¹ and organisational cultures which suppress dissent²² characterise hospitals with disproportionately high rates of error and harm. The worsening shortage of skilled health professionals, especially nurses, coupled with changes to safer restricted work shifts, have major implications for patient safety which need urgent attention.²³

Teamwork

Modern healthcare consists of care provided from doctors and nurses trained in more than 50 different types of medical specialty, as well as 10 streams of allied health, all operating in microsystems at a ward, unit or departmental level.²⁴ Good teamwork with blending of roles, proper communication, close collaboration and sharing of authority is required if the more than 200 interprofessional interactions that occur on average during a single episode of patient care are to result in efficient, safe care.²⁵ While 'we must work as a team' is a frequently uttered phrase, the determinants of well functioning teams (Table 2)²⁶⁻²⁸ are infrequently enunciated or promoted. This is a major failing as entrenched professional cultures and practice norms based on individual autonomy constitute daunting barriers to creating habits and beliefs of common purpose, accountability and interdependence that a safe culture requires.²⁹ Hospitals characterised by dysfunctional or poorly co-ordinated teams with inherent failures of interdisciplinary communication demonstrate excess mortality and morbidity.^{30,31}

Patient participation in care decisions

In making decisions about their care, some patients will be happy to defer completely to clinicians, others will ask to hear the options and understand rationales behind specific recommendations, while the remainder will actively seek out all relevant information and articulate their own preferences.³² In all three situations, however,

better outcome and less harm can be achieved by employing good clinician-patient communication skills, exploring patients' attitudes and beliefs, sharing information on risks and benefits in ways patients understand, and tailoring the way advice is provided to suit individual circumstances.³³ Practical means for skilling patients in how they themselves can decrease their risk of iatrogenic adversity by way of education,^{33,34} decision aids,³⁵ and disease management approaches³⁶ are listed in Table 3.

Healthcare interventions

Three major threats to patient safety arise from the use of diagnostic and therapeutic healthcare interventions: 1) overuse (receiving care of little or no value); 2) underuse (failing to receive needed care); and 3) misuse (errors and defects in delivering care).³⁷ Where it leads directly to physical injury, misuse of technology – a failure of execution - is the risk that most captures public (and media) attention and incites emotional reaction. Yet it is probable that the more indirect (and masked) burdens of complications and harm, lost productivity and increased costs resulting from overuse or underuse of care - problems of decision quality – are orders of magnitude greater than those resulting from misuse.

Up to 30% of clinical investigations and treatments confer little or no gain in patient health,³⁸ with little potential for benefit for many patients undergoing coronary revascularisation,³⁹ arthroscopy,⁴⁰ caesarean section,⁴¹ breast cancer screening,⁴² prostate surgery⁴³ and carotid endarterectomy.⁴⁴ Potentially dangerous medications such as non-steroidal anti-inflammatory drugs are prescribed to thousands of patients.⁴⁵ Conversely, studies show consistent failure of administration of effective treatments in prevalent, life-threatening conditions such as acute coronary syndromes,⁴⁶ heart failure,^{46,47} stroke,^{48,49} diabetes⁴⁷ and kidney failure.⁴⁹ Only 50% of patients receive recommended preventive care in regards to common causes of major illness.⁵⁰

In light of the above, a predominant focus on catastrophic but infrequent harm and 'near-misses' directly attributable to proximate executory errors ignores a much greater reservoir of potential iatrogenesis. Narrowing gaps between best practice and routine care by deploying effective systems of clinical decision support, practice evaluation and care improvement (Table 4)⁵¹⁻⁵⁵ may realise much larger dividends in improved patient outcomes than relying solely on administrative instruments such as sentinel event reporting or risk registers.

Over and above care related to specific clinical conditions is the uneven application across institutions of a number of effective, evidence-based safety practices aimed at preventing common hospital-acquired (nosocomial) complications (Table 5).^{56,57} In addition, redesigning high-risk clinical processes based on evidence obtained from high reliability/high hazard industries such as aviation can substantially improve safety, wherein reliance on individual vigilance (paying attention) for avoiding mistakes is replaced by systems with specific 'forcing functions' (such as unambiguous feedback, displays, instructions, automated systems).^{58,59}

Clinical governance

Every hospital is expected to have a 'clinical governance' framework for improving quality and safety despite uncertainty as to its effectiveness.⁶⁰ To succeed, these frameworks must: 1) devolve governance and performance monitoring to the level of clinical departments where care is provided by dedicated teams carrying ultimate responsibility;⁶¹ 2) feature practice-relevant, data-driven agendas that actively seek involvement and innovation on the part of practising clinicians; and 3) require hospital executives, clinical governance units and quality improvement co-ordinators to sponsor and support quality and safety activities within departments (or across departments in situations of shared care). At appropriate times, these activities may require authorisation of additional funding for performance measurement, enhancement of service capacity, or redesign of care delivery to address serious problems in quality and safety that have been clearly identified or are strongly suspected.

Hospital accreditation procedures of the ACHS, while becoming more stringent,³ do not mandate hospitals to implement proven safety practices, or mandate payers (state health departments or private health funds) to withhold funding to hospitals that consistently fail to implement such practices. Hospital funding formulae themselves are based on activity and throughput rather, as in some countries, on patient outcomes linked to quality and safety.^{62,63} Recent ACHS accreditation and attempts by the ACSQ to improve sentinel event reporting and clinical governance prevented none of the previously mentioned hospital inquiries.

Instead, it was individual whistleblowers who, at great cost to themselves, finally raised enough public pressure to force authorities to act in the face of compelling anecdotal evidence.²² In each case, organisations chose to respond to anomalous information indicative of safety problems by suppressing it or manipulating it to maintain the status quo (pathological response) or by constructing new administrative procedures which failed to address underlying causes (bureaucratic response). Instead, a generative approach would have used such information positively for inquiry and system change.⁶⁴

Information systems for performance monitoring and safety enhancement

Clinical databases and audit systems that allow prospective collecting and reporting of clinical performance data remain severely underdeveloped.^{65,66} Constant peer and self-review informed by such data may identify and remedy poor performance more effectively than delayed, adhoc retrospective sentinel reporting and chart review.^{67,68} Routine administrative data, traditionally used to measure output efficiency (length of stay, costs, utilisation rates), could, using appropriate techniques, be transformed into useful, real-time quality and safety measures.⁶⁹ Linkage of pharmacy, laboratory and patient databases could flag drug-result and drug-patient scenarios with potential for adverse events.⁷⁰ Systematic individual-based linkage of hospital episode statistics, death registries, and clinical databases would allow longitudinal relations between process and outcomes of care to be more easily established.^{71,72} Multi-hospital, data-driven collaborations aimed at improving care in specific clinical areas have potential to significantly shift routine care towards best practice standards in relatively short timeframes (less than 2 years).^{46,73-75}

An action plan for improving quality and safety

The following actions for improving safety and quality might, given adequate professional, managerial and political will, help to improve upon current levels of quality and safety of care.

Workforce credentialing

Action #1. Establish a common, linked set of procedures for registration and credentialing of health professionals in each state and territory, housed in one agency, with information collated from specialty colleges, previous employers and registration authorities in other jurisdictions, and where harsh penalties apply to what are regarded as criminal offences of practitioner non-adherence or fraudulent misrepresentation.

Action #2. As a condition of employment or visiting rights at any hospital, all practitioners must: i) have their credentials cross-checked with data stored in the central agency; ii) agree to an explicit and regular process of peer-mediated performance appraisal and re-credentialing;⁷⁶ and iii) commit to continuous monitoring of processes and outcomes of their practice using indicators appropriate to the discipline and level of expertise.

Action #3. Each hospital department should, using a transparent and data-driven process, determine its service capacity i.e. define the clinical conditions and patient types it has the expertise, facilities and staff to manage well, and the circumstances under which particular patients should be referred or transferred to another team or institution. Service capacity should be defined by departmental heads for both normal operating conditions and temporary situations of serious capacity-demand mismatching wherein spikes in patient load or shortfalls in staff or resources exceed pre-determined safe care thresholds.

Action #4. Legislate legal and vocational protection for clinician ‘whistleblowers’ voicing legitimate concerns about professional misconduct, and provide such persons unfettered access to professional appraisal bodies empowered to independently hear and investigate such concerns, free of political, managerial or media interference. More generally, staff at all levels should feel encouraged to voice concerns about organisational, managerial and industrial issues which appear to be impacting adversely on patient safety.

Action #5. Health departments, unions, university schools, specialty colleges and medical societies must collaborate in forging new career structures, industrial awards and training curricula⁷⁷ that focus on optimising quality and safety. A key reform is to enable doctors, nurses and allied health professionals to more effectively undertake high-order, bedside tasks that require specialised training by devolving distracting, low-order tasks to clinically orientated ‘health professional assistants.’⁷⁸ In times of future shortages of specific groups of skilled clinicians, professional boundaries will need renegotiation in situations where evidence confirms that tasks previously considered the exclusive province of one type of practitioner can be safely performed by other groups.⁷⁹

Teamwork skilling

Action #6. All hospitals should establish interdisciplinary programs of education and training in teamwork skills and communication, and require participation from all

clinicians. Affiliated university schools of medicine, nursing and allied health should implement interdisciplinary activities that inculcate attitudes of respect and co-operation among members of different professional streams.

Action #7. All hospital departments should provide a multidisciplinary orientation and information package to all clinicians joining the unit for the first time, and which outlines departmental policies and procedures and roles and responsibilities of all personnel.

Action #8. All hospital departments should have explicit procedures for: i) clinical handover between shifts for all disciplines;⁸⁰ ii) co-ordinating activities of different professionals, and different specialty teams, providing care to the same patient; iii) recording clinical information arising from ward rounds, case conferences and consultant visits, and conveying it to others who need to know; iv) expeditious identification and management of patients who become clinically unstable;⁸¹ v) use of paging, phone and other call systems in ways that minimise potentially unsafe disruption of clinical work and allow prioritisation of tasks;⁸² vi) role sharing and multi-skilling in situations where clinical demand exceeds clinician supply; and viii) transferring structured patient information (discharge summaries, clinic letters, community referrals) to general practitioners and other clinicians involved in out-of-hospital care.⁸³

Action #9. All hospital departments should hold regular, minuted multidisciplinary business meetings (including representation from non-clinical staff) in which quality and safety issues are standing agenda items, and innovative projects for improving care are actively encouraged and supported.

Patient advocacy

Action #10. All hospital departments should provide counselling and written materials to patients on admission and at discharge which address the issues listed in Table 3.

Action #11. All hospital departments should assign the role of 'Patient Advocate' to a patient representative whose role is to discuss with patients: 1) their rights and responsibilities in receiving care; 2) any safety and quality concerns they have relating to their care; and 3) circumstances surrounding any error or mishap that may occur.

Action #12. State governments should pilot implementation of a state-wide unique patient identifier system, coupled with an opt-in, patient-held 'smart card' health record. These devices would allow patient information, necessary for safe and seamless care, to be available at any time in any hospital. The huge benefits of reduced test duplication, less medication errors, and timely access to past medical history (especially in circumstances where patients are rendered clinically unable to provide such information), will most likely far outweigh any downside from potential breaches of privacy.

Evidence-informed healthcare

Action #13. All hospital departments should develop and implement readily accessible, evidence-based clinical practice guidelines, protocols and other forms of decision guidance covering their most commonly encountered conditions, procedures

and treatments. All staff should be made aware of the availability of such guidance and be trained in its use. Each department (or group of departments) might appoint a 'clinical informationist' or 'knowledge translator' with skills in clinical care, evidence retrieval and appraisal, information systems and communication who would steer the formulation of guidance with input from senior clinicians.⁸⁴ The process of formulating such guidance might identify practices associated with marginal benefit or potential safety concerns which would warrant formal departmental disendorsement.

Action #14. All hospitals should attempt to implement all patient safety practices listed in Table 4 across the institution using methods suggested by others as being effective,⁸⁵ rigorously monitor compliance, and apply sanctions to departments which consistently fail to meet agreed standards.

Action #15. All hospitals should attempt to simplify and standardise all 'high patient risk' technical procedures throughout the organisation such as: fluid and medication prescribing and administration,⁸⁶ particularly in relation to 'high-risk' agents; use of infusion pumps, anaesthetic machines and other medical equipment; and reporting and review procedures for significantly abnormal investigation results. Allowing different departments to retain separate systems on grounds of historical tradition or idiosyncratic preference, in the absence of supporting evidence of patient benefit, should no longer be accepted.

Clinical governance and performance monitoring

Action #16. All hospital departments should measure, analyse and report a set of: a) specialty-specific process-of-care and outcome clinical indicators; and b) hospital-wide (or generic) safety indicators in either block format (ie at the end of a pre-specified reporting period), or, particularly for infrequent sentinel events, in continuous mode using statistical process methods (i.e. run and control charts^{87,88} or cusum analysis⁸⁹).

Clinical indicators would ideally comprise those arising from previously developed, consensus-based clinical guidelines for high-volume or high-risk conditions. Clinical indicators relevant to the care of patients with medical conditions might include those listed in Table 6.⁹⁰⁻⁹² Generic safety indicators might include those listed in Table 7.⁹³

Primary data sources for either type of indicator may include, depending on the indicator, administrative files, hospital records, discharge summaries, mortality reviews, coroners' reports and patient complaints. Indicators for each department (but not necessarily those pertaining to individual clinicians) should be freely accessible to anyone within the healthcare system who has a legitimate interest in reviewing them.

Action #17. External accreditation surveys must include not only verification of hospital-wide quality and safety procedures but also direct sighting of departmental clinical and safety indicators if hospitals are to be granted unconditional accreditation.

Action #18. All hospital departments should develop an ongoing quality and safety program centred on one or more departmental personnel acting as patient quality and safety officers with defined roles and protected time. Such personnel could act to locate, adapt and promulgate practice improvement interventions that have proven

successful in other settings, and liaise with multi-site collaborations that focus on common problems.

Action #19. Hospital management (or the Health Insurance Commission and private health insurance funds in the case of private hospitals) must apply financial and professional sanctions to departments which show consistently unacceptable rates of preventable errors or complications resulting from poor governance or continuance of questionable clinical practices.⁹⁴

Action #20. State government executives in liaison with district and health area managers should formulate an action-based clinical governance framework that applies to all hospitals (which may include some or all of the above mentioned actions), and which is linked to a timeline for its enactment and a commitment to provide required resources. District managers will be required to develop and implement hospital-specific quality and safety plans whose objectives and methods of operationalisation are congruent with the state framework.

Some cautions

While electronic health records, computerised ordering and prescribing systems, and clinical databases hold much promise, information technology (IT) is often oversold as a definitive quality and safety solution. In improving care we need to closely analyse human factors - how humans interact with each other and with their environment – and not place undue reliance on putative advances in IT, especially when novel IT systems in themselves, if poorly designed, may add new safety problems.^{95,96}

In addition, clinical governance ‘roadmaps’ designed and overseen by quality coordinators, project officers and senior management, divorced from those directly involved in clinical work, are doomed to fail. Front-line staff who deliver care must help design and implement systems of governance and innovation, and ensure an appropriate blend of feasible checks and balances.^{24,61}

Finally, and most importantly, in improving quality and safety, we must confront, and cope with, the chaotic unpredictability of hospital practice that results from rapid change and growth in task complexity. Interactions between clinicians and their environment are those of ‘complex adaptive systems’⁹⁷ in which the how, why and what of clinical processes are in constant flux. Consequently, if we are to propose feasible and sustainable methods for improving care we will need to blend qualitative approaches (based on cognitive psychology, social learning theory, systems analysis, and political science) which attempt to ascertain why humans do what they do, with quantitative approaches (clinical epidemiology and biostatistics) which suggest what things humans can do to make care safer and of higher quality.⁹⁸⁻¹⁰¹ Blending these two approaches will be essential if we are to successfully renegotiate traditional mindsets around clinician autonomy and discretion, craftsmanship models of professionalism, and managerial leadership in ways that are acceptable to all players.^{102,103}

Next steps

This position statement is intended to incite purposeful debate which culminates in an action plan that systematically implements, across all hospitals, proven or highly

promising strategies for improving quality and safety at the bedside, many of which have been evaluated in detailed work undertaken by the ASCQ and endorsed by AHMC. In their recent review of patient safety in the US,⁴ Leape and Berwick recommend a meeting of all key stakeholders in healthcare with the aim of formulating and implementing a national action plan that attracts commitment from every player. At the very least, state-wide forums looking at care in hospitals might be considered with the aim of considering and implementing some or all of the recommendations contained in this document throughout all state hospitals.

References

1. Wilson RM, Runciman WB, Gibberd RW, et al. The Quality in Australian Health Care Study. *Med J Aust* 1995; 163: 458-471.
2. Australian Council for Safety and Quality in Health Care. Achieving Safety and Quality Improvements in Health Care. Sixth Report to the Australian Health Ministers' Conference. ACSQ, Sydney, July 28, 2005. Available at: www.safetyandquality.org
3. Australian Council of Healthcare Standards. National Report on Health Services Accreditation Performance: 2003 and 2004. ACHS, Ultimo, June 2005. Available at: www.achs.org.au/
4. Leape LL, Berwick DM. Five years after *To Err is Human*. What have we learned? *JAMA* 2005; 293: 2384-2390.
5. Runciman WB, Edmonds MJ, Pradhan M. Setting priorities for patient safety. *Qual Saf Health Care* 2002; 11: 224-229.
6. Cullen DJ, Bates DW, Small SD, et al. The incident reporting system does not detect adverse drug events: a problem for quality improvement. *Jt Comm J Qual Improv* 1995; 21: 541-548.
7. Shojania KG, Wald H, Gross R. Understanding medical error and improving patient safety in the inpatient setting. *Med Clin N Am* 2002; 86: 847-867.
8. Kachalia A, Shojania KG, Hofer TP, et al. Does full disclosure of medical errors affect malpractice liability? *Jt Comm J Qual Saf* 2003; 29: 503-511.
9. Weissman JS, Annas CL, Epstein AS, et al. Error reporting and disclosure systems. Views from hospital leaders. *JAMA* 2005; 293: 1359-1366.
10. Frankel A, Gandhi TK, Bates DW. Improving patient safety across a large integrated health care delivery system. *Int J Qual Health Care* 2003; 15 Suppl 1: i31-i40.
11. Gerberding JL. Hospital-onset infections: a patient safety issue. *Ann Intern Med* 2002; 137: 665-670.
12. Bundaberg Hospital Commission of Inquiry. Terms of Reference. Available at: www.bhci.qld.gov.au/terms.htm
13. Davies G. Queensland Public Hospitals Commission of Inquiry Report. December 2005. Queensland Health. Available: http://qheps.health.qld.gov.au/restructurereform/docs/davies_inquiry.pdf
14. South Wales Health Care Complaints Commission. Investigation report, Campbelltown and Camden Hospitals, Macarthur Health Service. Sydney: New South Wales Department of Health, 2003.
15. King Edward Memorial Hospital (KEMH) Inquiry. Available at: www.health.wa.gov.au/kemhinquiry/recommendations/index.cfm (accessed 19/7/05).
16. Community and Health Services Complaints Commissioner of the ACT. A final report of the investigation into adverse patient outcomes of neurosurgical services provided by the Canberra Hospital. Canberra: ACT Government, 2003.
17. Needleman J, Buerhaus P, Mattke S, et al. Nurse-staffing levels and the quality of care in hospitals. *N Engl J Med* 2002; 346: 1715-1722.
18. Aiken LH, Clarke SP, Sloane DM, et al. Hospital nurse staffing and patient mortality, nurse burnout, and job dissatisfaction. *JAMA* 2002; 288: 1987-1993.
19. Rothberg MB, Abraham I, Lindenauer PK, Rose DN. Improving nurse-to-patient staffing ratios as a cost-effective safety intervention. *Med Care* 2005; 43: 785-791.
20. Eucinoso WE, Bernard DM. Hospital finances and patient safety outcomes. *Inquiry* 2005; 42: 60-72.
21. Iredell JR. Relieving medical officers in Queensland country hospitals. *Med J Aust*. 1992; 157 :523-7.
22. Faunce TA, Bolsin SNC. Three Australian whistleblowing sagas: lessons for internal and external regulation. *Med J Aust* 2004; 181: 44-47.
23. Benson H, Barbret LC. Impact on quality and patient safety: the new shortage of healthcare professionals. *J Healthc Qual* 2002; 24: 45-47.
24. Mohr JJ, Batalden PB. Improving safety on the front lines: the role of clinical microsystems. *Qual Saf Health Care* 2002; 11: 45-50.
25. Morey JC, Simon R, Jay GD, et al. Error reduction and performance improvement in the emergency department through formal teamwork training: evaluation of the MedTeams project. *Health Serv Res* 2002; 37: 1553-1581.
26. Drew S, Coulson-Thomas C. Transformation through teamwork: The path to the new organisation? *Management Decision* 1996; 34: 7.

27. Borkowski N. Teams and Team Building. In Borkowski N (ed). Organisational Behaviour in Health Care. Johns and Bartlett Publishers Inc: Boston, 2005, 343-358.
28. Firth-Cozens J. Cultures for improving patient safety through learning; the role of teamwork. *Qual Health Care* 2001; 10 (suppl 2): ii26-31.
29. Degeling P, Kennedy J, Hill M. Mediating the cultural boundaries between medicine, nursing and management--the central challenge in hospital reform. *Health Serv Manage Res* 2001; 14: 36-48.
30. West M, Borril C, Dawsom J, et al. The link between the management of employees and patient mortality in acute hospitals. *Int J Human Resource Management* 2002; 13: 1299-1310.
31. Young GJ, Charms MP, Daley J, et al. Best practices for managing surgical services: The role of coordination. *Health Care Management Review* 1997; 22: 72-80.
32. Levinson W, Kao A, Kuby A, et al. Not all patients want to participate in decision-making: a national study of preferences. *J Gen Intern Med* 2005; 20: 531-535.
33. National Health and Medical Research Council (NHMRC). Draft toolkit for making decisions about tests and treatments. A guide to better communication between health consumers and health professionals. NHMRC: Canberra, July 2005. Available at: www.nhmrc.gov.au/consult/toolkit.htm.
34. Rankin SH, Stallings KD, London F. Patient Education in Health and Illness. 5th edition. Lippincott Williams and Wilkins: Baltimore, 2005.
35. O'Connor AM, Rostom A, Fiset V. Decision aids for patients facing health treatment or screening decisions: systematic review. *BMJ* 1999; 319: 731-734.
36. Holman H, Lorig K. Patients as partners in managing chronic illness. *BMJ* 2000; 320: 526-527.
37. Chassin MR, Galvin RW. The urgent need to improve health care quality: Institute of Medicine Roundtable on Health Care Quality. *JAMA* 1998; 280: 1000-1005.
38. Fisher ES, Welch HG. Avoiding the unintended consequences of growth in medical care. How might more be worse? *JAMA* 1999; 281: 446-453.
39. Bhatt DL, Roe MT, Peterson ED, et al. Utilisation of early invasive management strategies for high-risk patients with non-ST-segment elevation acute coronary syndromes: results from the CRUSADE Quality Improvement Initiative. *JAMA* 2004; 292: 2096-2104.
40. Moseley JB, O'Malley K, Petersen NJ, et al. A controlled trial of arthroscopic surgery for osteoarthritis of the knee. *N Engl J Med*. 2002; 347: 81-88.
41. Lagrew DC Jr, Adashek JA. Lowering the cesarean section rate in a private hospital: comparison of individual physicians' rates, risk factors, and outcomes. *Am J Obstet Gynecol* 1998; 178: 1207-1214.
42. Gotzsche PC. On the benefits and harms of screening for breast cancer. *Int J Epidemiol* 2004; 33: 56-73.
43. Fleshner N, Rakovitch E, Klotz L. Differences between urologists in the United States and Canada in the approach to prostate cancer. *J Urol* 2000; 163: 1461-1466.
44. Winslow CM, Solomon DH, Chassin MR, et al. The appropriateness of carotid endarterectomy. *N Engl J Med* 1988; 318: 721-727.
45. Wright J. The double-edged sword of COX-2 selective NSAIDs. *CMAJ* 2002; 167: 1131-1137.
46. Scott IA, Darwin I, Duke A, Harvey K, Harden H, Ward M, Buckmaster N, Atherton J. for the CHI Cardiac Collaborative. Optimising cardiac care in Queensland public hospitals. Results of a multi-site quality improvement collaboration. *Med J Aust* 2004; 180: 392-397.
47. National Institute of Clinical Studies. Evidence-Practice Gaps Report, Volume 1. NICS, Melbourne, 2003.
48. Duffy BK, et al. Evidence-based care and outcomes of acute stroke managed in hospital specialty units. *Med J Aust* 2003; 178: 318-323.
49. National Institute of Clinical Studies. Evidence-Practice Gaps Report, Volume 2. NICS, Melbourne, 2005.
50. McGlynn EA, Asch SM, Adams J, et al. The quality of health care delivered to adults in the United States. *N Engl J Med* 2003; 348: 2635-2645.
51. Campbell D, Scott I, Andersen J, Greenberg P. Improving clinical practice: what works and what does doesn't? *Intern Med J* 2001; 31: 536-540.
52. Scott IA, Denaro CP, Bennett CJ, Mudge AM. Towards effective use of decision support in clinical care – What the guidelines for guidelines don't tell you. *Intern Med J* 2004; 34: 492-500.

53. Cabana M, Rand C, Powe N, et al. Why don't physicians follow clinical practice guidelines? A framework for improvement. *JAMA* 1999; 282:1458-1465.
54. Grimshaw JM, Thomas RE, MacLennan G, et al. Effectiveness and efficiency of guideline dissemination and implementation strategies. *Health Technol Assess* 2004; 8: iii-iv, 1-72.
55. Kawamoto K, Houlihan CA, Balas EA, Lobach DF. Improving clinical practice using clinical decision support systems: a systematic review of trials to identify features critical to success. *BMJ* 2005; 330: 765-772.
56. Shojania KG, Duncan BW, McDonald KM, Wachter RM (eds) *Making Health Care Safer: A Critical Analysis of Patient Safety Practices*. Evidence Report/Technology Assessment No. 43, AHRQ Publication No. 01-E058, Rockville, Md: Agency for Healthcare Research and Quality, 2001.
57. National Quality Forum. *Safe Practices for Better Healthcare – A Consensus Report*, National Quality Forum, Washington, 2003.
58. Gaba D. Structural and organisational issues in patient safety: A comparison of health care to other high-hazard industries. *California Management Review* 2000; 43: 83-102.
59. Spencer FC. Human error in hospitals and industrial accidents: current concepts. *J Am Coll Surg* 2000; 191: 410-418.
60. Hoff T, Jameson L, Hannan E, Flink E. A review of the literature examining linkages between organizational factors, medical errors, and patient safety. *Med Care Res Rev* 2005; 61: 3-37.
61. Francois P, Peyrin JC, Touboul M, et al. Evaluating implementation of quality management systems in a teaching hospital's clinical departments. *Int J Qual Health Care* 2003; 15: 47-55.
62. McNamara P. Quality-based payment: six case examples. *Int J Qual Health Care* 2005; 17: 357-362.
63. Young GJ, White B, Burgess JF, et al. Conceptual issues in the design and implementation of pay-for-quality programs. *Am J Med Qual* 2005; 20: 144-150.
64. Westrum R. A typology of organisational cultures. *Qual Saf Health Care* 2004; 13 (suppl 2): ii22-ii27.
65. Russell EM, Bruce J, Krukowski ZH. Systematic reviews of the quality of surgical mortality monitoring. *Br J Surg* 2003; 90: 527-532.
66. Black N, Barker M, Payne M. Cross sectional survey of multicentre clinical databases in the United Kingdom. *BMJ* 2004; 328: 1478-1482.
67. Runciman WB, Webb RK, Helps SC, et al. A comparison of iatrogenic injury studies in Australia and the USA. II. Reviewer behaviour and quality of care. *Int J Qual Health Care* 2000; 12: 379-388.
68. Pronovost PJ, Nolan T, Zeger S, et al. How can clinicians measure safety and quality in acute care? *Lancet* 2004; 363: 1061-1067.
69. Zhan C, Miller MR. Administrative data based patient safety research: a critical review. *Qual Saf Health Care* 2003; 12: 58-63.
70. Schiff GD, Klass D, Peterson J, et al. Linking laboratory and pharmacy: opportunities for reducing errors and improving care. *Arch Intern Med* 2003; 163: 893-900.
71. Holman CD, Bass AJ, Rouse IL, Hobbs MS. Population-based linkage of health records in Western Australia: development of a health services research linked database. *Aust NZ J Public Health* 1999; 23: 453-459.
72. Hammermeister KE, Shrover AL, Sethi GK, Grover FL. Why is it important to demonstrate linkages between outcomes of care and processes and structures of care. *Med Care* 1995; 33 (10 Suppl): OS5-16.
73. O'Connor GT, Plume SK, Olmstead EM, et al. A regional intervention to improve the hospital mortality associated with coronary artery bypass graft surgery. The Northern New England Cardiovascular Disease Study Group. *JAMA* 1996; 275: 841-846.
74. Mehta R, Montoye C, Gallogly M, et al. Improving quality in the care of acute myocardial infarction: the Guidelines Applied to Practice (GAP) Initiative. *JAMA* 2002; 287: 1269-76.
75. LaBresh KA, Ellrodt AG, Gliklich R, et al. Get with the guidelines for cardiovascular secondary prevention. Pilot results. *Arch Intern Med* 2004; 164: 203-209.
76. Smith CA, Varkey AB, Evans AT, Reilly BM. Evaluating the performance of inpatient attending physicians. A new instrument for today's teaching hospitals. *J Gen Intern Med* 2004; 19: 766-771.
77. Kinley H, Czoski-Murray C, George S, et al. Extended scope of nursing practice: a multicentre randomised controlled trial of appropriately trained nurses and pre-registration house officers in pre-operative assessment in elective general surgery. *Health Technol Assess*. 2001; 5: 1-87.

78. National Patient Safety Education Framework Project Team. Final Draft of the National Patient Safety Education Framework. Framework Documents. University of Sydney, ACSQ, Centre for Innovation in Professional Health Education, Sydney, February 2005. Available at: www.patientsafety.org.au/pdfdocs/national_patient_safety_education_framework.pdf
79. NHS Modernisation Agency. Redesign and extend roles in line with efficient patient pathways to attract and retain an effective workforce. In: 10 high impact changes for service improvement and delivery. A guide for NHS leaders. NHS Modernisation Agency, London, September 2004, p79-85.
80. Australian Council for Quality and Safety in Health Care. Clinical Handover and Patient Safety. Literature Review Report. ACSQ, Sydney, March 2005. Available at: www.safetyandquality.org
81. Buist MD, Jarmolowski E, Burton PR, et al. Recognising clinical instability in hospital patients before cardiac arrest or unplanned admissions to intensive care. A pilot study in a tertiary care hospital. *Med J Aust* 1999; 171: 22-25.
82. Coiera EW, Jayasuriya RA, Hardy J, et al. Communication loads on clinical staff in the emergency department. *Med J Aust* 2002; 176: 415-418.
83. McWilliam CL, Sangster JF. Managing patient discharge to home: the challenges of achieving quality of care. *Int J Qual Health Care* 1994; 6: 147-161.
84. Davis D, Evans M, Jadad A, et al. The case for knowledge translation: shortening the journey from evidence to effect. *BMJ* 2003; 327: 33-5.
85. Magid DJ, Estabrooks PA, Brand DW, et al. Translating Patient Safety Research into Clinical Practice. *Advances in Patient Safety: From Research to Implementation*. Agency for Healthcare Research and Quality, National Institutes of Health, 2004.
86. Australian Council for Quality and Safety in Health Care. National Medication Safety Breakthrough Collaboration. Improvement Toolkits 1 & 2. ACSQ, Sydney, 2005. Available at: www.safetyandquality.org
87. Carey RG. How do you know that your care is improving? Part 1: Basic concepts in statistical thinking. *J Ambulatory Care Manage* 2002; 25: 80-87.
88. Carey RG. How do you know that your care is improving? Part 2: Using control charts to learn from your data. *J Ambulatory Care Manage* 2002; 25: 78-88.
89. Lim TO, Soraya A, Ding LM, Morad Z. Assessing doctors' competence: application of CUSUM technique in monitoring doctors' performance. *Int J Qual Health Care* 2002; 14: 251-258.
90. Jenks SF, Huff ED, Cuerdon T. Change in the quality of care delivered to Medicare beneficiaries, 1998-1999 to 2000-2001. *JAMA* 2003; 289: 305-312.
91. Jha AK, Li Z, Orav EJ, Epstein AM. Care in US hospitals – The Hospital Quality Alliance Program. *N Engl J Med* 2005; 353: 265-274.
92. Williams SC, Schmaltz SP, Morton DJ, et al. Quality of care in US hospitals as reflected by standardized measures, 2002-2004. *N Engl J Med* 2005; 353: 255-264.
93. Wolff AM, Bourke J, Campbell IA, Leembruggen DW. Detecting and reducing hospital adverse events: outcomes of the Wimmera clinical risk management program. *Med J Aust* 2001; 174: 621-5.
94. Kazel R. Minnesota insurer won't pay hospitals for "never events." *American Medical News*. November 8, 2004.
95. Koppel R, Metlay JP, Cohen A, et al. Role of computerized physician order entry systems in facilitating medication errors. *JAMA* 2005; 293: 1197-1203.
96. Ash JS, Berg M, Coiera E. Some unintended consequences of information technology in health care: the nature of patient care information system-related errors. *J Am Med Inform Assoc* 2004; 11: 104-112.
97. Plsek PE, Greenhalgh T. Complexity science. The challenge of complexity in health care. *BMJ* 2001; 323: 625-628.
98. Peat JK, Toelle BG, Nagy SA. Qualitative research: a path to better healthcare. *Med J Aust* 1998; 169: 327-329.
99. Malterud K. Qualitative research: standards, challenges, and guidelines. *Lancet* 2001; 358: 483-488.
100. Greenhalgh T, Robert G, Macfarlane F, et al. Diffusion of innovations in service organisations: Systematic review and recommendations. *Milbank Quart* 2004; 82: 581-629.
101. Berwick DM. Disseminating innovations in health care. *JAMA* 2003; 289: 1969-1975.

102. Carroll JS, Quijada MA. Redirecting traditional professional values to support safety: changing organisational culture in health care. *Qual Saf Health Care* 2004; 13 (suppl 2): ii16-ii21.
103. Amalberti R, Auroy Y, Berwick D, Barach P. Five system barriers to achieving ultrasafe health care. *Ann Intern Med* 2005; 142: 756-764.

Table 1. Quality and safety procedures of questionable effectiveness and scope

- Sentinel event reporting
- Root cause analyses (of sentinel events)
- Formal risk registers and risk management programs
- External hospital accreditation programs
- Quality/safety or clinical governance units
- Open disclosure policies
- Public reporting of quality and safety indicators

Table 2. Attributes of well functioning clinical teams

- Common purpose and vision related to delivering high-quality patient care.
- Open and clear communication with transparency of processes.
- Participative leadership and balanced participation by all members.
- Defined roles and tasks with adequate levels of autonomy, skill, time and support to enable productive work.
- Mutual respect, collaboration and co-operation.
- Agreed methods of negotiation and conflict resolution.
- Effective decision-making based on objective data and opinion.
- Valued diversity with respect for differing professional roles and aspirations.
- Cohesiveness and regular meetings of all team members.
- Recognition and reward for individual contributions and group successes.

Table 3. Strategies for empowering patients to act as their own care advocates

- Orientation programs which highlight patients' responsibilities to assisting the clinicians caring for them and detail common safety risk situations and the options open to patients (and carers') for voicing their concerns about any aspect of care involving themselves or other patients. Such programs should indicate named photographs and contact details of key members of the treating team.
- Educational resources on how patients can play a more effective role in managing their own illness, improving safe use of medicines, avoiding needless interventions, and optimising psychosocial support. Examples include brochures produced by ACSQ - *10 Tips for Safer Health Care* (available at: www.acsq.org.au) and US Agency for Healthcare Research and Quality – *Patient Fact Sheet. 20 Tips to Help Prevent Medical Errors* (available at: www.ahrq.gov/consumer/20tips.htm)
- Regular briefing of the patient on provisional diagnosis(es), likely clinical course and prognosis, intended management (investigations, treatments, consultations with others, and highlighting any invasive procedures), expected date of discharge, and timing of consultations with carers and family members.
- Promotion of active patient participation in care decisions by use of: evidence-based patient decision aids in situations involving narrow treatment benefit-risk ratios; advance health directives, advance care planning and elicitation of preferences for end-of-life care; and patient support groups (including those based on ethnicity or religion) who can assist patients to better understand the care being offered to them.
- Pre-discharge kits which contain disease/diagnosis information sheets, management plans and treatment goals, medication lists, self-management resources (including contact details of patient support groups), and follow-up schedules.
- For elective encounters, pre-admission and pre-clinic orientation kits which outline: the date, nature and reason for the encounter; any clinical material patients should bring with them (copies of past investigation results, specialist letters, discharge summaries from other hospitals, lists of current medications [including over the counter drugs], and details about allergies or past adverse events); names and contact details of their GPs and other treating specialists; and a listing of the problems (symptoms, disabilities) of greatest concern to them and a statement on what, for them, would constitute a successful outcome of the encounter.

Table 4. Evidence-based patient safety practices

Prevention of venous thromboembolism

- Identify patients at high risk of DVT/PTE and administer appropriate antithrombotic prophylaxis.

Prevention of perioperative complications

- Use beta-blockers peri-operatively in at-risk patients to reduce cardiovascular mortality
- Localise specific surgical procedures to high-volume centres

Prevention of nosocomial infection

- Implement strict protocols for decontaminating hands with hygienic hand rub or washing with disinfectant soap prior to and after direct contact with patient or objects immediately around patient.
- Use maximum sterile barriers while placing central intravenous catheters to prevent infections.
- Use real-time ultrasound guidance during central line insertion to prevent complications.
- Use antibiotic-impregnated central venous catheters to prevent catheter-related infections.
- Institute appropriate use of antibiotic prophylaxis in surgical patients to prevent postoperative infections.
- Institute continuous aspiration of subglottic secretions to prevent ventilator-associated pneumonia.
- Evaluate patients on admission and regularly thereafter for risk of aspiration.
- Vaccinate healthcare workers against influenza to protect them and patients from influenza.

Prevention of pressure ulcers

- Use risk stratification procedures to identify patients at risk of developing pressure ulcers.
- Use pressure relieving bedding materials to prevent pressure ulcers.
- Evaluate patients for risk of malnutrition and institute appropriate provision of nutrition, especially early enteral nutrition in critically ill and surgical patients.

Prevention of contrast media-induced renal failure

- Use validated protocols to evaluate patients at risk for contrast media-induced renal failure and implement clinically appropriate methods for reducing risk of renal injury based on patient's kidney function evaluation.

Patient advocacy

- Ask patients (or legal surrogate) to recall and restate what they have been told during the informed consent process.
- Inform patients undergoing high-risk, elective surgical procedures of the likely reduced risk of an adverse outcome at high-volume facilities with demonstrated superior outcomes.
- Document patient's preference for life sustaining care (including reference to advanced health directives) in a prominent place in medical charts.
- Implement patient self-management programs for warfarin use to achieve appropriate outpatient coagulation and prevent complications.

Preventing medication errors

- Actively involve clinical pharmacists in the medication use process: pharmacist liaison with prescribers on medication ordering and review, (eg. attendance of pharmacists on ward rounds); pharmacist-mediated medication reconciliation on admission and at discharge; pharmacist-mediated dispensing and monitoring of medications and education of patients in appropriate medication use.
- Use only standardised medication sheets, standardised abbreviations and dose designations, and standardised labelling, packaging and storing.
- Institute computerised prescriber order entry systems which include alerts on adverse drug reactions.
- Ensure medication storage and preparation areas are orderly, well lit, secure, and clean, medications which look similar are stored separately from each other, and high alert drugs (eg intravenous electrolytes, adrenergic agents, chemotherapy drugs, neuromuscular blockers, insulin, narcotics, etc) are clearly identified.
- Dispense medications in unit-dose or, when appropriate, unit-of-use form whenever possible.

Wrong site, wrong-patient surgery

- Implement standardised protocols to prevent occurrence of wrong-site, wrong-patient procedures.

Patient care information transfer

- Implement protocols for ensuring care information, especially changes in orders and new diagnostic information, is transmitted in timely and comprehensible fashion to all who need to know.
- Implement standardised systems for generating patient care summaries whenever patients move from one care team to another.

Staffing

- Specify an explicit protocol for ensuring an adequate level of nursing in each ward based on the usual casemix and experience and training of its nursing staff.
- Ensure all patients in critical care units (intensive care units, coronary care units, high dependency areas) are managed by physicians with appropriate training and certification.

Table 5. Attributes of effective clinical decision support, practice evaluation and quality improvement

Clinical decision support

(Guidelines, protocols, pathways, reminders, prompts)

- Evidence-based, credible, and locally agreed.
- Readily accessible and usable at the time and location of decision making.
- Automatically provided as part of clinician workflow.
- Delivers practical, feasible recommendations for key care processes graded according to strength of evidence, consensus of opinion, and applicability to patients.
- Openly endorsed and promoted by senior clinicians and opinion leaders.

Practice evaluation

(Audit and feedback, clinical indicators, process measures)

- Accurate and clinically credible clinical management and outcome data relevant to well-defined clinical conditions or patient groups.
- Timely feedback of relevant, readily assimilable information to all clinicians involved in care.
- Evaluation undertaken at level of clinical micro-systems (unit, department).
- Comparison of current practice standards with best practice and peer group standards.
- Commitment to enact remedial strategies in response to evaluation feedback.

Quality improvement

(Various strategies for improving clinical practice)

- Detailed analysis of current care processes (process mapping) which define reasons for suboptimal care identified during evaluation phase.
- All key clinician stakeholders involved in brainstorming, formulating and implementing remedial strategies in collaborative fashion.
- Incremental, plan-do-study-act approach to practice improvement is applied that starts with problem awareness and employs enabling and reinforcement strategies which enhance clinician self-efficacy (ie ability to put knowledge into practice).
- Practice improvement remains adaptive and responsive to changing circumstances, is embedded into clinical culture, is data-driven, and is self-sustaining.
- Practice improvement strategies are chosen which are supported by empirical evidence of effectiveness (eg reminders, prompts, computerised decision support, audit and feedback, etc), attract buy-in from all key stakeholders, and are actively supported and resourced by senior management.

Table 6. Sample of disease-specific clinical indicators relating to care of medical conditions

Condition	Indicator	Patients included	Patients excluded*	Data source
Acute coronary syndrome (ACS)	Aspirin prescribed at discharge	Patients ≥ 18 years of age with principal ICD-10-AM discharge diagnosis of acute coronary syndrome	Concurrent warfarin Any prior ADE	Random sample of up to 50 records per practice unit
	% β -blocker prescribed at discharge		Asthma Heart block Any prior ADE	
	% ACE inhibitor or ARB prescribed at discharge in patients with LV systolic dysfunction (EF<40%)		K+ >5.5 Cr >0.3 Bilateral (or unilateral if single kidney) renal artery stenosis Severe aortic stenosis (AVA <0.7cm ²) Any prior ADE	
	% Statin prescribed at discharge in patients with TC>4.0mmol/l		Hepatic failure Cr >0.3 Any prior ADE	
	Median time to thrombolysis	Patients with ST-segment elevation or left bundle branch block on ECG obtained closest to hospital arrival and who received thrombolytic therapy within 6 hours after arrival.		
Heart failure	% Cardiac catheterisation within 48 hours of presentation	Patients with ACS who are troponin-positive	Advanced age (>75 years), extreme frailty, advanced co-morbidities	Random sample of up to 50 records per practice unit
	% Referred cardiac rehabilitation or receiving in-hospital lifestyle counselling		Advanced age, extreme frailty, advanced co-morbidities	
	% In-hospital mortality			
	% Imaging heart function	Patients ≥ 18 years of age with principal ICD-10-AM discharge diagnosis of heart failure	Principal discharge diagnosis of heart failure and no C/I to stated intervention K+ >5.5 Cr >0.3 Bilateral (or unilateral if single kidney) renal	

			artery stenosis Severe aortic stenosis (AVA <0.7cm ²) Any prior ADE Asthma Heart block Any prior ADE Concurrent aspirin Uncontrolled HTN Active bleeding Active peptic ulcer Past cerebral or retroperitoneal bleed Any prior ADE	
	% β-blocker prescribed at discharge			
	% Warfarin prescribed at discharge in patients with atrial fibrillation			
	% Multidisciplinary review/education (eg specialist nurse, pharmacist)			
	% In-hospital mortality rate			
Stroke	% Cared for in formal stroke unit or service	Patients ≥18 years of age with principal ICD-10-AM discharge diagnosis of stroke		Random sample of up to 50 records per practice unit
	% Warfarin prescribed at discharge in patients with AF		Concurrent aspirin Uncontrolled HTN Active bleeding Active peptic ulcer Past cerebral or retroperitoneal bleed Any prior ADE Active bleeding Active peptic ulcer	
	% Antithrombotic treatment prescribed at discharge			
	% Referred to rehabilitation service			
Pneumonia	% Antibiotic consistent with ‘Antibiotic Guidelines’ recommendations	Patients ≥18 years of age with principal ICD-10-AM discharge diagnosis of pneumonia		Random sample of up to 50 records per practice unit
	% Antibiotic administered within 8h of arrival to hospital			
	% Use of oximetry to assess oxygenation within 24 hours of admission			
	% Blood cultures collected before initiation of antibiotic therapy			
	Median time from arrival to initial antibiotic administration			
	% Screened for influenza vaccination			
	% Screened for			

Exacerbation COPD	pneumococcal vaccination		
	% In-hospital mortality		
Diabetes- related admissions	% Measurement of airflow limitation (bedside spirometry, RFTs)	Patients ≥ 18 years of age with principal ICD-10- AM discharge diagnosis of exacerbation COPD	
	% Use of oximetry to assess oxygenation within 24 hours of admission		
	% Screened for influenza vaccination		
	% Screened for pneumococcal vaccination		
	% Referral to respiratory rehabilitation		Advanced age, frailty, advanced co- morbidities
	% HbA _{1c} measured	Patients ≥ 18 years of age with principal ICD-10- AM discharge diagnosis of diabetes or diabetic-related complication	
Patients at risk of thrombosis	% Lipids measured		
	% Diabetic patients with renal disease prescribed ACE inhibitor at discharge	Patients with estimated glomerular filtration rate <60ml/min	K+ >5.5 Cr >0.3 Bilateral (or unilateral if single kidney) renal artery stenosis Severe aortic stenosis (AVA <0.7cm ²) Any prior ADE
Patients at risk of thrombosis	% In-hospital mortality		
	% Prophylactic use of heparin or warfarin	Patients ≥ 18 years of age with principal ICD-10- AM discharge diagnosis of heart failure, OR orthopaedic operation, OR cancer OR gynaecology procedure	Active bleeding Active peptic ulcer Any prior ADE to heparin or warfarin

*For all indicators, the following patient types will be excluded unless otherwise stated: Patients transferred to another acute care hospital on day of arrival or transferred from another hospital including another emergency department (for indicators relating to admission); transferred to another hospital or to a palliative care hospice at discharge; left against medical advice; refused to accept the indicated therapy; suffered terminal illness with life expectancy <6 months.

Table 7. Generic Patient Safety Indicators

- Unexpected deaths
- Unplanned transfers from ward to ICU or high dependency unit
- Unplanned returns to operating theatre or catheter laboratory within 48 hours of procedure
- Unexpected and serious peri-procedural complications (eg. cardiorespiratory arrest, hypovolaemic shock)
- Serious medication or fluid errors
- Serious nosocomial complications: infection, DVT/PTE, advanced pressure ulcer, falls resulting in fracture or major soft-tissue injury
- Unplanned readmissions within 10 days of discharge
- Adverse findings from coroner's inquest or autopsy reports