

Kohn, LT, Corrigan, JM, Donaldson, MS, Eds; Committee on Quality of Health Care in America, Institute of Medicine. *To Err Is Human: Building a Safer Health System*. Washington, DC: National Academy Press; 1999. [Carayon P, Schoofs Hundt A, Karsh BT, et al. Work system design for patient safety: the SEIPS model. *Qual Saf Health Care* 2006; 15 Suppl 1:i50.](#) Reason J. *The Human Contribution: Unsafe Acts, Accidents and Heroic Recoveries*, Ashgate Publishing Company, Burlington 2008. [Alper SJ, Karsh BT. A systematic review of safety violations in industry. *Accid Anal Prev* 2009; 41:739.](#) [Stiegler MP, Neelankavil JP, Canales C, Dhillon A. Cognitive errors detected in anaesthesiology: a literature review and pilot study. *Br J Anaesth* 2012; 108:229.](#) [Neuhaus C, Huck M, Hofmann G, et al. Applying the human factors analysis and classification system to critical incident reports in anaesthesiology. *Acta Anaesthesiol Scand* 2018; 62:1403.](#) [Stiegler MP, Tung A. Cognitive processes in anesthesiology decision making. *Anesthesiology* 2014; 120:204.](#) [Croskerry P. The importance of cognitive errors in diagnosis and strategies to minimize them. *Acad Med* 2003; 78:775.](#) [Neily J, Mills PD, Eldridge N, et al. Incorrect surgical procedures within and outside of the operating room. *Arch Surg* 2009; 144:1028.](#) [Arriaga AF, Elbardissi AW, Regenbogen SE, et al. A policy-based intervention for the reduction of communication breakdowns in inpatient surgical care: results from a Harvard surgical safety collaborative. *Ann Surg* 2011; 253:849.](#) [Greenberg CC, Regenbogen SE, Studdert DM, et al. Patterns of communication breakdowns resulting in injury to surgical patients. *J Am Coll Surg* 2007; 204:533.](#) [Lingard L, Espin S, Whyte S, et al. Communication failures in the operating room: an observational classification of recurrent types and effects. *Qual Saf Health Care* 2004; 13:330.](#) [Wauben LS, Dekker-van Doorn CM, van Wijngaarden JD, et al. Discrepant perceptions of communication, teamwork and situation awareness among surgical team members. *Int J Qual Health Care* 2011; 23:159.](#) [Halverson AL, Casey JT, Andersson J, et al. Communication failure in the operating room. *Surgery* 2011; 149:305.](#) [Nagpal K, Vats A, Ahmed K, et al. A systematic quantitative assessment of risks associated with poor communication in surgical care. *Arch Surg* 2010; 145:582.](#) [Gillespie BM, Chaboyer W, Murray P. Enhancing communication in surgery through team training interventions: a systematic literature review. *AORN J* 2010; 92:642.](#) [Dayton E, Henriksen K. Communication failure: basic components, contributing factors, and the call for structure. *Jt Comm J Qual Patient Saf* 2007; 33:34.](#) [Hickson GB, Jenkins AD. Identifying and addressing communication failures as a means of reducing unnecessary malpractice claims. *N C Med J* 2007; 68:362.](#) [Edmondson AC. Speaking up in the operating room: How team leaders promote learning in interdisciplinary action teams. *J Manage Stud* 2003; 40:1419.](#) [Aggarwal R, Undre S, Moorthy K, et al. The simulated operating theatre: comprehensive training for surgical teams. *Qual Saf Health Care* 2004; 13 Suppl 1:i27.](#) [Bruppacher HR, Alam SK, LeBlanc VR, et al. Simulation-based training improves physicians' performance in patient care in high-stakes clinical setting of cardiac surgery. *Anesthesiology* 2010; 112:985.](#) [Blum RH, Raemer DB, Carroll JS, et al. A method for measuring the effectiveness of simulation-based team training for improving communication skills. *Anesth Analg* 2005; 100:1375.](#) [Armour Forse R, Bramble JD, McQuillan R. Team training can improve operating room performance. *Surgery* 2011; 150:771.](#) [Falcone RA Jr, Daugherty M, Schweer L, et al. Multidisciplinary pediatric trauma team training using high-fidelity trauma simulation. *J Pediatr Surg* 2008; 43:1065.](#) [Healey AN, Undre S, Vincent CA. Defining the technical skills of teamwork in surgery. *Qual Saf Health Care* 2006; 15:231.](#) [Manser T. Teamwork and patient safety in dynamic domains of healthcare: a review of the literature. *Acta Anaesthesiol Scand*](#)

[2009; 53:143.](#) [McCulloch P, Mishra A, Handa A, et al. The effects of aviation-style non-technical skills training on technical performance and outcome in the operating theatre. Qual Saf Health Care 2009; 18:109.](#) [Catchpole KR, Dale TJ, Hirst DG, et al. A multicenter trial of aviation-style training for surgical teams. J Patient Saf 2010; 6:180.](#) [Alonso, A, Baker, et al. Reducing medical error in the Military Health System: How can team training help? Human Resource Management Review 2006; 16:396.](#) [Hudson ME, Chelly JE, Lichter JR. Wrong-site nerve blocks: 10 yr experience in a large multihospital health-care system. Br J Anaesth 2015; 114:818.](#) [Barrington MJ, Uda Y, Pattullo SJ, Sites BD. Wrong-site regional anesthesia: review and recommendations for prevention? Curr Opin Anaesthesiol 2015; 28:670.](#) [Cohen SP, Hayek SM, Datta S, et al. Incidence and root cause analysis of wrong-site pain management procedures: a multicenter study. Anesthesiology 2010; 112:711.](#) [Weiser TG, Haynes AB. Ten years of the Surgical Safety Checklist. Br J Surg 2018; 105:927.](#) [Abbott TEF, Ahmad T, Phull MK, et al. The surgical safety checklist and patient outcomes after surgery: a prospective observational cohort study, systematic review and meta-analysis. Br J Anaesth 2018; 120:146.](#) [Bergs J, Hellings J, Cleemput I, et al. Systematic review and meta-analysis of the effect of the World Health Organization surgical safety checklist on postoperative complications. Br J Surg 2014; 101:150.](#) [Gillespie BM, Chaboyer W, Thalib L, et al. Effect of using a safety checklist on patient complications after surgery: a systematic review and meta-analysis. Anesthesiology 2014; 120:1380.](#) [van Klei WA, Hoff RG, van Aarnhem EE, et al. Effects of the introduction of the WHO "Surgical Safety Checklist" on in-hospital mortality: a cohort study. Ann Surg 2012; 255:44.](#) [Bosk CL, Dixon-Woods M, Goeschel CA, Pronovost PJ. Reality check for checklists. Lancet 2009; 374:444.](#) [Leape LL. The checklist conundrum. N Engl J Med 2014; 370:1063.](#) [Burian BK, Clebone A, Dismukes K, Ruskin KJ. More Than a Tick Box: Medical Checklist Development, Design, and Use. Anesth Analg 2018; 126:223.](#) [Ali M, Osborne A, Bethune R, Pullyblank A. Preoperative surgical briefings do not delay operating room start times and are popular with surgical team members. J Patient Saf 2011; 7:139.](#) [Allard J, Bleakley A, Hobbs A, Coombes L. Pre-surgery briefings and safety climate in the operating theatre. BMJ Qual Saf 2011; 20:711.](#) [Bethune R, Sasirekha G, Sahu A, et al. Use of briefings and debriefings as a tool in improving team work, efficiency, and communication in the operating theatre. Postgrad Med J 2011; 87:331.](#) [Lingard L, Regehr G, Cartmill C, et al. Evaluation of a preoperative team briefing: a new communication routine results in improved clinical practice. BMJ Qual Saf 2011; 20:475.](#) [Papaspayros SC, Javangula KC, Adluri RK, O'Regan DJ. Briefing and debriefing in the cardiac operating room. Analysis of impact on theatre team attitude and patient safety. Interact Cardiovasc Thorac Surg 2010; 10:43.](#) [Paull DE, Mazzia LM, Wood SD, et al. Briefing guide study: preoperative briefing and postoperative debriefing checklists in the Veterans Health Administration medical team training program. Am J Surg 2010; 200:620.](#) [Markin NW. Navigating to the Goal: The Importance of Shared Mental Models in Complex Environments. J Cardiothorac Vasc Anesth 2018; 32:2618.](#) [Cooper JB. Critical Role of the Surgeon-Anesthesiologist Relationship for Patient Safety. Anesthesiology 2018; 129:402.](#) [Neily J, Mills PD, Young-Xu Y, et al. Association between implementation of a medical team training program and surgical mortality. JAMA 2010; 304:1693.](#) [Altpeter T, Luckhardt K, Lewis JN, et al. Expanded surgical time out: a key to real-time data collection and quality improvement. J Am Coll Surg 2007; 204:527.](#) [Healey AN, Sevdalis N, Vincent CA. Measuring intra-operative interference from distraction and interruption observed in the operating theatre. Ergonomics 2006; 49:589.](#) [Wiegmann DA, ElBardissi AW, Dearani JA, et](#)

al. Disruptions in surgical flow and their relationship to surgical errors: an exploratory investigation. *Surgery* 2007; 142:658. Panahi P, Stroh M, Casper DS, et al. Operating room traffic is a major concern during total joint arthroplasty. *Clin Orthop Relat Res* 2012; 470:2690. Young RS, O'Regan DJ. Cardiac surgical theatre traffic: time for traffic calming measures? *Interact Cardiovasc Thorac Surg* 2010; 10:526. Schmid F, Goepfert MS, Kuhnt D, et al. The wolf is crying in the operating room: patient monitor and anesthesia workstation alarming patterns during cardiac surgery. *Anesth Analg* 2011; 112:78. Fritsch MH, Chacko CE, Patterson EB. Operating room sound level hazards for patients and physicians. *Otol Neurotol* 2010; 31:715. Cesarano FL, Piergeorge AR. The Spaghetti Syndrome. A new clinical entity. *Crit Care Med* 1979; 7:182. Carthey J, de Leval MR, Reason JT. The human factor in cardiac surgery: errors and near misses in a high technology medical domain. *Ann Thorac Surg* 2001; 72:300. de Leval MR. Human factors and outcomes of cardiac surgery. *Paediatr Anaesth* 1996; 6:349. ElBardissi AW, Wiegmann DA, Henrickson S, et al. Identifying methods to improve heart surgery: an operative approach and strategy for implementation on an organizational level. *Eur J Cardiothorac Surg* 2008; 34:1027. Catchpole KR, Giddings AE, Wilkinson M, et al. Improving patient safety by identifying latent failures in successful operations. *Surgery* 2007; 142:102. Solis-Trapala IL, Carthey J, Farewell VT, de Leval MR. Dynamic modelling in a study of surgical error management. *Stat Med* 2007; 26:5189. Lynch RJ, Englesbe MJ, Sturm L, et al. Measurement of foot traffic in the operating room: implications for infection control. *Am J Med Qual* 2009; 24:45. Moorthy K, Munz Y, Adams S, et al. A human factors analysis of technical and team skills among surgical trainees during procedural simulations in a simulated operating theatre. *Ann Surg* 2005; 242:631. Wadhwa RK, Parker SH, Burkhart HM, et al. Is the "sterile cockpit" concept applicable to cardiovascular surgery critical intervals or critical events? The impact of protocol-driven communication during cardiopulmonary bypass. *J Thorac Cardiovasc Surg* 2010; 139:312. Lingard L, Reznick R, Espin S, et al. Team communications in the operating room: talk patterns, sites of tension, and implications for novices. *Acad Med* 2002; 77:232. Salas E, Wilson KA, Murphy CE, et al. Communicating, coordinating, and cooperating when lives depend on it: tips for teamwork. *Jt Comm J Qual Patient Saf* 2008; 34:333. Santos R, Bakero L, Franco P, et al. Characterization of non-technical skills in paediatric cardiac surgery: communication patterns. *Eur J Cardiothorac Surg* 2012; 41:1005. Hazlehurst B, McMullen CK, Gorman PN. Distributed cognition in the heart room: how situation awareness arises from coordinated communications during cardiac surgery. *J Biomed Inform* 2007; 40:539. Berenholtz SM, Schumacher K, Hayanga AJ, et al. Implementing standardized operating room briefings and debriefings at a large regional medical center. *Jt Comm J Qual Patient Saf* 2009; 35:391. McGreevy JM, Otten TD. Briefing and debriefing in the operating room using fighter pilot crew resource management. *J Am Coll Surg* 2007; 205:169. Salas E, Klein C, King H, et al. Debriefing medical teams: 12 evidence-based best practices and tips. *Jt Comm J Qual Patient Saf* 2008; 34:518. Gawande AA, Thomas EJ, Zinner MJ, Brennan TA. The incidence and nature of surgical adverse events in Colorado and Utah in 1992. *Surgery* 1999; 126:66. Devine J, Chutkan N, Norvell DC, Dettori JR. Avoiding wrong site surgery: a systematic review. *Spine (Phila Pa 1976)* 2010; 35:S28. Deutsch ES, Yonash RA, Martin DE, et al. Wrong-site nerve blocks: A systematic literature review to guide principles for prevention. *J Clin Anesth* 2018; 46:101. The Joint Commission. Summary data of sentinel events reviewed by The Joint Commission. https://www.jointcommission.org/assets/1/18/Summary_2Q_2016.pdf (Accessed on

December 07, 2016). [Hempel S, Maggard-Gibbons M, Nguyen DK, et al. Wrong-Site Surgery, Retained Surgical Items, and Surgical Fires : A Systematic Review of Surgical Never Events. JAMA Surg 2015; 150:796.](#) [Hopping M, Merry AF, Pandit JJ. Exploring performance of, and attitudes to, Stop- and Mock-Before-You-Block in preventing wrong-side blocks. Anaesthesia 2018; 73:421.](#) [Chikkabbaiah V, French J, Townsley P, Bedforth N. Further reducing the risk of wrong site block. Anaesthesia 2015; 70:1453.](#) [Moppett IK, Shorrocks ST. Working out wrong-side blocks. Anaesthesia 2018; 73:407.](#) [Pandit JJ, Matthews J, Pandit M. "Mock before you block": an in-built action-check to prevent wrong-side anaesthetic nerve blocks. Anaesthesia 2017; 72:150.](#) [Loftus RW, Koff MD, Birnbach DJ. The dynamics and implications of bacterial transmission events arising from the anesthesia work area. Anesth Analg 2015; 120:853.](#) [Munoz-Price LS, Bowdle A, Johnston BL, et al. Infection prevention in the operating room anesthesia work area. Infect Control Hosp Epidemiol 2018; :1.](#) [Loftus RW, Brown JR, Patel HM, et al. Transmission dynamics of gram-negative bacterial pathogens in the anesthesia work area. Anesth Analg 2015; 120:819.](#) [Birnbach DJ, Rosen LF, Fitzpatrick M, et al. Double gloves: a randomized trial to evaluate a simple strategy to reduce contamination in the operating room. Anesth Analg 2015; 120:848.](#) [Tanner J, Padley W, Assadian O, et al. Do surgical care bundles reduce the risk of surgical site infections in patients undergoing colorectal surgery? A systematic review and cohort meta-analysis of 8,515 patients. Surgery 2015; 158:66.](#) [Mauermann WJ, Nemergut EC. The anesthesiologist's role in the prevention of surgical site infections. Anesthesiology 2006; 105:413.](#) [Seamon MJ, Wobb J, Gaughan JP, et al. The effects of intraoperative hypothermia on surgical site infection: an analysis of 524 trauma laparotomies. Ann Surg 2012; 255:789.](#) [Sessler DI. New surgical thermal management guidelines. Lancet 2009; 374:1049.](#) [Sessler DI. Perioperative thermoregulation and heat balance. Lancet 2016; 387:2655.](#) [John M, Ford J, Harper M. Peri-operative warming devices: performance and clinical application. Anaesthesia 2014; 69:623.](#) [Perl T, BrÄuer A, Quintel M. Prevention of perioperative hypothermia with forced-air warming systems and upper-body blankets. Surg Technol Int 2006; 15:19.](#) [Madrid E, UrrÄtia G, RoquÄ i Figuls M, et al. Active body surface warming systems for preventing complications caused by inadvertent perioperative hypothermia in adults. Cochrane Database Syst Rev 2016; 4:CD009016.](#) [Gandhi GY, Murad MH, Flynn DN, et al. Effect of perioperative insulin infusion on surgical morbidity and mortality: systematic review and meta-analysis of randomized trials.7. Mayo Clin Proc 2008; 83:418.](#) [Martinez EA, Thompson DA, Errett NA, et al. Review article: high stakes and high risk: a focused qualitative review of hazards during cardiac surgery. Anesth Analg 2011; 112:1061.](#) [Pennathur PR, Thompson D, Abernathy JH 3rd, et al. Technologies in the wild \(TiW\): human factors implications for patient safety in the cardiovascular operating room. Ergonomics 2013; 56:205.](#) [Martinez EA, Shore A, Colantuoni E, et al. Cardiac surgery errors: results from the UK National Reporting and Learning System. Int J Qual Health Care 2011; 23:151.](#) [Wiegmann D, Suther T, Neal J, et al. A human factors analysis of cardiopulmonary bypass machines. J Extra Corpor Technol 2009; 41:57.](#) [Leotsakos A, Zheng H, Croteau R, et al. Standardization in patient safety: the WHO High 5s project. Int J Qual Health Care 2014; 26:109.](#) [Lorraway PG, Savoldelli GL, Joo HS, et al. Management of simulated oxygen supply failure: is there a gap in the curriculum? Anesth Analg 2006; 102:865.](#) <https://www.asahq.org/For-Members/Clinical-Information/2008-ASA-Recommendations-for-PreAnesthesia-Checkout.aspx>. [Park S, Ahn JY, Ahn YE, et al. Two Cases of Cerebral Air Embolism That Occurred during Esophageal Ballooning and Endoscopic Retrograde](#)

[Cholangiopancreatography. Clin Endosc 2016; 49:191.](#) [Barker SJ, Doyle DJ. Electrical safety in the operating room: dry versus wet. Anesth Analg 2010; 110:1517.](#) The Joint Commission. National patient safety goals effective January 1, 2015. http://www.jointcommission.org/assets/1/6/2015_NPSG_HAP.pdf (Accessed on December 19, 2016). [Lee LA, Domino KB. The Closed Claims Project. Has it influenced anesthetic practice and outcome? Anesthesiol Clin North America 2002; 20:485.](#) [Dutton RP. Introducing the Anesthesia Incident Reporting System \(AIRS\). Newsl Am Soc Anesthesiol 2011; 75:30.](#) [Scott Beattie W, Culwick MD, Grocott HP. Canadian Anesthesia Incident Reporting System \(CAIRS\): The Canadian Anesthesiologists' Society's National Patient Safety Initiative. Can J Anaesth 2018; 65:749.](#) [Gibbs NM, Culwick M, Merry AF. A cross-sectional overview of the first 4,000 incidents reported to webAIRS, a de-identified web-based anaesthesia incident reporting system in Australia and New Zealand. Anaesth Intensive Care 2017; 45:28.](#) [Andrzejczak C, Karwowski W, Thompson W. The identification of factors contributing to self-reported anomalies in civil aviation. Int J Occup Saf Ergon 2014; 20:3.](#) [Wanderer JP, Gratch DM, Jacques PS, et al. Trends in the Prevalence of Intraoperative Adverse Events at Two Academic Hospitals After Implementation of a Mandatory Reporting System. Anesth Analg 2018; 126:134.](#) Consensus report, Institute of Medicine. Clinical practice guidelines we can trust. March 23, 2011. <http://www.iom.edu/Reports/2011/Clinical-Practice-Guidelines-We-Can-Trust.aspx> (Accessed on January 13, 2012). [Lugtenberg M, Zegers-van Schaick JM, Westert GP, Burgers JS. Why don't physicians adhere to guideline recommendations in practice? An analysis of barriers among Dutch general practitioners. Implement Sci 2009; 4:54.](#) Institute of Medicine. Standards for Developing Trustworthy Clinical Practice Guidelines. <http://iom.edu/Activities/Quality/ClinicPracGuide.aspx> (Accessed on July 05, 2011). [Carney BT, West P, Neily J, et al. Changing perceptions of safety climate in the operating room with the Veterans Health Administration medical team training program. Am J Med Qual 2011; 26:181.](#) [Dunn EJ, Mills PD, Neily J, et al. Medical team training: applying crew resource management in the Veterans Health Administration. Jt Comm J Qual Patient Saf 2007; 33:317.](#) [Higham H, Baxendale B. To err is human: use of simulation to enhance training and patient safety in anaesthesia. Br J Anaesth 2017; 119:i106.](#) [Weller JM, Merry AF, Robinson BJ, et al. The impact of trained assistance on error rates in anaesthesia: a simulation-based randomised controlled trial. Anaesthesia 2009; 64:126.](#) [Ziewacz JE, Arriaga AF, Bader AM, et al. Crisis checklists for the operating room: development and pilot testing. J Am Coll Surg 2011; 213:212.](#) [Stevens LM, Cooper JB, Raemer DB, et al. Educational program in crisis management for cardiac surgery teams including high realism simulation. J Thorac Cardiovasc Surg 2012; 144:17.](#) [Arriaga AF, Bader AM, Wong JM, et al. Simulation-based trial of surgical-crisis checklists. N Engl J Med 2013; 368:246.](#) [Manser T, Harrison TK, Gaba DM, Howard SK. Coordination patterns related to high clinical performance in a simulated anesthetic crisis. Anesth Analg 2009; 108:1606.](#) [Moorthy K, Munz Y, Forrest D, et al. Surgical crisis management skills training and assessment: a simulation\[corrected\]-based approach to enhancing operating room performance. Ann Surg 2006; 244:139.](#) [Powers KA, Rehrig ST, Irias N, et al. Simulated laparoscopic operating room crisis: An approach to enhance the surgical team performance. Surg Endosc 2008; 22:885.](#) [Weinger MB, Banerjee A, Burden AR, et al. Simulation-based Assessment of the Management of Critical Events by Board-certified Anesthesiologists. Anesthesiology 2017; 127:475.](#) [Wetzel CM, Black SA, Hanna GB, et al. The effects of stress and coping on surgical performance during simulations. Ann Surg 2010; 251:171.](#) [Arora S, Sevdalis](#)

[N, Nestel D, et al. Managing intraoperative stress: what do surgeons want from a crisis training program? Am J Surg 2009; 197:537.](#) [Aggarwal R, Mishra A, Crochet P, et al. Effect of caffeine and taurine on simulated laparoscopy performed following sleep deprivation. Br J Surg 2011; 98:1666.](#) [Darling E, Searles B. Oxygenator change-out times: the value of a written protocol and simulation exercises. Perfusion 2010; 25:141.](#) [Depriest JL, Patil R, Patil T. The Code Blue 2-min drill. Resuscitation 2010; 81:140.](#) [Kurup V, Matei V, Ray J. Role of in-situ simulation for training in healthcare: opportunities and challenges. Curr Opin Anaesthesiol 2017; 30:755.](#) [Frankel AS, Leonard MW, Denham CR. Fair and just culture, team behavior, and leadership engagement: The tools to achieve high reliability. Health Serv Res 2006; 41:1690.](#) [Pronovost PJ, Holzmueller CG, Martinez E, et al. A practical tool to learn from defects in patient care. Jt Comm J Qual Patient Saf 2006; 32:102.](#) [Timmel J, Kent PS, Holzmueller CG, et al. Impact of the Comprehensive Unit-based Safety Program \(CUSP\) on safety culture in a surgical inpatient unit. Jt Comm J Qual Patient Saf 2010; 36:252.](#) [Dixon-Woods M, Bosk CL, Aveling EL, et al. Explaining Michigan: developing an ex post theory of a quality improvement program. Milbank Q 2011; 89:167.](#) [Pronovost PJ, Berenholtz SM, Goeschel C, et al. Improving patient safety in intensive care units in Michigan. J Crit Care 2008; 23:207.](#) [Pronovost P, Weast B, Rosenstein B. Implementing and validating a Comprehensive Unit-based Safety Program. J Patient Safety 2005; 1:33.](#) [Wax DB, McCormick PJ, Joseph TT, Levin MA. An Automated Critical Event Screening and Notification System to Facilitate Preanesthesia Record Review. Anesth Analg 2018; 126:606](#)