Study	Country	Primary aim	Secondary aim	Participants; Organisation	Method	Performance measures	Key findings
Agarwal et al. (2016)[1]	Australia	To investigate the elements of best management practices in an Australian state-run healthcare system.	To determine whether there is a positive association between management practices score (MPS) and the level of clinical education of a managers in public hospitals.	42 acute care public hospitals	Quantitative analysis of survey data	Management Practices Score (MPS), consisting of 21 hospital management practices across multiple dimensions	The coefficient on the level of skills and education within hospitals was positive and significant (p=0.06). Therefore, the authors supported the hypothesis that hospitals with a higher proportion of clinically qualified and skilled managers perform significantly better in management practices.
Bai and Krishnan (2015)[2]	USA	To examine whether hospitals without physician participation on their boards of directors deliver lower quality of care.	N/A	142 non-profit hospitals	Quantitative analysis of US Hospital Quality Alliance and California Office of Statewide Health Planning and Development data	Process of care quality encompassing four categories (heart attack, heart failure, pneumonia, and surgery infection prevention)	The absence of physicians on the board was associated with a decrease of 3-5% points in three of four measures of care quality (heart failure, pneumonia, and surgery infection prevention).
Colla et al. (2014)[3]	USA	To explore the extent to which physicians are engaged in the leadership of emerging Accountable Care Organisations (ACOs), including whether ACOs identify themselves as physician-led, have boards that are run by physicians, and are physician owned.	To examine how physician-led ACOs compare to other ACOs in terms of structure, size, and services provided. To examine the implications of leadership types for ACO capabilities and the future of the ACO model.	173 accountable care organisations	Quantitative analysis of survey data	Care management and technology capabilities	Physician-led organisations had fewer patients per contract than other ACOs. Physician-led ACOs had similar care management and health IT capabilities to those of other ACOs, despite having different leadership structures and offering fewer services. Physician-led ACOs were leading in outpatient care management and health IT. However, they were falling behind in their ability to manage care across settings. Physician-led organisations may face greater challenges than other ACOs in managing transitions between settings of care and managing hospital-based care, as they were less likely to include hospitals or post-acute care facilities. Physician-led ACOs were less likely than other ACOs to offer services that are traditionally separate from medical care, such as pharmacy.
De Andrade (2014)[4]	USA	To investigate whether having board members with medical expertise affects the levels of uncompensated care provided by hospitals.	To verify how the relationship between board member medical expertise and uncompensated care is affected by the hospital's ownership type.	281 hospitals	Quantitative analysis of data from the California Office of Statewide Health Planning and Development for 1997-2010	Uncompensated care provision	Physician board membership was not related to uncompensated care provision, except when hospital's ownership status was taken into account. When hospital ownership type was considered, the percentage of physicians on the board did affect the provision of uncompensated care. Relative to non-profit and public hospitals, for-profit hospitals provided more uncompensated care the higher the percentage of physicians on the board. For an average for-profit board size, which has 10 members, substituting one member by a physician increased the amount of uncompensated care provided by 19%.
Goodall (2011)[5]	USA	To determine if there is an association between physician leaders and hospital performance.	N/A	300 healthcare executives; 100 hospitals	Quantitative analysis of survey data	Index of Hospital Quality	Positive association was found between physician CEO and hospital performance for all three hospital specialties (p<0.001).
Jiang et al. (2009)[6]	USA	To examine whether differences exist in hospitals' quality performance in relation to adoption of particular practices in board oversight of quality.	N/A	562 healthcare executives; 490 hospitals	Quantitative analysis of survey data	Process of care performance and risk-adjusted mortality relating to three conditions (heart attack, heart failure, and pneumonia)	Hospitals that had representatives with clinical expertise serving on the quality board had significantly better performance in process of care and/or mortality. Sixty percent of participating hospitals had a Chief Medical Officer or Vice President of Medical Affairs on the committee; this resulted in significantly (p<0.05) higher process of care scores (85.3% vs 81%) and lower risk adjusted mortality rates (5.6% vs 7.3%) than hospitals that did not have a Chief Medical Officer or Vice President of Medical Affairs as committee member. Eighty-three percent of participating hospitals had medical staff on the committee; this resulted in significantly (p<0.05) higher process of care scores (84.2% vs 80.9%) but no difference in risk adjusted mortality rates. Sixty-three percent of participating hospitals had a clinical board member on the committee; this resulted in no difference in process of care scores but significantly (p<0.05) lower risk adjusted mortality rates (5.7% vs. 7.2%).

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Konu and Viitanen (2008)[7]	Finland	To investigate the incidence of shared leadership among middle-level managers in social service and health care.	N/A	433 middle-level managers in social and healthcare	Quantitative analysis of survey data	Shared leadership practices	Shared leadership practices were more common among managers without a medical background.
Kuntz et al. (2013)[8]	Germany	To assess the influence of the extent to which physicians are involved in hospital leadership on staff- to-patient ratios.	To investigate the significance of employing a full-time Medical Director (MD) and, for hospitals with a part-time MD, the impact that the amount of time spent in this role has on physician-to- patient-ratio and nurse-to-patient ratio.	604 hospitals, with a subsample of 442 hospitals	Quantitative analysis of survey data	Staff-to-patient ratios	There were significant differences in staff-to-patient ratios between the low level part-time category and the high-level part-time category (physicians: $p < 0.001$, nurses: $p < 0.001$), as well as for the difference between the high level part-time category and the full-time involvement (physicians: $p < 0.001$, nurses: $p < 0.01$). Regression analysis demonstrated a positive association between full-time MDs and staff-to-patient ratios for both physicians and nurses. With the exception of part-time involvement and nurse- to-patient ratio, this association remained strong after controlling for a range of confounding variables (case-mix, size, ownership).
Kuntz et al. (2016)[9]	Germany	To explain differences in the financial performance of hospitals with regard to ownership by studying the size and composition of supervisory boards.	To examine three hypotheses: H1: Hospital financial performance depends on ownership. H2: Hospital supervisory board size and composition depend on ownership. H3: The influence of hospital ownership on financial performance is mediated by the size and composition of the supervisory board.	175 hospital companies operating 246 hospitals	Quantitative analysis of hospital financial performance data (from the AMADEUS database) and information on hospital and board characteristics (from business and quality reports, hospital websites and health insurers)	Financial performance, based on four measures (return on assets (ROA), earnings before interest and tax (EBIT) margin, total profit margin, and net income)	Financial performance, and board size and composition depended on ownership ($p < .01$ for ROA and $p < .001$ for the other four performance measures). An increase in board size and greater political participation were negatively associated with all five tested measures of financial performance. An increase in physician participation was positively associated with one dimension of financial performance, ROA (0.05, $p = .061$). An increase in nurse and economist participation was negatively associated with financial performance; no associations were found for clerical participation.
O'Keefe (2015)[10]	Ireland	To examine the hypothesis that there would be an increasing gradient of risk aversion from physicians through clinicians in management and managers to public representatives regarding an acceptable level of risk when considering discharging a patient from the emergency department.	N/A	180 consultant physicians, 47 clinicians involved in management, 143 senior healthcare managers and 418 public representatives; acute care hospitals	Quantitative analysis of survey data	Level of acceptable risk	Post hoc pairwise comparisons (Bonferroni corrected significance level of $P < 0.008$) showed no significant differences between physicians and clinician managers or between managers and public representatives in acceptability of risk; however, all pairwise comparisons between doctors and managers or public representatives were significant. There were significant differences in the acceptability of risk and a reducing tolerance of a preventable death following discharge from the emergency department between doctors, healthcare managers and public representatives; clinicians with a managerial role did not differ in risk tolerance from their purely clinical counterparts.
Parayitam et al. (2007)[11]	USA	To analyse the outcomes of decisions when physician executives are involved in strategic decision-making processes in healthcare organisations.	To examine three hypotheses: H1: The greater the presence of physician executives in shared decision-making teams (SDMTs) the greater will be the decision quality. H2: The greater the presence of physician executives in SDMTs the greater will be the understanding of the rationale of decisions. H3: The greater the presence of physician executives in SDMTs the greater will be the commitment to decisions.	109 hospitals, 114 CEOs, 254 strategic decision makers (executive officers, director of human resources, chief technical offices, chiefs of staff, personnel involved in facilities, maintenance)	Quantitative analysis of survey data	Decision outcomes (decision quality, understanding, and commitment)	The ratio of physicians was positively correlated with decision understanding, commitment and quality.
Prybil (2006)[12]	USA	To determine whether board structures, processes, and practices in high-performing hospitals differ from similar hospitals where performance is midrange and, if so, in what ways.	N/A	7 matched hospital pairs	Mixed method analysis of hospital documents and interviews with hospital CEOs and board members	High performance hospitals (from the Solucient Center for Healthcare Improvement's '100 Top Hospitals' listings from 1999-2003) matched with midrange performance hospitals.	Medical staff members formed a larger component of the boards of high performing hospitals (30.3%) as compared with the boards of midrange hospitals (20.8%). In five of the seven high performing hospitals, medical staff members comprised 25% or more of the boards' voting members. This was true in only one mid-range hospital.
Saleh et al. (2013)[13]	Lebanon	To explore the use of strategic planning processes in Lebanese hospitals and to investigate its association with financial performance.	To examine six hypotheses: H1: The existence of a strategic plan is favorably associated with hospital performance. H2: A more developed strategic plan is	79 hospitals (56.4%)	Quantitative analysis of survey data and hospital performance data from the Lebanese Ministry of Public Health	Occupancy rate (OR) and revenue-per-bed (RPB)	There was no association between having a strategic plan and either of the two performance measures. The extent of strategic plan implementation was adversely related to OR, that is, the more a hospital implemented its

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			positively associated with hospital performance. H3: Implementation of the strategic plan is positively associated with hospital performance. H4: CEO control of the strategic planning process is positively associated with hospital performance. H5: Strategic planning process is positively associated with hospital performance. H6: The level of physician involvement in the strategic planning process is positively associated with hospital performance.				strategic plan, the lower its OR ($p< 0.05$). A similar trend was observed with level of governing board involvement in strategic plan development. There was no association between the level of physician involvement in the strategic planning process and hospital outcomes; generally, physician involvement was low (4.1 out of a possible score of 7).
Simonen et al. (2009)[14]	Finland	To determine how social and health care managers evaluate the impact of knowledge sources as affecting their decision-making.	To determine whether evaluations differ depending on the manager's professional background, activity sector, gender, management experience, or age.	404 middle-level social and healthcare managers in a hospital	Quantitative analysis of survey data	Impact of various knowledge sources on decision-making	Doctor managers more strongly perceived that their decision-making was influenced by their own professional experience, journals and scientific research within their own professional field, and nationwide interaction within their own profession. Differences were found between doctor managers and nurse managers with respect to organization documents and publications, which clearly seemed to carry more weight in nurse managers' decision-making. Regarding other knowledge sources, i.e., knowledge obtained from one's own subordinates, examples from other corresponding units, patient demands and needs, media statements, municipality/city resident opinions, contracts between municipalities and municipal federations, or one's own professional education, no differences were found between managers of different professional backgrounds.
Spehar et al. (2015)[15]	Norway	To investigate how clinicians' professional background influences their transition into the managerial role and identity as clinical managers.	N/A	Four public hospitals, two health trusts; 30 clinician managers (doctors, nurses, allied health) interviewed, 20 of these were observed in management and staff meetings during the day	Qualitative analysis of interview and observation data	Managerial role transition and clinical manager identity	Doctors experienced difficulties in reconciling the clinical and management role and used clinical work to gain legitimacy and respect from medical colleagues. Nurses experienced a faster and more positive transition into the manager role, and were more fully engaged in the managerial aspects of the role.
Veronesi et al. (2013)[16]	UK	To determine how much difference managers will make to performance outcomes.	To determine whether the positive outcomes of clinical leadership derive from the participation of all clinicians in boards (including nurses and allied health. professions) or only doctors.	102 NHS hospital trusts in England (60% total)	Quantitative analysis of data from hospital trust annual reports, publicly available performance measures from the Healthcare Commission, and data gathered by Dr Foster over a three-year period (2006-2009)	Quality of the service provided (compliance with core standards concentrating on four main areas: health and well-being, clinical effectiveness, safety and patient focus, and ease and equity of access)	Significant and positive association was found between a higher percentage of clinicians on boards and the quality ratings of service providers (confirmed in relation to lower morbidity rates and tests to exclude the possibility of reverse causality). No equivalent association was found for clinical professions such as nurses and other allied health professions.