

Summary of findings

Context for successful quality improvement

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This document summarises the findings from the studies and reviews included in the best evidence review, *Context for successful quality improvement* by Glenn Robert and Naomi Fulop.

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Tables of findings from included primary studies

Table 1: Summary of findings from macro level structural factors

	Study design	Organisations investigated	Contextual factor measure	Main findings
Adang; Borm, 2007 ¹	Longitudinal quantitative study	15 European health care systems, 15 European countries	Productivity of health care system (inputs: % of GDP allocated to health care; physicians per population; level of tobacco use, outputs: life expectancy; infant mortality)	No significant correlation with changes in <i>Patient satisfaction measures</i> over time.
Alexander; Weiner; Shortell, et al., 2007 ²	Cross-sectional quantitative study	1784 Community hospitals, US	Market concentration: Herfindal Index	Significantly increases association of: Number of guidelines developed, Use of quality of care data, Use of statistical/process tools and Quality improvement emphasis with better <i>In-hospital mortality from acute myocardial infarction</i> . Number of guidelines developed, and Use of quality of care data, with <i>In-hospital mortality from congestive heart failure</i> . Number of guidelines developed, and Use of quality of care data, with <i>In-hospital mortality from stroke</i> . Number of guidelines developed, and Use of quality of care data, with <i>In-hospital mortality from pneumonia</i> . Number of guidelines developed with <i>Bilateral catheterisation</i> . Number of guidelines developed, and Use of quality of care data, with <i>Laparoscopic cholecystectomy</i> .

Table 1: Summary of findings from macro level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
				<p>No significant moderation of association of:</p> <ul style="list-style-type: none"> Any quality improvement implementation indicator with <i>In-hospital mortality from CABG</i>. Use of statistical/process tools or Quality improvement emphasis with <i>In-hospital mortality from congestive heart failure</i>. Use of statistical/process tools or Quality improvement emphasis with <i>In-hospital mortality from stroke</i>. Use of quality of care data, Use of statistical/process tools or Quality improvement emphasis with <i>Bilateral catheterisation</i>. Use of statistical/process tools or Quality improvement emphasis with <i>In-hospital mortality from pneumonia</i>. Use of statistical/process tools or Quality improvement emphasis with <i>Laparoscopic cholecystectomy</i>.

Table 1: Summary of findings from macro level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
			<p>Managed care penetration: % of population in private risk, Medicare risk or Medicaid risk insurance</p>	<p>Significantly increases association of: Use of statistical/process tools with better <i>In-hospital mortality from CABG</i>. Number of guidelines developed and Use of statistical/process tools with better <i>In-hospital mortality from acute myocardial infarction</i>. Number of guidelines developed and Use of statistical/process tools with better <i>In-hospital mortality from congestive heart failure</i>. Number of guidelines developed, and Use of statistical/process tools with better <i>In-hospital mortality from stroke</i>. Number of guidelines developed, and Use of statistical/process tools with better <i>In-hospital mortality from pneumonia</i>. Number of guidelines developed with better <i>Bilateral catheterisation</i>. Number of guidelines developed, and Use of statistical/process tools with better <i>Laparoscopic cholecystectomy</i>.</p>

Table 1: Summary of findings from macro level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
				<p>No significant moderation of association of:</p> <ul style="list-style-type: none"> Number of guidelines developed Use of quality of care data, or Quality improvement emphasis with <i>In-hospital mortality from CABG</i>. Use of quality of care data or Quality improvement emphasis with <i>In-hospital mortality from acute myocardial infarction</i>. Use of quality of care data or Quality improvement emphasis with <i>In-hospital mortality from congestive heart failure</i>. Use of quality of care data or Quality improvement emphasis with <i>In-hospital mortality from stroke</i>. Use of quality of care data or Quality improvement emphasis with <i>In-hospital mortality from pneumonia</i>. Use of quality of care data, Use of statistical/process tools or Quality improvement emphasis with <i>Bilateral catheterisation</i>. Use of quality of care data or Quality improvement emphasis with <i>Laparoscopic cholecystectomy</i>.
Amundson; Solberg; Reed, et al., 2003 ³	Longitudinal quantitative study	20 Medical care groups, US	Outcomes Recognition Program	Significant improvement in <i>Rate of recording smoking status</i> , and in <i>Rate of recording advice to quit smoking</i> .

Table 1: Summary of findings from macro level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Baker; Einstadter; Thomas, et al., 2002 ⁴	Longitudinal quantitative study	30 Acute care hospitals, US	Publication of "consumer reports" on patient outcomes	Significant fall in <i>Risk adjusted in-hospital mortality rate</i> from <i>Acute myocardial infarction</i> , from <i>Gastro-intestinal haemorrhage</i> and from <i>Pneumonia</i> but no significant change in <i>30-day mortality rate</i> . Significant fall in <i>Risk adjusted in-hospital and 30-day mortality rate</i> from <i>Congestive heart failure</i> , <i>Chronic obstructive pulmonary disease</i> . No significant change in <i>Risk adjusted in-hospital mortality rate</i> from <i>Stroke</i> and significant rise in <i>30-day mortality rate</i> . No significant change in <i>Risk adjusted mortality rate</i> from <i>Gastro-intestinal haemorrhage</i> , from <i>Lower bowel resection</i> , or from <i>Coronary artery bypass graft</i> .
Baker; Einstadter; Thomas, et al., 2003 ⁵	Longitudinal quantitative study	30 Acute care hospitals, US	Identification of mortality outlier status in consumer reports	No significant change in <i>Risk adjusted 30-day mortality rate from 6 conditions</i> for any outlier status (Best, Above average, Average, Below average or Worst).
Baldwin; MacLehose; Hart, et al., 2004 ⁶	Cross-sectional quantitative study	4085 Medicare hospitals, US	Rurality (Urban, Large rural, Small rural, Remote small rural)	Significantly lower chance of receiving all 6 <i>Appropriate interventions during hospitalisation</i> and 2 of 4 <i>Appropriate interventions on discharge</i> with greater rurality. No significant association with another 2 <i>Appropriate interventions on discharge</i> . Significantly worse <i>Mortality within 30 days of admission for acute myocardial infarction in patients aged 65 and over with greater rurality</i> .
Berlowitz; Anderson; Brandeis, et al., 1999 ⁷	Cross-sectional quantitative study	128 VA Nursing homes, US	Urban vs Rural	No significant association with <i>Pressure sores</i> .

Table 1: Summary of findings from macro level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Born; Simon, 2001 ⁸	Cross-sectional quantitative study	140 to 240 Health Maintenance Organisations, US	For profit and not-for-profit status, controlling for market factors	Significantly more eligible patients in for-profit plans receiving <i>Cervical cancer screening</i> , and <i>Follow-up after hospitalisation for mental illness</i> . Not significantly associated with <i>Childhood immunisations Combination 1 or 3</i> , <i>Breast cancer screening</i> , <i>Prenatal care in the first trimester</i> , <i>Checkup after delivery</i> , <i>Beta-blockers following heart attack</i> , or <i>Follow-up after hospitalisation for mental illness</i> .
Bradley; Herrin; Curry, et al., 2010 ⁹	Cross-sectional quantitative study	2908 Short-term acute and critical access non-federal hospitals, US	Urban/rural location	Significantly associated with lower <i>30-day Mortality</i> .
			Geographic region	Significant variation in <i>30-day Mortality</i> .
Braithwaite; Greenfield; Westbrook, et al., 2010 ¹⁰	Cross-sectional quantitative study	19 Health care organisations, Australia	Accreditation performance	No significant association with <i>Clinical indicator performance score from indicators nominated by organisation</i> (better or worse than national average).
Campbell; Reeves; Kontopantelis, et al., 2007 ¹¹	Longitudinal quantitative study	42 Primary care practices, UK (England)	Introduction of pay for performance	Significant improvement in <i>Measures of diabetes care</i> , and <i>Measures of asthma care</i> No significant change in <i>Measures of coronary heart disease care</i> .
Castle; Wagner; Ferguson, et al., 2011 ¹²	Cross-sectional quantitative study	14934 Nursing homes, US	State Medicaid reimbursement rate/resident	Significantly associated with lower chance of <i>Deficiency citation for environmental safety</i> , <i>Deficiency citation for care safety</i> and <i>Deficiency citation for life safety</i> . As Medicaid resident occupancy rises, becomes significantly associated with higher chance of <i>Deficiency citation for environmental safety</i> , <i>Deficiency citation for care safety</i> and <i>Deficiency citation for life safety</i> .

Table 1: Summary of findings from macro level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
			Quality of care deficiency citations	Significantly associated with higher chance of <i>Deficiency citation for environmental safety, Deficiency citation for care safety, and Deficiency citation for life safety.</i>
			Worst grade of quality of care deficiency citations	Significantly associated with lower chance of <i>Deficiency citation for care safety.</i> No significant association with <i>Deficiency citation for environmental safety, or Deficiency citation for life safety.</i>
			State Medicaid reimbursement rate/resident	Significantly associated with lower chance of <i>Deficiency citation for environmental safety, Deficiency citation for care safety and Deficiency citation for life safety.</i> As Medicaid resident occupancy rises, becomes significantly associated with higher chance of <i>Deficiency citation for environmental safety, Deficiency citation for care safety and Deficiency citation for life safety.</i>
Chang; Hsiao; Huang, et al., 2011 ¹³	Longitudinal quantitative study	31 Regional hospitals, Taiwan	Taiwan Quality Indicator Project (TQIP)	Significant improvement in <i>48 hour inpatient mortality in ambulatory patients</i> 1998 (pre-TQIP) to 2002 (post-TQIP) and 1998 to 2004 (post-TQIP, and including period of SARS outbreak).
Clough; Engler; Snow, et al., 2002 ¹⁴	Non-RCT controlled study	Acute hospital care in Cleveland and the rest of Ohio, US	Publication of "consumer reports" on patient outcomes	No significant difference in trend in <i>Risk adjusted in-hospital mortality rate from 6 conditions</i> between Cleveland (publication of performance) and the rest of Ohio (no publication of performance).
Doran; Fullwood; Gravelle, et al.,	Cross-sectional quantitative study	8105 Primary practices, UK	Capitation % of revenue	Significant negative association with <i>Satisfaction with physician care score.</i>

Table 1: Summary of findings from macro level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
2006 ¹⁵		(England)	Bonus % of provider incomes	Significant negative association with <i>Satisfaction with physician care score</i> .
Dranove; Kessler; McClellan, et al., 2003 ¹⁶	Longitudinal quantitative study	Hospital care in New York State and Pennsylvania, US	Mandatory reporting of coronary artery bypass graft outcome	No significant association with <i>Readmission for acute myocardial infarction within a year in Medicare patients 65 and older admitted for acute myocardial infarction</i> , but significantly associated in <i>more severely ill patients</i> (admitted to hospital in year before acute myocardial infarction). Significantly associated with <i>Readmission for heart failure within a year in Medicare patients 65 and older admitted for acute myocardial infarction</i> , and significantly worse in <i>more severely ill patients</i> . No significant association with <i>Mortality within a year in Medicare patients 65 and older admitted for acute myocardial infarction</i> , but significantly associated in <i>more severely ill patients</i> .
Dückers; Makai; Vos, et al., 2009 ¹⁷	Non-RCT controlled study	112 Hospitals, Netherlands	National policy emphasis on health quality management	Change over time that policy emphasis increased associated with increase in <i>Measure of quality management system development</i> .
			Multi-level quality management intervention	No significant difference in <i>Measure of quality management system development</i> or change in <i>Measure</i> over time between participating and non-participating hospitals.
Eggers; Frankenfield; Greer, et al., 2002 ¹⁸	Longitudinal quantitative study	Medicare Managed Care and Fee for Service, US	Medicare Managed Care compared to Medicare Fee for Service	No significant association with <i>Time to mortality from start of renal replacement therapy</i> .

Table 1: Summary of findings from macro level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Escarce; Kapur; Solomon, et al., 2003 ¹⁹	Cross-sectional quantitative study	144 Eye care practices, US	Bonus % of provider incomes	Significant negative association with <i>Satisfaction with physician care score</i> .
			Capitation % of revenue	Significant negative association with <i>Satisfaction with physician care score</i> .
Ettner; Thompson; Stevens, et al., 2006 ²⁰	Cross-sectional quantitative study	6194 Diabetes patients, US	Strength of performance incentive (outpatient utilisation/cost)	Significantly better performance on <i>Assessment of lipids</i> with stronger Incentive on outpatient utilisation or costs. No significant association with <i>Assessment of glycaemic control (HbA1c)</i> , <i>Assessment of proteinuria</i> , <i>Dilated eye exam</i> , <i>Foot exam during most or all visits</i> or <i>Advice to take aspirin</i> .
			Strength of performance incentive (patient satisfaction)	No significant association with any element of <i>Diabetes care</i> .
Garpenby, 1997 ²¹	Qualitative interview study cross-sectional	3 County councils, Sweden	Introduction of patient choice and purchaser-provider split	In one county council, competition stimulated stronger medical-led <i>Quality assurance</i> within providers in response to patient choice, while in another there was a top-down <i>Quality structure</i> receiving information on patient satisfaction and clinical measures, though medical engagement was limited. In a third, medical-led <i>Quality assurance</i> was seen as separate from organisational objectives.
Gillies; Chenok; Shortell, et al., 2006 ²²	Cross-sectional quantitative study	272 Health plans, US	HMO penetration in area health plan operates in	Significant association with better <i>Immunization</i> .

Table 1: Summary of findings from macro level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Glickman; Ou; DeLong, et al., 2007 ²³	Non-RCT controlled study	500 Hospitals participating in voluntary quality improvement registry for heart disease care, US	Pay for performance programme	Significant improvement in <i>Risk adjusted in-hospital mortality rate from acute myocardial infarction</i> , Performance on <i>Process measures of acute myocardial infarction care included in pay for performance programme</i> and in <i>Performance on Process measures of acute myocardial infarction care not included in pay for performance programme</i> in hospitals participating and not participating in pay for performance programme. No significant difference between groups.
Greenberg; Rosenheck, 2003 ²⁴	Cross-sectional quantitative study	139 Veterans Affairs medical centres, US	Social capital	Significantly associated with <i>Outpatient care for secondary medical condition within six months of discharge</i> , <i>No service gap (severely mentally ill patients)</i> , or <i>Modified Modified [sic] Continuity Index</i> . No significant association with <i>Outpatient treatment within 30 days of discharge</i> , <i>Outpatient treatment within six months of discharge</i> , <i>Number of two-month periods in the six months after discharge with two or more outpatient visits</i> , <i>Number of months during a six-month period with at least one visit (severely mentally ill patients)</i> , <i>Continuity-of-Care Index</i> .
			State mental health agency per capita spending	No significant association with <i>Outpatient treatment within 30 days of discharge</i> , <i>Outpatient treatment within six months of discharge</i> , <i>Outpatient care for secondary medical condition within six months of discharge</i> , <i>Number of two-month periods in the six months after discharge with two or more outpatient visits</i> , <i>Number of months during a six-month period with at least one visit (severely mentally ill patients)</i> , <i>No service gap (severely mentally ill patients)</i> , <i>Continuity-of-Care Index</i> , or <i>Modified Modified Continuity Index</i> .

Table 1: Summary of findings from macro level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Greene; Beckman; Chamberlain, et al., 2004 ²⁵	Longitudinal quantitative study	900 Primary care physicians, US	Multi-faceted quality improvement intervention incorporating financial incentive	Significant improvement in <i>Adherence to guideline for acute sinusitis care</i> .
Hannan; Kumar; Racz, et al., 1994 ²⁶	Non-RCT controlled study	30 Hospitals and 32 Surgeons in New York State providing coronary artery bypass graft, US	Publication of performance (hospitals)	Significant differences between worst, middle and best performers in <i>Risk-adjusted mortality rate following coronary artery bypass graft</i> at start of 3-year period during which overall mortality rate fell were not present at end. Changes in volume over this period were not related to <i>Risk-adjusted mortality rate</i> at the start of the period.
			Publication of performance (surgeons)	The findings were similar analysed by surgeons rather than hospitals.
Hannan; Siu; Kumar, et al., 1995 ²⁷	Longitudinal quantitative study	136 Surgeons in New York State providing coronary artery bypass graft, US	Surgeon volume	Significant relationship with <i>Risk-adjusted mortality rate following coronary artery bypass graft</i> . Decline over 3-year period in <i>Overall mortality rate</i> accounted for partly by shift in caseload to higher volume surgeons and by a shift in the composition of low-volume surgeons, to include some who had come from out of state or had previously been high-volume surgeons, and the cessation from surgery of some low-performing low volume surgeons.

Table 1: Summary of findings from macro level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Hibbard; Stockard; Tusler, 2003 ²⁸	Non-RCT controlled study	111 Community Hospitals, US	Performance report publication (Published report/Private report/No report)	No significant differences between groups in <i>Aggregate numbers of obstetric and cardiac quality activities</i> . Significant dose responses (greatest for published report) when <i>Obstetric</i> and <i>Cardiac activities</i> analysed separately. Greater significant dose response among low performers in obstetric care quality for <i>Obstetric activities</i> . No significant differences between groups among low performers in cardiac care quality for <i>Cardiac activities</i> .
Jha; Epstein, 2006 ²⁹	Longitudinal quantitative study	31 Hospitals and 168 Surgeons in New York State providing coronary artery bypass graft, US	Publication of performance (hospitals)	Performance of hospitals in <i>Risk-adjusted mortality rate following coronary artery bypass graft</i> significantly correlated with performance in period when data was published and would be used.
			Publication of performance (surgeons)	Performance of surgeons in <i>Risk-adjusted mortality rate following coronary artery bypass graft</i> appears to be correlated with performance in period when data was published and would be used, but significance of correlation not reported.
Lake; Shang; Klaus, et al., 2010 ³⁰	Cross-sectional quantitative study	5388 Nursing units, US	Magnet (recognition of hospital nursing excellence) status (analysed at hospital level)	Significantly lower <i>Number of falls</i> in <i>All units</i> and in <i>ICUs</i> and <i>Non-ICUs</i> analysed separately.
Landon; Zaslavsky; Bernard, et al., 2004 ³¹	Cross-sectional quantitative study	Medicare Managed Care and Fee for Service, US	Variation in differences in Medicare Managed Care compared to Medicare Fee for Service by State	Of 44 states, 10 significantly better and 6 significantly worse for Rating of care received overall. Of 44 states, 1 significantly better and 23 significantly worse for Flu shots.

Table 1: Summary of findings from macro level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Lindenauer; Remus; Roman, et al., 2007 ³²	Non-RCT controlled study	613 Acute hospitals, US	Quality incentive programme with public reporting compared to public reporting only	Significantly greater improvement in <i>Composite process score from 5 acute myocardial infarction measures, Composite process score from 2 heart failure measures, Composite process score from 3 Pneumonia measures, and Composite process score from all 10 measures.</i>
Longo; Land; Schramm, et al., 1997 ³³	Longitudinal quantitative study	90 Hospitals providing obstetrical services, US	Publication of "consumer reports" on obstetric services	Significant rise in hospitals with low <i>Vaginal-birth-after-caesarean rates</i> , non-significant change in all hospitals and in hospitals with average or high rates Significant fall in <i>Caesarean rate</i> in all hospitals and in hospitals with high rates. Non-significant change in hospitals with average or low rates.
Lutfiyya; Sikka; Mehta, et al., 2009 ³⁴	Cross-sectional quantitative study	730 Critical access hospitals, US	Accreditation by Joint commission of Healthcare Organizations	Significantly associated with better performance on 1 of 4 <i>Acute myocardial infarction indicators</i> , 2 of 4 <i>Heart failure indicators</i> , and 1 of 6 <i>Pneumonia indicators</i> . No significant associations with 3 <i>Acute myocardial infarction indicators</i> , 2 <i>Heart failure indicators</i> , and 5 <i>Pneumonia indicators</i> . No significant associations with 2 <i>Surgery infection prevention indicators</i> .

Table 1: Summary of findings from macro level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
McCloskey; Diers, 2005 ³⁵	Longitudinal quantitative study	All 85 hospitals in Public Health Care system, New Zealand	Reengineering: proportion of change from 1992 to 2000 (before 1993 changes) through abandoning of for-profit elements (1996) explained by changes in Nursing FTE	Significantly associated with worse levels of 3 of 9 <i>Medical nurse-sensitive outcomes: CNS complications; Decubitus ulcers; Sepsis;</i> and with 9 of 12 <i>Surgical nurse-sensitive outcomes: CNS complications; Decubitus ulcers; Deep vein thromboses and pulmonary emboli; Sepsis; Urinary tract infection; Pulmonary failure; Physiologic and metabolic derangement; Surgical wound infections and Mortality.</i> No significant associations with 6 <i>Medical nurse-sensitive outcomes: Deep vein thromboses and pulmonary emboli; Upper gastrointestinal bleeding; Pneumonia; Shock and cardiac arrest; Urinary tract infection;</i> and <i>Mortality,</i> nor with 3 <i>Surgical nurse-sensitive outcomes: Upper gastrointestinal bleeding; Pneumonia; Shock and cardiac arrest.</i>
			Reengineering: proportion of change from 1992 to 2000 explained by changes in Nursing Hours worked	Significantly associated with worse levels of 3 of 9 <i>Medical nurse-sensitive outcomes: CNS complications; Decubitus ulcers; Sepsis;</i> and with 9 of 12 <i>Surgical nurse-sensitive outcomes: CNS complications; Decubitus ulcers; Deep vein thromboses and pulmonary emboli; Sepsis; Urinary tract infection; Pulmonary failure; Physiologic and metabolic derangement; Surgical wound infections and Mortality.</i> No significant associations with 6 <i>Medical nurse-sensitive outcomes: Deep vein thromboses and pulmonary emboli; Upper gastrointestinal bleeding; Pneumonia; Shock and cardiac arrest; Urinary tract infection;</i> and <i>Mortality,</i> nor with 3 <i>Surgical nurse-sensitive outcomes: Upper gastrointestinal bleeding; Pneumonia; Shock and cardiac arrest.</i>

Table 1: Summary of findings from macro level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
			Reengineering: proportion of change from 1992 to 2000 explained by changes in Nursing Skill Mix Registered Nurse as a proportion of all nursing FTE	<p>Significantly associated with worse levels of 4 of 9 <i>Medical nurse-sensitive outcomes: CNS complications; Decubitus ulcers; Sepsis; Urinary tract infection;</i> and with 9 of 12 <i>Surgical nurse-sensitive outcomes: CNS complications; Decubitus ulcers; Deep vein thromboses and pulmonary emboli; Sepsis; Urinary tract infection; Pulmonary failure; Physiologic and metabolic derangement; Surgical wound infections and Mortality.</i></p> <p>No significant associations with 5 <i>Medical nurse-sensitive outcomes: Deep vein thromboses and pulmonary emboli; Upper gastrointestinal bleeding; Pneumonia; Shock and cardiac arrest;</i> and <i>Mortality,</i> nor with 3 <i>Surgical nurse-sensitive outcomes: Upper gastrointestinal bleeding; Pneumonia; Shock and cardiac arrest.</i></p>
Maniadakis; Hollingsworth; Thanassoulis, 1999 ³⁶	Longitudinal quantitative study	Acute health care system, UK (Scotland)	Introduction of internal market	<p>Analysed independently, no change in <i>Standardised survivals after admission for stroke, fractured neck of femur and myocardial infarction</i> over 5 year period from introduction of internal market. Analysed jointly with productivity, improvement over 5 year period from introduction of internal market (all hospitals together). Most change in first year, some regression in following years. In both analyses great variability between hospitals; e.g. over 5 study years for joint analysis <i>Standardised survivals after admission for stroke, fractured neck of femur and myocardial infarction</i> improved in 46 hospitals, regressed in 29 and was constant in none.</p>

Table 1: Summary of findings from macro level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Marlin; Minghe; Huonker, 1999 ³⁷	Cross-sectional quantitative study	397 Nursing homes, US	Rural/Urban	Significantly more <i>Unplanned weight change</i> and fewer <i>Life and safety deficiencies</i> in Rural than Urban. No significant association with pressure sores, <i>Catheterization, Restraint use, Health deficiencies</i> .
Mehrotra; Pearson; Coltin, et al., 2007 ³⁸	Cross-sectional quantitative study	79 Autonomous physician groups, US	Report of Pay for Performance incentive in any of 8 selected Health Employer Data and Information Set (HEDIS) measures	Significant positive association with <i>Quality improvement initiatives</i> targeting a measure for which the group has a Pay for Performance incentive.
Meyer; Goes, 1988 ³⁹	Longitudinal quantitative study	25 Private, non-profit hospitals, US	Environmental variables (Urbanisation, Affluence and population Medicare/Medicaid coverage)	Significantly associated with <i>Assimilation of innovation</i> (9-point scale from learning of an innovation to its adoption and expansion). Greater assimilation with more urban hospitals.
Peterson; Delong; Jollis, et al., 1998 ⁴⁰	Non-RCT controlled study	Hospital care in New York State, US	Provider profiling of coronary artery bypass graft outcomes	Significantly greater improvement in <i>Risk-adjusted 30-day mortality rate following admission for coronary artery bypass graft</i> in New York State Medicare patients aged 65 and older over time compared to rest of US. No significant change in <i>Rate of out-of-state coronary artery bypass grafts in Medicare patients aged 65 and older</i> , or in <i>Risk profile of Medicare patients aged 65 and older receiving coronary artery bypass graft in New York State</i> (proxies for access).
Pettigrew; Ferlie; McKee, 1992 ⁴¹	Qualitative interview study longitudinal	8 District health authorities, UK (England)	Environmental pressure Fit between change agenda and its locale	Derived inductively from case studies of <i>Implementing strategic change</i> , including some examples of service improvement and others of operational change and retrenchment.

Table 1: Summary of findings from macro level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Popescu; Werner; Vaughan-Sarrazin, et al., 2009 ⁴²	Cross-sectional quantitative study	2761 Hospitals reporting performance on acute myocardial infarction process measures, US	Urban location	From analysis of variance, significant gradient (more urban in <i>Better performers</i>) in <i>Performance on acute myocardial infarction process measures (Low, Medium, High)</i> .
Rabhani; Lalji; Abbas, et al., 2011 ⁴³	Qualitative interview study cross-sectional	4 Units of a philanthropic not-for-profit university hospital, Pakistan	Participatory culture	Identified as Desirable for <i>Implementation of balanced scorecard</i> .
Rodriguez; Von Glahn; Rogers, et al., 2009 ⁴⁴	Cross-sectional quantitative study	34 Medical groups, US	Area-level deprivation	Greater area deprivation significantly associated with lower <i>Patient assessment of access to care</i> and <i>Patient assessment of care coordination</i> . No significant associations with <i>Patient assessment of physician communication</i> or <i>Patient assessment of care coordination</i> .
			Financial incentive formula (productivity/efficiency %)	Higher % for productivity in physician incentive formula significantly associated with lower <i>Patient assessment of access to care</i> . No significant associations with <i>Patient assessment of physician communication</i> , <i>Patient assessment of care coordination</i> , or <i>Patient assessment of office staff interactions</i> .

Table 1: Summary of findings from macro level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Rosenthal; Quinn; Harper, 1997 ⁴⁵	Longitudinal quantitative study	30 Acute care hospitals, US	Publication of "consumer reports" on patient outcomes	Significant fall in <i>Risk adjusted mortality rate</i> from <i>Congestive heart failure</i> and from <i>Pneumonia</i> No significant change in <i>Overall Risk adjusted mortality rate</i> for 8 conditions, <i>Risk adjusted mortality rate</i> from <i>acute myocardial infarction</i> , from <i>Stroke</i> , from <i>Obstructive airway disease</i> , from <i>Gastro-intestinal haemorrhage</i> , from <i>Lower bowel resection</i> , or from <i>Coronary artery bypass graft</i> .
Sack; Scherag; Lütkes, et al., 2011 ⁴⁶	Cross-sectional quantitative study	328 Hospital departments, Germany	Accreditation by any of 3 programmes	No significant association with <i>Patients who would recommend the hospital to others</i> .
Shortell; Schmittiel; Wang, et al., 2005 ⁴⁷	Cross-sectional quantitative study	693 Medical groups that treated patients with all 4 of asthma, congestive heart failure, depression, and diabetes, US	Environment: HMO penetration	No significant associations.
			Environment: Outside reporting	Significantly associated with increased <i>Overall Quality Index</i> (=Care quality index + Health promotion index + receipt of awards for quality performance), <i>Care Management Index</i> (use of recommended care management processes) and <i>Health Promotion Index</i> (offer health promotion programmes and use reminders for preventive services).
			Environment: Delegation of hospitalisation risk	Significantly associated with increased <i>Care Management Index</i> . No significant association with <i>Overall Quality Index</i> or <i>Health Promotion Index</i> .
			Quality-centred culture: Compensation for quality/service	No significant associations.

Table 1: Summary of findings from macro level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Srirangalingam; Sahathevan; Lasker, et al., 2006 ⁴⁸	Longitudinal quantitative study	1 Primary care trust, UK (England)	Financial incentive for diabetes management in primary care	No significant change in <i>Number of referrals to secondary care</i> following introduction of incentive. Case mix changed to significantly more <i>Referrals for poor glycaemic control</i> .
Stetler; Ritchie; Rycroft-Malone, et al., 2009 ⁴⁹	Mixed methods: cross-sectional observational quantitative, and qualitative interview study	2 Acute care hospitals, US	Environmental pressure	Influenced by leadership and supported <i>Institutionalisation of evidence-based practice</i> .
			Fit between change agenda and its locale	Not influential in these cases in <i>Institutionalisation of evidence-based practice</i> .
Sutton; McLean, 2006 ⁵⁰	Cross-sectional quantitative study	60 Primary care practices, UK (Scotland)	Population deprivation	Significantly associated with better <i>Quality score</i> forming basis for financial incentive payment.
			Population chronic illness rate	No significant association with <i>Quality score</i> .
			Population age	No significant association with <i>Quality score</i> .
			Urban-rural location	No significant association with <i>Quality score</i> .
Valdmanis; Rosko; Mutter, 2008 ⁵¹	Cross-sectional quantitative study	1377 Short term, community hospitals, US	Competition (Herfindahl-Hirschman index)	Significantly associated with better <i>Quality congestion score</i> .
Zinn; Weech; Brannon, 1998 ⁵²	Cross-sectional quantitative study	241 Nursing homes, US	Competitive market: Administrator's perception of intensity of TQM Survey market competition (scale 1-10); Herfindahl index of nursing home market concentration; Excess capacity Average number of empty beds per facility in the county; Hospital-based substitutes Number of hospital units in the county providing inpatient or outpatient long-term care services	Of 4 measures, only perceived competition significantly associated with <i>TQM adoption</i> .

Table 1: Summary of findings from macro level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
			Medicare market penetration Proportion of hospital discharges in county covered by Medicare	Significant association with <i>TQM adoption</i> .
			HMO membership Proportion of county residents who are HMO members	No significant association with <i>TQM adoption</i> .

Table 2: Summary of findings from meso level structural factors

	Study design	Organisations investigated	Contextual factor measure	Main findings
Alexander, 2008 ⁵³	Cross-sectional quantitative study	510 Nursing homes, US	Registered Nurse staffing (hours per resident day divided by thirds of the range into high, medium and low)	<p>Significant variance with <i>Long stay residents whose need for help with activities of daily living has increased and Short-stay residents with pressure sores.</i></p> <p>No significant variance with <i>Long stay high-risk residents who have pressure sores, Long stay residents who have become more depressed or anxious, Long stay low-risk residents who were incontinent, Long stay residents whose ability to move in and around their room got worse, or Short-stay residents who had moderate to severe pain.</i></p>
			Licensed Practical Nurse staffing	<p>Significant variance with <i>Long stay residents whose need for help with activities of daily living has increased and Short-stay residents with pressure sores.</i></p> <p>No significant variance with <i>Long stay high-risk residents who have pressure sores, Long stay residents who have become more depressed or anxious, Long stay low-risk residents who were incontinent, Long stay residents whose ability to move in and around their room got worse, or Short-stay residents who had moderate to severe pain.</i></p>

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
			Certified Nurse Assistant staffing	<p>Significant variance with <i>Long stay low-risk residents who were incontinent.</i></p> <p>No significant variance with <i>Long stay residents whose need for help with activities of daily living has increased, Long stay high-risk residents who have pressure sores, Long stay residents who have become more depressed or anxious, Long stay residents whose ability to move in and around their room got worse, Short-stay residents who had moderate to severe pain, Short-stay residents with pressure sores.</i></p>
			Registered Nurse + Licensed Practical Nurse staffing	No significant variance.
			Registered Nurse + Certified Nurse Assistant staffing	No significant variance.
			Licensed Practical Nurse + Certified Nurse Assistant staffing	<p>Significant variance with <i>Short-stay residents with pressure sores.</i></p> <p>No significant variance with <i>Long stay residents whose need for help with activities of daily living has increased, Long stay high-risk residents who have pressure sores, Long stay residents who have become more depressed or anxious, Long stay low-risk residents who were incontinent, Long stay residents whose ability to move in and around their room got worse, Short-stay residents who had moderate to severe pain.</i></p>
			Registered Nurse + Licensed Practical Nurse + Certified Nurse Assistant staffing	No significant variance.

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Alexander; Weiner; Shortell, et al., 2006 ⁵⁴	Cross-sectional quantitative study	1847 Community hospitals, US	Information systems capabilities	Significantly associated with <i>quality improvement implementation scope</i> measured by <i>Hospital unit involvement in quality improvement</i> , but no significant association with <i>Hospital staff on quality improvement teams</i> or <i>Physicians on quality improvement teams</i> . Significantly associated with <i>quality improvement implementation intensity</i> measured by <i>Conditions and procedures with guidelines</i> , and <i>Use of quality of care data by project teams</i> , but no significant association with <i>Use of statistical and process management tools</i> .
			Clinical infrastructure capabilities	Significantly associated with <i>quality improvement implementation scope</i> measured by <i>Hospital unit involvement in quality improvement</i> and <i>Hospital staff on quality improvement teams</i> but no significant association with <i>Physicians on quality improvement teams</i> . Significantly associated with <i>quality improvement implementation intensity</i> measured by <i>All 3 measures</i> .
			Clinical integration	Significantly associated with <i>quality improvement implementation scope</i> measured by <i>Hospital unit involvement in quality improvement</i> , but no significant association with <i>Hospital staff on quality improvement teams</i> or <i>Physicians on quality improvement teams</i> . Significantly associated with <i>quality improvement implementation intensity</i> measured by <i>All 3 measures</i> .

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
			Investment in quality improvement (total expenses per bed)	Significantly associated with <i>quality improvement implementation scope</i> measured by <i>Hospital unit involvement in quality improvement</i> , but no significant association with <i>Hospital staff on quality improvement teams</i> or <i>Physicians on quality improvement teams</i> . Significantly associated with <i>quality improvement implementation intensity</i> measured by <i>Conditions and procedures with guidelines</i> , but no significant association with <i>Use of statistical and process management tools</i> or <i>Use of quality of care data by project teams</i> .
Alexander; Weiner; Shortell, et al., 2007 ²	Cross-sectional quantitative study	1784 Community hospitals, US	Profitability	Significantly increases association of: Number of guidelines developed, and Quality improvement emphasis with better <i>In-hospital mortality from acute myocardial infarction</i> . Number of guidelines developed, and Quality improvement emphasis with better <i>In-hospital mortality from congestive heart failure</i> . Number of guidelines developed with better <i>In-hospital mortality from stroke</i> . Number of guidelines developed, and Quality improvement emphasis with better <i>In-hospital mortality from pneumonia</i> . Number of guidelines developed with better <i>Bilateral catheterisation</i> . Number of guidelines developed, Use of quality of care data, Use of statistical/process tools, and Quality improvement emphasis with better <i>Laparoscopic cholecystectomy</i> .

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
				No significant moderation of association of: Any quality improvement implementation indicator with <i>In-hospital mortality from CABG</i> . Use of quality of care data or Use of statistical/process tools with <i>In-hospital mortality from acute myocardial infarction</i> . Use of quality of care data or Use of statistical/process tools with <i>In-hospital mortality from congestive heart failure</i> . Use of quality of care data, Use of statistical/process tools or Quality improvement emphasis with <i>In-hospital mortality from stroke</i> . Use of quality of care data or Use of statistical/process tools with <i>In-hospital mortality from pneumonia</i> . Use of quality of care data, Use of statistical/process tools or Quality improvement emphasis with <i>Bilateral catheterisation</i> .
Allison; Kiefe; Weissman, et al., 2000 ⁵⁵	Cross-sectional quantitative study	4361 Hospitals, US	Teaching status (Minor, Major, Non-teaching)	Significantly lower <i>30-day post-discharge mortality in acute myocardial infarction patients</i> in minor and major teaching hospitals than in non-teaching hospitals.
Amirkhanyan; Kim; Lambright, 2008 ⁵⁶	Cross-sectional quantitative study	14423 Nursing homes, US	Ownership (For profit /Non-profit/Public)	Significantly associated with lower <i>% of Beds Medicaid (proxy for access)</i> . Significantly associated with <i>Deficiency citation</i> .
Berlowitz; Anderson; Brandeis, et al., 1999 ⁷	Cross-sectional quantitative study	128 VA Nursing homes, US	Nursing home size (average daily census)	No significant association with <i>Pressure sores</i> .
			Size of hospital to which home is attached (average daily census)	Largest and smallest hospitals associated with higher <i>Pressure sore development</i> .
			Physician FTE per 100 nursing home residents (patient care time only)	No significant association with <i>Pressure sores</i> .

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
			Registered Nurse FTE per 100 nursing home residents	Higher Registered Nurse staffing associated with higher <i>Pressure sore development</i> .
			Medical resident FTE per 100 nursing home residents	No significant association with <i>Pressure sores</i> .
			Support staff FTE per 100 nursing home residents	Highest and lowest Support staffing associated with higher <i>Pressure sore development</i> .
			Teaching nursing home status	No significant association with <i>Pressure sores</i> .
Berlowitz; Young; Hickey, et al., 2003 ⁵⁷	Cross-sectional quantitative study	35 Nursing Homes, US	Degree of quality improvement implementation. Mean score on 5 point scale from employee survey based on Baldrige criteria -	No significant association with Implementation of best practice on pressure ulcer prevention (6 most important recommendations), Implementation of best practice on pressure ulcer prevention (all 15 recommendations), Risk adjusted pressure ulcer rates.
Berney; Needleman, 2006 ⁵⁸	Cross-sectional quantitative study	161 Non-profit acute care hospital, US	Overtime as % of registered nurse (RN) acute hours	Higher RN overtime significantly with associated with better Mortality for medical and surgical patients. No significant associations with Urinary tract infection, Gastro-intestinal bleeding, Pneumonia, Shock and cardiac arrest, Sepsis, or Failure to rescue, in medical or surgical patients.
			RN hours as % of licensed hours	More RN hours significantly associated with worse Failure to rescue rates for medical and surgical patients. No significant associations with Urinary tract infection, Gastro-intestinal bleeding, Pneumonia, Shock and cardiac arrest, Sepsis, or Mortality, in medical or surgical patients.

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
			RN hours per acute day, case mix adjusted	More RN hours significantly associated with better Sepsis rates, Failure to rescue and Mortality rates, for medical and surgical patients. More RN hours significantly associated with better Urinary tract infection rate and Gastro-intestinal bleeding rate in surgical patients. No significant associations with Urinary tract infection rate and Gastro-intestinal bleeding rate in medical patients or with Pneumonia or Shock and cardiac arrest, in medical or surgical patients.
Boockvar; Livote; Goldstein, et al., 2010 ⁵⁹	Longitudinal quantitative study	7 VA Nursing homes referring to 2 VA hospital and non-VA nursing homes referring to 3 non-VA hospitals, US	Nursing home-hospital with or without Electronic Health Record	No significant association with <i>Medication discrepancies</i> , <i>High-risk medication discrepancies</i> or <i>Adverse Drug Event caused by a medication discrepancy</i> .
Born; Simon, 2001 ⁸	Cross-sectional quantitative study	140 to 240 Health Maintenance Organisations, US	Net operating income per member, measured over the prior two years	Significantly fewer eligible patients in for-profit plans receiving <i>Childhood immunisations Combination 1</i> , <i>Annual eye exams for diabetics</i> and <i>Follow-up office visit after a mental health hospitalisation</i> in low-profit than high-profit. Not significantly associated with <i>Childhood immunisations Combination 3</i> , <i>Breast cancer screening</i> , <i>Cervical cancer screening</i> , <i>Prenatal care in the first trimester</i> , <i>Checkup after delivery</i> or <i>Beta-blockers following heart attack</i> .
			% change in net worth measured from the previous year	No significant associations with any outcome.

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
			Licensed Practical Nurse hours/resident day	Significantly higher <i>Proportion of residents with pressure ulcers, Proportion of residents with late loss ADL decline.</i> No significant associations with <i>Proportion of residents with incontinence, Proportion of residents with behavioural problems, Proportion of residents with weight loss, Proportion of residents with physical restraint use, Proportion of residents with behavioural problems.</i>
			Nurse Aide hours/resident day	Significant positive association with <i>Proportion of residents with incontinence, Proportion of residents with pressure ulcers.</i> No significant associations with <i>Proportion of residents with behavioural problems, Proportion of residents with weight loss, Proportion of residents with physical restraint use, Proportion of residents with behavioural problems, Proportion of residents with late loss ADL decline.</i>
Bostick, 2004 ⁶⁰	Cross-sectional quantitative study	413 Nursing homes, US	Registered Nurse hours/resident day	Significantly higher <i>Proportion of residents with pressure ulcers</i> No significant association with <i>Proportion of residents with incontinence, Proportion of residents with weight loss, Proportion of residents with late loss ADL decline, Proportion of residents with physical restraint use, Proportion of residents with behavioural problems.</i>
Bradley; Herrin; Curry, et al., 2010 ⁹	Cross-sectional quantitative study	2908 Short-term acute and critical access non-federal hospitals, US	Teaching status (Council of Teaching Hospitals member, Has residency programmes, Non-teaching)	Significantly associated with lower <i>30-day Mortality from admission in Medicare Fee-for-service patients with acute myocardial infarction.</i>
			Bed size	Significantly associated with higher <i>30-day Mortality.</i>
			Medicare acute myocardial infarction volume	Significantly associated with lower <i>30-day Mortality.</i>

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
			Cardiac facilities (Open heart surgery capacity, Catheterisation laboratory only, No catheterisation laboratory)	Significantly associated with lower <i>30-day Mortality</i> .
			Cardiac rehabilitation services	No significant association with <i>30-day Mortality</i> .
			Tobacco treatment services	No significant association with <i>30-day Mortality</i> .
			Hospice beds	No significant association with <i>30-day Mortality</i> .
Bradley; Herrin; Mattera, et al., 2005 ⁶¹	Cross-sectional quantitative study	234 Hospitals participating in acute myocardial infarction registry, US	quality improvement interventions	Of 7 quality improvement interventions only Standing orders significantly associated with being in <i>High or Medium group</i> for <i>Rate of appropriate beta-blocker prescription to acute myocardial infarction patients on discharge</i> independently of other contextual factors measured.
			Data feedback techniques	Of 6 Data feedback techniques, Physician specific feedback significantly negatively associated with being in <i>High or Medium group</i> for <i>Rate of appropriate beta-blocker prescription</i> , independently of other contextual factors measured.
Bradley; Holmboe; Mattera, et al., 2001 ⁶²	Qualitative interview study cross sectional	8 Hospitals of various types providing care for patients with acute myocardial infarction, US	Performance improvement initiatives	Believed by interviewees to be associated with improved β -blocker use, but reports of initiatives did not distinguish between <i>High</i> and <i>Low performers</i> .
			Use of data	Believed by interviewees to be associated with improved β -blocker use, and higher quality data feedback reported in <i>Higher performing hospitals</i> .
Bradley; Holmboe; Mattera, et al., 2003 ⁶³	Mixed methods: cross-sectional observational quantitative, and qualitative	8 Hospitals, US	Support of quality improvement with organizational structures	Support of quality improvement with organizational structures.
			Procurement of organizational resources for quality improvement efforts: staffing	Procurement of organizational resources for quality improvement efforts: staffing.

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
	interview study		Procurement of organizational resources for quality improvement efforts: IT	Procurement of organizational resources for quality improvement efforts: IT.
Bradley; Nallamothu; Herrin, et al., 2009 ⁶⁴	Non-RCT controlled study	831 Hospitals participating in the National Cardiovascular Data registry, US	Enrolment in Door-to-Balloon alliance	<i>Change in Door-to-Balloon time within 90 minutes rate over 3 year study period significantly greater in Hospitals enrolled than not enrolled in Door-to-Balloon time alliance.</i> <i>Participation in Door-to-Balloon time Alliance tools among enrolled hospitals increased over study period.</i>
Braithwaite; Greenfield; Westbrook, et al., 2010 ¹⁰	Cross-sectional quantitative study	19 Health care organisations, Australia	Consumer involvement	No significant association with <i>Accreditation score</i> .
Bray; Cummings; Pharm, et al., 2009 ⁶⁵	Qualitative interview study cross sectional	13 Community health centres and private practices participating in quality improvement collaborative, US	End of quality improvement collaborative	12 of 13 purposively selected practices <i>Sustained their original quality improvement activity</i> and of these 9 had <i>Begun or were planning new quality improvement projects</i> .
			Regular meetings to study practices population data	Found in most practices <i>Sustaining quality improvement</i> .
			Infrastructure/staff support	Found in most practices <i>Sustaining quality improvement</i> .
			Strategic partnership	Found in most practices <i>Sustaining quality improvement</i> .
			Collaborative environment in practice	Found in most practices <i>Sustaining quality improvement</i> .

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Castle, 2000 ⁶⁶	Longitudinal quantitative study	12193 Nursing homes, US	Size: number of beds	More beds significantly associated with <i>Decrease in restraint use 1992-1997</i> (use of vests, belts, mittens, wrist and ankle restraints, and chairs with locking trays (geri-chairs)) (restraint use restricted by Nursing Home Reform Act implemented Dec 1991). Increase in Size 1992-1997 significantly negatively associated with <i>Increase in restraint use 1992-1997</i> .
			Ownership: for-profit/not-for-profit	For profit ownership significantly associated with <i>Increase in restraint use</i> and negatively with <i>Decrease in restraint use</i> . Change to For-profit ownership 1992-1997 significantly associated with <i>Increase in restraint use</i> and negatively with <i>Decrease in restraint use</i> .
			Membership of chain	Chain membership significantly associated with <i>Increase in restraint use</i> . Change to Chain membership 1992-1997 significantly associated with <i>Increase in restraint use</i> .
			Alzheimer special care unit	Alzheimer unit significantly negatively associated with <i>Decrease in restraint use 1992-1997</i> . Addition of Alzheimer unit significantly associated with <i>Increase in restraint use</i> .
			FTE hours Registered Nurse per 100 beds	Higher Registered Nurse staffing significantly negatively associated with <i>Increase in restraint use</i> . No significant association between Increase in Registered Nurse staffing 1992-1997 and <i>Restraint use</i> .

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
			FTE hours Licensed Practical Nurse per 100 beds	No significant association between Licensed Practical Nurse staffing and <i>Restraint use</i> . Increase in Licensed Practical Nurse staffing 1992-1997 significantly associated with <i>Decrease in restraint use</i> .
			FTE hours Nurse Assistant per 100 beds	Higher Nurse Assistant staffing significantly associated with <i>Increase in restraint use</i> 1992-1997. Increase in Nurse Assistant staffing 1992-1997 significantly negatively associated with <i>Decrease in restraint use</i> .
			Rehabilitation (FTE hours speech, occupational, and physical therapists) per 100 beds	Higher Rehabilitation provision significantly negatively associated with <i>Decrease in restraint use</i> 1992-1997. Increase in Rehabilitation provision 1992-1997 significantly associated with <i>Decrease in restraint use</i> .
			Occupancy rate	Higher Average occupancy significantly associated with <i>Increase in restraint use</i> and negatively with <i>Decrease in restraint use</i> . No significant association between <i>Restraint use</i> and Increase in Average occupancy 1992-1997.
			Medicaid resident rate	Higher Medicaid resident rate significantly negatively associated with <i>Decrease in restraint use</i> . Increase in Medicaid resident rate 1992-1997 significantly associated with <i>Increase in restraint use</i> and negatively with <i>Decrease in restraint use</i> .
			Private-pay resident rate	Higher Private-pay resident rate significantly associated with <i>Decrease in restraint use</i> . Increase in Private-pay resident rate 1992-1997 significantly associated with <i>Decrease in restraint use</i> .

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Castle, 2009 ⁶⁷	Cross-sectional quantitative study	3876 Nursing homes, US	Homes with no agency use of Nurse Assistants compared to ≥25% agency use	Significantly associated with fewer <i>Long stay residents</i> whose <i>Need for help with daily activities increased</i> , who <i>Experienced moderate to severe pain</i> , fewer <i>Long stay high risk residents with pressure ulcers</i> , <i>Long stay low-risk residents with loss of bladder or bowel control</i> , <i>Catheter inserted and left in bladder</i> , <i>Spend most time in bed or in a chair</i> , <i>Developed urinary tract infection</i> , and fewer <i>Short stay residents who Experienced moderate to severe pain</i> . No significant associations with 5 other <i>Long-stay measures</i> or 2 other <i>Short-stay measures</i> .
			Homes with no agency use of Licensed Practical Nurses compared to ≥25% agency use	Significantly associated with fewer <i>Long stay residents</i> whose <i>Need for help with daily activities increased</i> , who <i>Spend most time in bed or in a chair</i> , whose <i>Ability to move in/around room worsened</i> , fewer <i>Short stay residents who Experienced delirium</i> . No significant associations with 9 other <i>Long-stay measures</i> or 2 other <i>Short-stay measures</i> .
			Homes with no agency use of Registered Nurses compared to ≥25% agency use	Significantly associated with fewer <i>Long stay residents</i> whose <i>Need for help with daily activities increased</i> , <i>Long stay High risk residents with pressure ulcers</i> , <i>Long stay Low-risk residents with loss of bladder or bowel control</i> , who <i>Spend most time in bed or in a chair</i> , whose <i>Ability to move in/around room worsened</i> , and who <i>Developed urinary tract infections</i> . No significant differences in 6 other <i>Long-stay</i> or any <i>Short-stay measures</i> .

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Castle; Engberg, 2008 ⁶⁸	Cross-sectional quantitative study	879 Medicare certified nursing homes, US	FTE agency Registered Nurses per 100 beds	Significantly associated with better <i>Quality score derived from 14 nursing home care indicators</i> and with better <i>Quality score with greater Regular Licensed Practical Nurse staffing</i> (interaction). No significant association <i>with Quality score given Regular Registered Nurse staffing</i> or with <i>Quality score given Regular Nurse Aide staffing</i> .
			FTE agency Licensed Practical Nurses per 100 beds	No significant association with <i>Quality score</i> .
			FTE agency Nurse Aides per 100 beds	Significantly associated with better <i>Quality score with greater Regular Registered Nurse staffing</i> . No significant association <i>Quality score, Quality score given Regular Licensed Practical Nurse staffing</i> or <i>Quality score given Regular Nurse Aide staffing</i> .
			FTE Registered Nurses per 100 beds	No significant association with <i>Quality score</i> .
			FTE Licensed Practical Nurses per 100 beds	No significant association with <i>Quality score</i> .
			FTE Nurse Aides per 100 beds	Significantly associated with better <i>Quality score</i> .
Castle; Wagner; Ferguson, et al., 2011 ¹²	Cross-sectional quantitative study	14934 Nursing homes, US	Nurse Aide staffing (FTE/resident)	Significantly associated with higher chance of <i>Deficiency citation for environmental safety</i> . No significant association with <i>Deficiency citation for care safety</i> or <i>Deficiency citation for life safety</i> .
			Licensed Practical Nurse staffing (FTE/resident)	Significantly associated with higher chance of <i>Deficiency citation for care safety</i> . No significant association with <i>Deficiency citation for environmental safety</i> or <i>Deficiency citation for life safety</i> .

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
			Registered Nurse staffing (FTE/resident)	Significantly associated with lower chance of <i>Deficiency citation for environmental safety, Deficiency citation for care safety and Deficiency citation for life safety.</i>
			Medicaid resident occupancy	Significantly associated with higher chance of <i>Deficiency citation for environmental safety, Deficiency citation for care safety and Deficiency citation for life safety.</i>
Charles; McKee; McCann, 2011 ⁶⁹	Qualitative interview study cross-sectional	8 Hospital trusts, UK (England)	Leadership	Two types of trust found to perform well in <i>Patient safety</i> . Resilient trusts had directive but consensual leadership while adaptive trusts had leadership that was democratic and consensual.
Charles; McKee; McCann, 2011 ⁶⁹	Qualitative interview study cross-sectional	8 Hospital trusts, UK (England)	Leadership	Two types of trust found to perform well in <i>Patient safety</i> . Resilient trusts had directive but consensual leadership while adaptive trusts had leadership that was democratic and consensual.
			Environmental shocks: external e.g. reorganisation and internal e.g. outbreaks	Resilient trusts had been protected from environmental shocks while Adaptive trusts had experienced and adapted to shocks, including lack of continuity in senior leaders.
			Supportive practices/structures	Resilient and Adaptive trusts had multiple modes and channels of communication, although all types of trust were performance-driven.
Chukmaitov; Devers; Harless, et al., 2011 ⁷⁰	Cross-sectional quantitative study	101-115 Ambulatory care centres, US	Specialization 1: percent of specialization in colonoscopy and arthroscopy	Significant association between more specialisation and lower <i>Unplanned hospitalisation for complication within 30 days of arthroscopy, Unplanned hospitalisation for complication within 30 days of colonoscopy.</i>

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
			Specialization 2: square of Specialization 1 for each procedure (gives indication of diminishing returns)	Evidence of a threshold in benefit at higher levels of specialisation.
			Ownership: corporate, partnership, other	Significant association between partnership and <i>Unplanned hospitalisation for complication within 30 days of arthroscopy</i> . No significant association with <i>Unplanned hospitalisation for complication within 30 days of colonoscopy</i> .
			Volume 1: natural log of total number of colonoscopies and arthroscopies per year	Significant association between higher volume and lower <i>Unplanned hospitalisation for complication within 30 days of arthroscopy</i> , <i>Unplanned hospitalisation for complication within 30 days of colonoscopy</i> .
			Volume 2: square of natural log of total number of colonoscopies and arthroscopies per year	Evidence of a threshold in benefit at higher volumes.
Curry; Spatz; Cherlin, et al., 2011 ⁷¹	Qualitative interview study cross sectional	11 Hospitals, US	Hospital practices and protocols to improve AMI care	No systematic difference between <i>High and Low performers on 30-day risk-standardized acute myocardial infarction mortality rate ranking</i> .
			Broad staff presence and expertise in AMI care	Champions for improvement at every level and empowered nurses in <i>High performers</i> , not found in <i>Low performers</i> .
Dixon-Woods; Bosk; Aveling, et al., 2011 ⁷²	Realist evaluation	Intensive care units, US	Isomorphic pressures	Both associated with success in programme to reduce <i>Central venous catheter bloodstream infections</i> derived from retrospective interview with 2 programme leaders, documentary analysis and consensus building.
			Networked community effects	

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Doran; Fullwood; Gravelle, et al., 2006 ¹⁵	Cross-sectional quantitative study	8105 Primary practices, UK (England)	Practice size	Significantly worse <i>Global score on achievement of clinical quality indicators</i> for pay-for-performance programme with larger practice.
			Group practice	No significant association with <i>Satisfaction with physician care score</i> .
			Group size	No significant association with <i>Satisfaction with physician care score</i> .
Dückers; Spreeuwenberg; Wagner, et al., 2009 ⁷³	Cross-sectional quantitative study	168 Quality Improvement teams, Netherlands	Organisational support	No significant correlation with <i>Change in indicator for Quality Improvement Collaborative</i> including clinical effectiveness, patient safety, patient experience and process change.
Escarce; Kapur; Solomon, et al., 2003 ¹⁹	Cross-sectional quantitative study	144 Eye care practices, US	Practitioner specialism concordant with patient condition (Open Angle Glaucoma or Diabetic Retinopathy)	Significant positive association with <i>Satisfaction with physician care score</i> .
Feifer; Nemeth; Nietert, et al., 2007 ⁷⁴	Mixed methods: longitudinal quantitative, and qualitative interview study	9 Primary care practices, US	Old established practice	All 9 practices identified as <i>High performers by Score for adherence to evidence based clinical guidelines</i> extracted from data submitted to quality project at 2 time points were established, apart from one started by a physician with a strong track record of leading successful organisations.
			Financially secure	All 9 <i>High performing</i> practices were financially secure.
			Use of quality improvement tools	All 9 <i>High performing</i> practices made good use of the project quality tools.

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Flocke; Orzano; Selinger, et al., 1999 ⁷⁵	Cross-sectional quantitative study	185 Managed care plans, US	Financial restrictiveness of health plan	No significant association with <i>Patient perception of Interpersonal communication, Comprehensive care, Continuity of care, Coordination of care, Provider's accumulated knowledge about the patient, Family orientation, Community orientation, Advocacy, and Patient preference for their usual provider</i> (Components of Primary Care Instrument), or with <i>Patient satisfaction with visit to practice</i> .
			Organisational restrictiveness of health plan	
Forbes-Thompson; Gessert, 2005 ⁷⁶	Qualitative interview study cross sectional	2 End-of-life nursing homes, US	Analysis of evidence from physical and commercial environment, mission and staffing using observations, document review and interviews	Contrasts in structural factors in 2 case studies associated with contrasts in <i>Quality of resident experience</i> .
			Analysis of evidence from resident care planning and communications regarding end of life preferences using observations, document review and interviews	Contrasts in process factors in 2 case studies associated with contrasts in <i>Quality of resident experience</i> .
Friese; Lake; Aiken, et al., 2008 ⁷⁷	Cross-sectional quantitative study	164 Hospitals providing surgical oncology, US	Nurse practice environment (participation, quality of care, leadership, management and resource dimensions)	Worse environment significantly associated with higher <i>30-day Mortality following cancer surgery</i> and higher <i>Failure to rescue (30-day mortality in patients with complications following cancer surgery)</i> . No significant association with <i>Complications following cancer surgery</i> .
			Nurse staffing (patients/shift)	Worst staffing ratio significantly associated with higher <i>30-day Mortality following cancer surgery</i> , and higher <i>Complications following cancer surgery</i> . No significant association with <i>Failure to rescue</i> .

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
			Nurse education: % of Registered Nurses with Baccalaureate or higher	Higher education significantly associated with better <i>30-day Mortality following cancer surgery</i> and better <i>Failure to rescue</i> . No significant association with <i>Complications following cancer surgery</i> .
Gené-Badia; Escaramis-Babiano; Sans-Corrales, et al., 2007 ⁷⁸	Longitudinal quantitative study	257 Primary care teams, Spain	Target payment	Of 23 <i>User satisfaction measures</i> (with <i>Organisation, Physicians, Nurses, Support personnel, Health care, premises</i> and <i>Overall measure of whether would recommend practice</i>) only <i>Cleanliness of premises and facilities</i> significantly improved following introduction of the 2 programmes.
			Professional development scheme	
Gillies; Chenok; Shortell, et al., 2006 ²²	Cross-sectional quantitative study	272 Health plans, US	% of enrollees Medicare	Significant association with better <i>Immunization</i> and better <i>Heart disease screening</i> . No significant association with <i>Women's health screening, Diabetes screening</i> or <i>Smoking cessation</i> . Significant association with better <i>Satisfaction with health plan</i> . No significant association with <i>Satisfaction with group care</i> or <i>Satisfaction with physician care</i> .
			Age of plan	Significant association with better <i>Women's health screening</i> . No significant association with <i>Immunization, Heart disease screening, Diabetes screening, and Smoking cessation</i> . No significant association with <i>Satisfaction with group care, Satisfaction with physician care</i> or <i>Satisfaction with health plan</i> .

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
			For profit status	Significant association with worse <i>Women's health screening</i> , worse <i>Immunization</i> , and worse <i>Smoking cessation</i> . No significant association with <i>Heart disease screening</i> or <i>Diabetes screening</i> . Significant association with worse <i>Satisfaction with health plan</i> . No significant association with <i>Satisfaction with group care</i> or <i>Satisfaction with physician care</i> .
			Affiliation with national managed care firm	No significant association with any <i>Care delivery measure</i> . Significant association with worse <i>Satisfaction with physician care</i> and <i>Satisfaction with health plan</i> . No significant association with <i>Satisfaction with group care</i> .
			Total enrolment	No significant association with any <i>Care delivery measure</i> or <i>Patient satisfaction measure</i> .
			Primary care physician/specialist ratio	No significant association with any <i>Care delivery measure</i> or <i>Patient satisfaction measure</i> .
			Primary care delivery system (%Group and Staff compared to Individual Practice Association, Network, Mixed)	Significant association with better <i>Women's health screening</i> , <i>Immunization</i> , <i>Heart disease screening</i> and <i>Diabetes screening</i> . No significant association with <i>Smoking cessation</i> . No significant association with any <i>Patient satisfaction measure</i> .
Glickman; Boulding; Staelin, et al., 2007 ⁷⁹	Cross-sectional quantitative study	212 Hospitals participating in quality	Quality improvement tools 10 point scale on questionnaire survey	Significant positive correlation with difference in a <i>Composite process score for guideline adherence</i> in study year and 2 years earlier.

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
		improvement program, US	Forum for feedback of data from quality improvement initiative questionnaire survey	No significant correlation.
			Extent of feedback of data from quality improvement initiative to staff from questionnaire survey	No significant correlation.
			Barriers to quality improvement (resource availability)	Significant positive correlation with difference in a <i>Composite process score for guideline adherence</i> in study year and 2 years earlier.
			Barriers to quality improvement (operational ineffectiveness)	No significant correlation.
Grabowski; Stevenson, 2008 ⁸⁰	Longitudinal quantitative study	2170 Nursing homes which converted from non-profit to for profit or for profit to non-profit, US	Conversion from non-profit to for profit	No significant change over period from 3 years before conversion to 3 or more years after with proportion of residents with <i>Loss of ability in basic daily activities, Infections, Pain, Pressure sores (high risk residents), Pressure sores (low risk residents), Physical restraints, Excessive weight loss, Spent most of their time in bed or in a chair, Ability to move about in and around their room got worse, Have become more depressed or anxious, Lose control of their bowels or bladder (low risk residents) or Have/had a catheter inserted and left in their bladder.</i>
			Conversion from for profit to non-profit	

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Greenberg; Rosenheck, 2003 ²⁴	Cross-sectional quantitative study	139 Veterans Affairs medical centres, US	Outpatient mental health treatment costs as percentage of all mental health treatment costs	Significantly associated with <i>Outpatient treatment within 30 days of discharge, Outpatient treatment within six months of discharge, Outpatient care for secondary medical condition within six months of discharge, Number of two-month periods in the six months after discharge with two or more outpatient visits, Number of months during a six-month period with at least one visit (severely mentally ill patients), and Continuity-of-Care Index.</i> No significant association with <i>No service gap (severely mentally ill patients) or Modified Modified Continuity Index.</i>
			Outpatient mental health treatment costs per capita	Significantly associated with <i>Number of months during a six-month period with at least one visit (severely mentally ill patients).</i> No significant association with <i>Outpatient treatment within 30 days of discharge, Outpatient treatment within six months of discharge, Outpatient care for secondary medical condition within six months of discharge, Number of two-month periods in the six months after discharge with two or more outpatient visits, No service gap (severely mentally ill patients), Continuity-of-Care Index or Modified Modified Continuity Index.</i>

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
			Research and education as percentage of mental health treatment costs	Significantly associated with <i>Outpatient care for secondary medical condition within six months of discharge, Number of months during a six-month period with at least one visit (severely mentally ill patients)</i> . No significant association with <i>Outpatient treatment within 30 days of discharge, Outpatient treatment within six months of discharge, Number of two-month periods in the six months after discharge with two or more outpatient visits, No service gap (severely mentally ill patients), Continuity-of-Care Index or Modified Modified Continuity Index</i> .
			Facility size (number of full-time employees)	No significant association with <i>Any continuity of care outcome</i> .
Haldiman; Tzeng, 2010 ⁸¹	Cross-sectional quantitative study	505 Medicaid certified home health agencies, US	For-profit status	For profit significantly better on 1 of 3 <i>Ambulation measures</i> , 3 of 4 <i>Activities of daily living measures</i> and 1 of 3 <i>Utilisation of emergent care measure</i> . For profit significantly worse on 1 <i>Utilisation of emergent care measure</i> . No significant association with 2 of 3 <i>Ambulation measures</i> , 2 <i>Patient discharge status measures</i> , 1 of 4 <i>Activities of daily living measures</i> and 1 <i>Utilisation of emergent care measure</i> .
Harris; Froehlich; Wietlisbach, et al., 2007 ⁸²	Cross-sectional quantitative study	21 Centres providing colonoscopy, 10 European countries	Type of funding and access (Public/gatekeeper, Public/open access, Private/open access)	Patients at Private/open access significantly higher probability than at public/gatekeeper of <i>Having a complete colonoscopy</i> .
			% of endoscopists who were senior (4 bands)	Smaller proportion of endoscopists who are senior significantly associated with <i>Having a complete colonoscopy</i> .

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
			Annual volume of colonoscopies	Smaller centres associated with <i>Having a complete colonoscopy</i> .
Hillman; Ripley; Goldfarb, et al., 1999 ⁸³	Randomised controlled trial	49 Primary care practices serving paediatric members of a Medicaid managed care plan, US	Financial incentive to enhance feedback intervention	Significant improvement over time in <i>Immunisation indicators</i> in and in <i>Other process indicators included in financial incentive programme</i> . No significant difference in change between feedback only, feedback and financial incentive, and control groups.
Hockey; Bates, 2010 ⁸⁴	Qualitative interview study cross sectional	5 Academic medical centres and community hospitals, US	Information technology	Interviewees in both <i>High</i> and <i>Low performers</i> believed that information systems were important for quality care although only 1 (a <i>High performer</i>) had a fully-integrated system.
			Personalised and organisational outcome data	Interviewees in both <i>High</i> and <i>Low performers</i> believed that performance feedback was important for quality care although implementation of feedback did not distinguish <i>High</i> from <i>Low performers</i> .
			Investment in education for quality	<i>High performers</i> were distinguished from <i>Low performers</i> by provision of physician training in quality improvement skills, which was believed to be important to quality of care by interviewees.
			Physician organisation structure	Interviewees in <i>High performers</i> reported clear physician accountability to senior management, and good relations.
Hong; Atlas; Chang, et al., 2010 ⁸⁵	Cross-sectional quantitative study	162 Primary care physicians, US	Practice type (Community health centre, Hospital affiliated practice)	Community health centre significantly associated with <i>Change (rise) in practice ranking on Evidence-based practice score resulting from adjustment for practice type, visit frequency, and demographic features of patient panel</i> .

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
			Proportion of patients visiting more than 3 times a year	No significant association with <i>Change in practice ranking on Evidence-based practice score</i> .
			Mean patient age	Significant negative association with <i>Change (rise) in practice ranking on Evidence-based practice score</i> .
			Mean number of patient comorbidities	Significant negative association with <i>Change (rise) in practice ranking on Evidence-based practice score</i> .
			Proportion of patients non-English speaking	Significant positive association with <i>Change (rise) in practice ranking on Evidence-based practice score</i> .
			Proportion of patients privately insured	No significant association with <i>Change in practice ranking on Evidence-based practice score</i> .
			Proportion of Medicare patients	Significant negative association with <i>Change (rise) in practice ranking on Evidence-based practice score</i> .
			Proportion of Medicaid or uninsured patients	No significant association with <i>Change in practice ranking on Evidence-based practice score</i> .
Keroack; Youngberg; Cerese, et al., 2007 ⁸⁶	Mixed methods: cross-sectional observational quantitative, and qualitative interview study	6 Academic Medical Centres, US	Accountability system for service, quality, and safety (developed from inductive analysis of case study interviews verified by researcher not involved in data collection)	Found at all 3 <i>High performers on composite measure incorporating patient safety, mortality, effectiveness [clinical] and equity</i> and no more than one <i>Not-high performer</i> , from interviews at case study sites.
Kirby; Keeffe; Nicols, 2007 ⁸⁷	Cross-sectional quantitative study	111 Hospice organisations, US	Innovation [commercial]. Percentage of patient-days that are funded by private insurance, Percentage of patient-days that are funded by self-pay, Total number of voluntary specialized services offered	Significant positive association with <i>Composite score derived from violations of federal quality-of-care standards and number of complaints filed</i> .

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
			Efficiency: net income margin (total revenues/total expenses) and total average expenditure per patient, z transformed and summed	No significant association with outcome.
Krein; Damschroder; Kowalski, et al., 2010 ⁸⁸	Qualitative interview study longitudinal	6 General medical/surgical hospitals, US	Politics (Relationships and Engaging stakeholders)	Difficult relationships undermine <i>Implementation of central line associated bloodstream infection prevention practices.</i>
Lake; Shang; Klaus, et al., 2010 ³⁰	Cross-sectional quantitative study	5388 Nursing units, US	Registered Nurse hours per patient day	Significantly lower <i>Number of patient falls</i> in <i>All units</i> and in <i>ICUs</i> analysed separately. No significant association with <i>Number of falls in Non-ICUs.</i>
			Licensed Practical Nurse hours per patient day	Significantly higher <i>Number of falls</i> in <i>All units</i> and in <i>ICUs</i> and <i>Non-ICUs.</i>
			Nurse Aide hours per patient day	Significantly higher <i>Number of patient falls</i> in <i>All units</i> and <i>Non-ICUs.</i> No significant association with <i>Number of falls in ICUs.</i>
Landon; Zaslavsky; Bernard, et al., 2004 ³¹	Cross-sectional quantitative study	Medicare Managed Care and Fee for Service , US	Medicare Fee for Service compared to Medicare Managed Care	Significantly better <i>Rating of care received overall, Rating of physician, Rating of specialist, Getting needed care composite.</i> Significantly worse <i>Courtesy and respect of physician's staff</i> in year one of study, NS in second year. Significantly worse <i>Paperwork and information composite</i> and in all 3 Preventive services (Flu shot, Pneumococcal immunization, Advised to quit smoking). No significant association with <i>Physicians who communicate well composite, Getting care quickly composite.</i>

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Lee; Choi; Kang, et al., 2002 ⁸⁹	Cross-sectional quantitative study	67 Large Hospitals ≥400 beds, S Korea	CQI training provided by employer	No significant association with <i>Mean Quality Improvement implementation score</i> .
			Sophistication of information system: No of units (of 8) with computer-based automated system	Significant positive association with <i>Mean Quality Improvement implementation score</i> .
			CQI department	No significant association with <i>Mean Quality Improvement implementation score</i> .
			CQI staff	No significant association with <i>Mean Quality Improvement implementation score</i> .
			CQI budget	No significant association with <i>Mean Quality Improvement implementation score</i> .
McCarthy; Datta; Sherlaw-Johnson, 2009 ⁹⁰	Cross-sectional quantitative study	Hospitals cancer centres/units and cancer teams (number not clear, but all England), England	Formal complaints per 1000 FCEs	Significant association in expected direction with " <i>Respect and dignity</i> " (inpatient measure) for <i>Breast</i> and <i>Colon</i> cancer patients. No associations with " <i>Respect and dignity</i> " for <i>Lung</i> cancer patients, or with " <i>Communication</i> " (outpatient measure) for any site.
			Total attendances in a year	Significant association in expected direction with " <i>Respect and dignity</i> " for <i>Colon</i> cancer. No associations with " <i>Respect and dignity</i> " for other sites or with " <i>Communication</i> " for any site.
			% of patients admitted ≤4 h	Significant association in expected direction with " <i>Respect and dignity</i> " for <i>Breast</i> and <i>Colon</i> . No associations with " <i>Respect and dignity</i> " for <i>Lung</i> cancer patients, or with " <i>Communication</i> " for any site.

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
			Ratio of outpatients to admissions	Significant association in expected direction with " <i>Respect and dignity</i> " for <i>Breast</i> cancer. No associations with " <i>Respect and dignity</i> " for other sites or with " <i>Communication</i> " for any site.
			Various staffing measures	Significant association in expected direction of Medicine consultant WTE per 1000 admissions with " <i>Respect and dignity</i> " for <i>Breast</i> and <i>Colon</i> . No associations for " <i>Respect and dignity</i> " with <i>Lung</i> , for " <i>Communication</i> " for any site, or with either outcome for any site for 6 other staffing measures.
McDermott; Keating, 2012 ⁹¹	Qualitative interview study cross-sectional	3 Hospitals, Ireland	Capacity for service improvement	<i>Improvement to services</i> linked to capacity for service improvement, determined by task context (interactions between governance, accounting system and service planning system).
Mckay; Deily, 2008 ⁹²	Cross-sectional quantitative study	9910 Short-term acute care hospitals, US	Cost inefficiency	No significant association with <i>Mortality</i> or <i>Complication rate</i> .
McNulty; Ferlie, 2002 ⁹³	Qualitative interview study longitudinal	1 Large teaching hospital, UK (England)	Organisation, management, and resourcing of the reengineering programme: Resources Organisation, management, and resourcing of the reengineering programme: Tools Receptive and non-receptive contexts for change: structure Scope and complexity of patient processes Resourcing change: Skill-mix and training	Identified as explaining variation in the implementation and impact of process reengineering.

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
			Resourcing change: IT	
Mannion; Davies; Marshall, 2005 ⁹⁴	Qualitative interview study cross sectional	6 Hospital trusts, UK (England)	Accountability and information systems	Clear upward accountability supported by performance management measures in <i>High performing trusts</i> , lack of clarity in <i>Low performers</i> .
			Human resources policies	Recruitment and staff development to foster culture in <i>High performers</i> , lacking in <i>Low performers</i> .
			External relationships	<i>High performers</i> cultivated good relations with external stakeholders while <i>Low performers</i> sometimes had antagonistic relations.
Mark; Harless; Berman, 2007 ⁹⁵	Cross-sectional quantitative study	286 Short term general hospitals, US	Registered Nurse hours worked/patient day	Significantly lower <i>Postoperative cardiopulmonary complication in children, Postoperative pneumonia in children, Postoperative septicaemia or other infection in children</i> , greatest effect at lowest staffing level. <i>Lower Urinary tract infection in children</i> only significant at highest staffing level. No significant association with <i>Post-operative in-hospital mortality in children</i> .
Marlin; Minghe; Huonker, 1999 ³⁷	Cross-sectional quantitative study	397 Nursing homes, US	Strategic groups (Composite of Scope variables: Medicaid utilization, Medicare utilization, insurance/health maintenance organization utilization, private-pay utilization, Veterans Administration utilization, average length of stay, average patient age, and case mix and Resource deployment variables: percentage of nursing costs, percentage of ancillary costs, occupancy rate, semiprivate room rate, number of beds, registered nurses per resident, and staff per resident)	Significant differences between Strategic groups in <i>Catheterization, Health deficiencies</i> and <i>Life and safety deficiencies</i> identified during recertification. No significant associations with <i>Pressure sores, Physical restraint usage</i> or <i>Unplanned significant weight gain/loss</i> .

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
			Ownership	No significant association with any measure.
			Membership of chain	No significant association with any measure.
			Dedicated Specialty Care Unit	No significant association with any measure.
Mills; Weeks, 2004 ⁹⁶	Longitudinal quantitative study	134 Medical quality improvement teams participating in Breakthrough Series collaboratives, US	Sufficient time to complete project (measured at 2 time points)	No significant variations.
			Information systems are helpful (measured at 2 time points)	No significant variations.
			Sufficient resources to complete project (measured at 2 time points)	No significant variations.
			Useful information systems (grouping of several factors, not specified)	No significant variations.
Murray; Burns; May, et al., 2011 ⁹⁷	Qualitative interview study cross-sectional	3 Case studies in hospital, primary care and community settings, UK (England and Scotland)	Innovation attribute: Interactional workability	All accounted for variation in <i>Degree of normalisation of e-health initiative</i> .
			Innovation attribute: Relational integration	
			Innovation attribute: Skill set workability	
			Innovation attribute: Contextual integration	
Nau; Garber; Lipowski, et al., 2004 ⁹⁸	Cross-sectional quantitative study	162 Acute hospital pharmacies, US	Hospital size	Significantly greater <i>Number of quality improvement tools used</i> with greater hospital size.

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Nutti; Daraio; Speroni, et al., 2011 ⁹⁹	Cross-sectional quantitative study	12 Local health authorities in Tuscany region, Italy	Efficiency (Inputs: total cost; Outputs: primary care doctors, hospital, pharmacy and outpatient services)	No significant association with <i>Overall quality score from regional performance evaluation (regional policy targets, quality of care, patient satisfaction, staff satisfaction, and efficiency and financial performance dimensions)</i> .
			Weighted per capita cost	Significantly associated with worse <i>Overall quality score from regional performance evaluation</i> .
Øvretveit; Staines, 2007 ¹⁰⁰	Qualitative interview study cross-sectional	Hospital and its county council, Sweden	No major reorganizations	Emerged from analysis as contributing some <i>Clinical change attributable to programme</i> .
			Consistency of leadership	Emerged from analysis as contributing to <i>Sustained Quality Improvement programme</i> .
			Quality as a business strategy	Emerged from analysis as contributing to <i>Sustained Quality Improvement programme</i> .
Parsons; Cornett, 2011 ¹⁰¹	Qualitative interview study cross-sectional	15 Hospitals with Magnet recognition, US	Valuing education	Perceived by Chief Nursing Officers as facilitating sustained <i>Magnet recognition</i> .
			Financial concerns for organisation	Perceived by Chief Nursing Officers as a barrier to sustained <i>Magnet recognition</i> .
Pettigrew; Ferlie; McKee, 1992 ⁴¹	Qualitative interview study longitudinal	8 District health authorities , UK (England)	Quality and coherence of policy	All derived inductively from case studies of <i>Implementing strategic change</i> , including some examples of service improvement and others of operational change and retrenchment.
			Managerial-clinical relations	
			Co-operative inter-organisation networks	
			Simplicity and clarity of goals and priorities	

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Pines; Hollander, 2008 ¹⁰²	Cross-sectional quantitative study	1 Emergency department, US	Crowding: occupancy rate	Higher occupancy significantly associated with <i>Delay >1 hour in analgesia from triage</i> and <i>Delay >1 hour in analgesia from arrival in treatment room</i> . No association with <i>No analgesia</i> .
			Crowding: total patient-care hours	No significant association.
			Crowding: number of patients in waiting room	Higher Number of patients in waiting room significantly associated with <i>No analgesia</i> , <i>Delay >1 hour in analgesia from triage</i> and <i>Delay >1 hour in analgesia from arrival in treatment room</i> .
Popescu; Werner; Vaughan-Sarrazin, et al., 2009 ⁴²	Cross-sectional quantitative study	2761 Hospitals reporting performance on acute myocardial infarction process measures, US	Safety-net status (defined by Medicaid caseload relative to mean for US)	From analysis of variance, significant gradient (fewer in <i>Better performers</i>).
			Teaching status	From analysis of variance, significant gradient (more in <i>Better performers</i>).
			Nurse staffing (FTE per adjusted patient day)	From analysis of variance, significant relationship (higher in <i>High</i> than in <i>Intermediate</i> and <i>Low performers</i>).
			Bed size	From analysis of variance, significant relationship (bigger in <i>High</i> than in <i>Intermediate</i> and <i>Low performers</i>).
			For profit status	From analysis of variance, significant gradient (fewer for profit in <i>Better performers</i>).
			Medicare acute myocardial infarction volume	From analysis of variance, significant relationship (greater in <i>High</i> than in <i>Intermediate</i> and <i>Low performers</i>).
			Mean Medicare patient age	From analysis of variance, significant gradient (younger in <i>Better performers</i>).

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
			% Medicare patients black	From analysis of variance, significant gradient (lower in <i>Better performers</i>).
			Medicare patient zip code mean household income	From analysis of variance, significant gradient (higher in <i>Better performers</i>).
			Medicare patient mean distance from hospital with revascularisation facilities	From analysis of variance, significant gradient (nearer in <i>Better performers</i>).
			Medicare patient comorbidities	From analysis of variance, significant gradient (fewer comorbidities in <i>Better performers</i>).
			Performance on acute myocardial infarction measures (Low, Medium, High)	In regression model, significantly better <i>30-day mortality from admission in Medicare Fee-for-service patients with acute myocardial infarction</i> in Higher performers.
Rafferty; Clarke; Coles, et al., 2007 ¹⁰³	Cross-sectional quantitative study	30 Hospital trusts, UK (England)	Nurse staffing: patients/nurse	Significantly worse <i>In-patient mortality and Failure to rescue (mortality in those whose length of stay exceeds 1.25 times the mean for their condition)</i> in the worst staffing quartile compared to the best.
Rivard; Elixhauser; Christiansen, et al., 2010 ¹⁰⁴	Cross-sectional quantitative study	1108 VA and non-federal hospitals, US	Bed size	No significant association with performance on <i>Patient safety indicator composite</i> in VA or non-federal hospitals.
			Teaching status	Minor and major teaching VA hospitals significantly worse performance than non-teaching VA hospitals on <i>Patient safety indicator composite</i> . Major teaching non-federal hospitals significantly worse than non-teaching non-federal hospitals.
			Nurse staffing (Registered Nurse and Licensed Practical Nurse hours per adjusted patient day)	Significant association between higher nurse staffing and worse performance on <i>Patient safety indicator composite</i> in VA and non-federal hospitals.
			VA compared to non-federal hospitals	Similar effects in VA and non-federal hospitals.

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Robertson; Hassan, 1999 ¹⁰⁵	Cross-sectional quantitative study	2133 Hospitals providing COPD care, US	FTE Registered Nurse, Licensed Practical Nurse and Ancillary nursing personnel (separately) per 100 admissions	No significant association between <i>Risk adjusted COPD mortality</i> and any Nursing staffing measure for any year.
			FTE Respiratory therapists and Respiratory technicians (separately) per 100 admissions	Significant lower <i>Risk adjusted COPD mortality</i> with more Respiratory therapists in 2 of 3 years and also with Respiratory technicians in 2 of 3 years.
			FTE Radiographers/radiologic technicians, Radiation therapists, Nuclear medicine technologists and Other radiologic personnel (separately) per 100 admissions	No significant association between <i>Risk adjusted COPD mortality</i> and any Radiologic personnel staffing measure for any year.
			FTE Medical technologists and Other laboratory personnel (separately) per 100 admissions	Significant lower <i>Risk adjusted COPD mortality</i> with more Other laboratory personnel in 1 of 3 years. No significant association between <i>Risk adjusted COPD mortality</i> and Medical technologist staffing.
Rodriguez; Von Glahn; Rogers, et al., 2009 ⁴⁴	Cross-sectional quantitative study	34 Medical groups, US	Medical group type (Independent practice association/Integrated medical group/Hybrid model)	Integrated medical group type significantly associated with higher <i>Patient assessment of physician communication</i> and <i>Patient assessment of care coordination</i> than Independent practice group or Hybrid model. No significant association with <i>Patient assessment of access to care</i> , or <i>Patient assessment of office staff interactions</i> .

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
			Primary care physicians per medical group	More Primary care physicians per medical group significantly associated with higher <i>Patient assessment of physician communication</i> , <i>Patient assessment of access to care</i> , <i>Patient assessment of care coordination</i> and <i>Patient assessment of office staff interactions</i> .
			Patient experience improvement strategies count	No significant associations.
Rosen; Loveland; Romano, et al., 2009 ¹⁰⁶	Longitudinal quantitative study	3492 Acute care VA and general non-federal Medicare hospitals, US	Physician working time regulation (Accreditation Council for Graduate Medical Education Resident Duty Hour reform)	No systematic difference in <i>Continuity of care patient safety indicator composite</i> , <i>Technical care patient safety indicator composite</i> , or <i>Other patient safety indicator composite</i> by Teaching intensity pre and post reforms.
			Teaching intensity (resident/bed ratio)	
Rosenheck; Fontana, 2001 ¹⁰⁷	Non-RCT controlled study	35 Inpatient and residential Veterans Affairs programs that provide specialized treatment for veterans with military-related PTSD, US	Inpatient programs that made either change below compared to those that did not	No significant association with any outcome.
			Inpatient programs that formally shortened their length of stay compared to inpatient programs that did not	No significant association with any outcome.
			Programs that converted from hospital-based inpatient programs to residential rehabilitation programs compared to unchanged residential programs	Significantly improved <i>PTSD outcome</i> by 2 measures for Unchanged residential programs. No significant change for changed programs. Significantly worse <i>Alcohol and Drug problem</i> indices and <i>Violent behaviour</i> for changed programs, and significantly improved for unchanged residential programs.

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Ross; Cha; Epstein, et al., 2007 ¹⁰⁸	Cross-sectional quantitative study	1577 Safety-net and non-safety net hospitals serving the same populations, US	Safety-net hospitals (defined by Medicaid caseload relative to mean for state)	Significantly worse 30-day mortality after admission for acute myocardial infarction in patients 65 and older, Rate of Appropriate non-reperfusion therapy, and Rate of Appropriate time-to-reperfusion therapy.
Rothberg; Cohen; Lindenauer, et al., 2010 ¹⁰⁹	Longitudinal quantitative study	122 Hospitals, US	Hospital costs for selected diagnoses	Apparently no relationship between changes in mortality and cost. <i>Relative In-hospital mortality rate for Acute myocardial infarction</i> fell by 21% (ranked best fall of 7 conditions) while relative cost rose by 49% (ranked 2nd highest rise). <i>Relative In-hospital mortality rate for congestive heart failure</i> fell by 19% (ranked 3rd) while relative cost rose by 60% (ranked highest). <i>Relative In-hospital mortality rate for chronic obstructive pulmonary disease</i> fell by 14% (ranked =4th) while relative cost rose by 27% (ranked 6th). <i>Relative In-hospital mortality rate for cerebrovascular accident</i> fell by 14% (ranked =4th) while relative cost rose by 30% (ranked 5th). <i>Relative In-hospital mortality rate for pneumonia</i> fell by 20% (ranked 2nd) while relative cost rose by 26% (ranked 7th). <i>Relative In-hospital mortality rate for sepsis</i> fell by 1% (ranked 7th) while relative cost rose by 41% (ranked 3rd). <i>Relative In-hospital mortality rate for urinary tract infection</i> fell by 14% (ranked =4th) while relative cost rose by 31% (ranked 4th).

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Russell; Dahrouge; Hogg, et al., 2009 ¹¹⁰	Mixed methods: cross-sectional observational quantitative, and qualitative interview study	137 Primary care practice, Canada	Primary care delivery model (Community health centre, Fee-for-service, Family health network, Health service organisation)	Significantly worse performance than Community health centres in <i>Composite measure of evidence-based chronic disease management</i> by Fee-for-service, Family health network, and Health service organisation.
			Nurse practitioner provided	Significantly better <i>Composite measure of evidence-based chronic disease management</i> . Identified in physician interviews as supporting good practice.
			Practice size (>4 physicians)	Significantly worse performance in <i>Composite measure of evidence-based chronic disease management</i> .
			Patients/physician	Significantly worse performance in <i>Composite measure of evidence-based chronic disease management</i> . Supported by patient interviewees identifying time spent with patient as important to successful disease management.
Salge; Vera, 2009 ¹¹¹	Cross-sectional quantitative study	173 Hospital trusts, UK (England)	Science-based innovativeness Score	Significantly associated with better <i>Patient mortality</i> and <i>Patient satisfaction</i> . No significant association with <i>Healthcare Commission Service quality rating</i> .
Schubert; Glass; Clarke, et al., 2008 ¹¹²	Cross-sectional quantitative study	8 Acute care hospitals, Switzerland	Rationing: nurse-reported frequency of not being able to perform tasks in last 7 days due to resources	No significant association with <i>Overall patient satisfaction</i> .
Shortell; Jones; Rademaker, et al., 2000 ¹¹³	Longitudinal quantitative study	16 Hospitals providing CABG, US	High vs low TQM experience and maturity from use of TQM and training and participation	No significant association with any <i>Clinical efficiency</i> , or <i>Health status measure</i> . No significant association with any <i>Patient satisfaction measure</i> .

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
			Average score in 7 areas of quality management based on Baldrige criteria	No significant association with <i>Operating room time</i> , <i>Postoperative intubation time</i> , or <i>Health status measures</i> . Significantly greater <i>Satisfaction with nurses</i> . No significant association with 3 other <i>Patient satisfaction measures</i> .
Shortell; Schmittiel; Wang, et al., 2005 ⁴⁷	Cross-sectional quantitative study	693 Medical groups that treated patients with all 4 of asthma, congestive heart failure, depression, and diabetes, US	Resource acquisition: Contracts	Significantly associated with increased <i>Overall Quality Index</i> and <i>Care Management Index</i> . No significant association with <i>Health Promotion Index</i> .
			Resource acquisition: Additional income	No significant associations.
			Resource acquisition: Medicare revenue	No significant associations.
			Resource acquisition: Capital/M.D	No significant associations.
			Resource deployment: Number of M.D.s	More M.D.s significantly associated with increased <i>Overall Quality Index</i> . No significant associations with <i>Health Promotion Index</i> or <i>Care Management Index</i> .
			Resource deployment: Provision of Multispecialty care	Significantly associated with increased <i>Health Promotion Index</i> . No significant association with <i>Overall Quality Index</i> or <i>Care Management Index</i> .
			Resource deployment: Primary care only	Significantly associated with reduced <i>Care Management Index</i> and increased <i>Health Promotion Index</i> . No significant association with <i>Overall Quality Index</i> .
			Resource deployment: Age of organization	No significant associations.

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
			Resource deployment: Hospital/system	Significantly associated with increased <i>Care Management Index</i> and <i>Health Promotion Index</i> . No significant association with <i>Overall Quality Index</i> .
			Quality-centred culture: quality improvement involvement	Significantly associated with increased <i>Overall Quality Index</i> , <i>Care Management Index</i> and <i>Health Promotion Index</i> .
			Quality-centred culture: Measures patient satisfaction	Significantly associated with increased <i>Overall Quality Index</i> and <i>Health Promotion Index</i> . No significant association with <i>Care Management Index</i> .
Snyder; Anderson, 2005 ¹¹⁴	Longitudinal quantitative study	~9,000 Hospitals invited to participate in Medicare Quality Improvement Organisation, US	Participation in Quality Improvement Organisation	Significantly associated with 1 of 5 measures of <i>Evidence-based practice in Pneumonia</i> . No significant association with <i>Evidence-based practice in Atrial fibrillation</i> (1 measure), <i>Evidence-based practice in Acute myocardial infarction</i> (6 measures), <i>Evidence-based practice in Heart failure</i> (1 measure), or <i>Evidence-based practice in Stroke</i> (2 measures).
			Bed size	Significantly associated with <i>Participation in Quality Improvement Organisation</i> in all of 5 conditions.
			Profit status	Significantly associated with <i>Participation in Quality Improvement Organisation</i> in 4 of 5 conditions.
Spector; Selden; Cohen, 1998 ¹¹⁵	Cross-sectional quantitative study	2230 Long-term residents in free-standing private nursing homes, US	For profit /non-profit status	Significantly lower <i>Infections</i> in Non-profit homes. No significant association with <i>Mortality</i> , <i>Bedsore</i> s, <i>Time as a hospital inpatient</i> , <i>Functional disability (ADL)</i> .

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Spiegel; Bolus; Desai, et al., 2010 ¹¹⁶	Cross-sectional quantitative study	90 Dialysis facilities, US	Facility characteristics	In exploratory study, Rapidity that care conferences convened after patient discharged from hospital to facility significantly associated with Standardised mortality rate. No significant association between Perceived quality of continuing medical education programmes or 3 other facility-level variables and Standardised mortality rate.
Stetler; Ritchie; Rycroft-Malone, et al., 2009 ⁴⁹	Mixed methods: cross-sectional observational quantitative, and qualitative interview study	2 Acute care hospitals, US	Quality and coherence of policy	Most influential of Pettigrew Ferlie and McKee ⁴¹ factors in <i>Institutionalisation of evidence-based practice</i> .

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Sung; Suh; Lee, et al., 2010 ¹¹⁷	Cross-sectional quantitative study	20 Primary care services, South Korea	Type of primary care service (Private clinic, Teaching hospital clinic, Public health center clinic, Health cooperative clinic)	<p>Significant rankings for all 6 domains of <i>Primary Care Assessment Tool</i>.</p> <p>Ranking for <i>Patient-rated Comprehensiveness</i> (best to worst): 1 Health cooperative clinic; 2 Teaching hospital clinic; =3 Public health center clinic and Private clinic.</p> <p>Ranking for <i>Patient-rated Coordination</i> (best to worst): =1 Health cooperative clinic and Teaching hospital clinic; 3 Private clinic; 4 Public health center clinic.</p> <p>Ranking for <i>Patient-rated Personalized care</i> (best to worst): 1 Health cooperative clinic; =2 Teaching hospital clinic and Private clinic; 4 Public health center clinic.</p> <p>Ranking for <i>Patient-rated Family/community orientation</i> (best to worst): 1 Health cooperative clinic; 2 Private clinic; =3 Teaching hospital clinic and Public health center clinic.</p> <p>Ranking for <i>Patient-rated First contact</i> (best to worst): 1 Health cooperative clinic; 2 Private clinic; 3 Teaching hospital clinic; 4 Public health center clinic.</p> <p>Ranking for <i>Patient-rated Primary care average score</i> (best to worst): 1 Health cooperative clinic; =2 Private clinic and Teaching hospital clinic; 4 Public health center clinic.</p>
Sutton; McLean, 2006 ⁵⁰	Cross-sectional quantitative study	60 Primary care practices, UK (Scotland)	Clinical team size	Larger team significantly associated with better <i>Quality score</i> .
			Clinical team composition	Non principals making greater proportion of clinical team significantly associated with better <i>Quality score</i> .
			Practice characteristics	Former fundholding status significantly associated with better <i>Quality score</i> .

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
			Income from other sources	Greater proportion of income from weighted capitation significantly associated with worse <i>Quality score</i> .
Szecsenyi; Goetz; Campbell, et al., 2011 ¹¹⁸	Cross-sectional quantitative study	676 Primary care practices, Germany	Ratio of quarterly contact group/number of all staff members	Fewer patients with at least one contact per quarter significantly correlated with greater <i>Patient intention not to change practice</i> . No significant correlations with <i>Patient satisfaction with physician</i> or <i>Patient satisfaction with organisation of the practice team</i> .
			Ratio of quarterly contact group/number of non-physicians	No significant correlations.
			Ratio of quarterly contact group/number of physicians	No significant correlations.
Temkin-Greener; Zheng; Cai, et al., 2010 ¹¹⁹	Cross-sectional quantitative study	162 Nursing home facilities, US	Perceived work effectiveness	Significant association with <i>Federal quality of care deficiency citations</i> and <i>Most severe quality of care citations</i> . No significant association with <i>Quality of life citations</i> .
			Self-managed teams % staff reporting to work in self-managed teams	Significant association with <i>Federal quality of care deficiency citations</i> . No significant association with <i>Quality of life citations</i> and <i>Most severe quality of care citations</i> .
			Formal teams % staff reporting to work in formal teams	No significant associations.

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Trinkoff; Johantgen; Storr, et al., 2011 ¹²⁰	Cross-sectional quantitative study	71 Acute care non-federal hospitals, US	Long work hours	Significantly associated with <i>Mortality from pneumonia</i> and <i>Mortality from acute myocardial infarction</i> . No significant association with <i>Mortality from abdominal aortic aneurysm</i> , <i>Mortality from congestive heart failure</i> , <i>Mortality from stroke</i> or <i>Mortality from craniotomy</i> .
			Off shift and weekends	No significant association with any outcome.
			Weekly burden	Significantly associated with <i>Mortality from acute myocardial infarction</i> . No significant association with <i>Mortality from pneumonia</i> , <i>Mortality from abdominal aortic aneurysm</i> , <i>Mortality from congestive heart failure</i> , <i>Mortality from stroke</i> , or <i>Mortality from craniotomy</i> .
			Lack of time away	Significantly associated with <i>Mortality from pneumonia</i> , and <i>Mortality from abdominal aortic aneurysm</i> . No significant association with <i>Mortality from congestive heart failure</i> , <i>Mortality from acute myocardial infarction</i> , <i>Mortality from stroke</i> , or <i>Mortality from craniotomy</i> .
			Mandatory overtime	No significant association with any outcome.
			Working while sick	Significantly associated with <i>Mortality from congestive heart failure</i> . No significant association with <i>Mortality from pneumonia</i> , <i>Mortality from abdominal aortic aneurysm</i> , <i>Mortality from acute myocardial infarction</i> , <i>Mortality from stroke</i> , or <i>Mortality from craniotomy</i> .
			Required on call	No significant association with any outcome.
			Insufficient work breaks	No significant association with any outcome.
			Off shift and weekends	No significant association with any outcome.

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Unruh; Zhang, 2012 ¹²¹	Longitudinal quantitative study	124 Short-term general hospitals, US	Registered Nurse FTE given hospital size at baseline	Significant association with better <i>Rate of Infections due to medical care</i> . Significant association with worse <i>Rate of Failure to rescue</i> . No significant association with <i>Decubitus ulcer</i> or <i>Postoperative sepsis</i> .
			Change in Registered Nurse FTE 1966-2004	Significant association with better <i>Rate of Infections due to medical care</i> . Significant association with worse <i>Rate of Failure to rescue</i> . No significant association with <i>Rate of decubitus ulcer</i> or <i>Postoperative sepsis</i> .
			Registered Nurse per adjusted patient day at baseline	Significant association with worse <i>Rate of Decubitus ulcer</i> and <i>Infections due to medical care</i> . No significant association with <i>Rate of Failure to rescue</i> or <i>Postoperative sepsis</i> .
			Change in Registered Nurse per adjusted patient day 1966-2004	Significant association with worse <i>Rate of Infections due to medical care</i> and <i>Postoperative sepsis</i> . No significant association with <i>Rate of decubitus ulcer</i> or <i>Failure to rescue</i> .
Valdmanis; Rosko; Mutter, 2008 ⁵¹	Cross-sectional quantitative study	1377 Short term, community hospitals, US	Total expenditures	Significantly associated with better <i>Quality congestion score</i> compiled from <i>Failure to rescue</i> , <i>Infection due to medical care</i> , <i>Postoperative respiratory failure</i> and <i>Postoperative sepsis</i> .
			High-tech services	Significantly associated with better <i>Quality congestion score</i> .
			Medicare (%)	Significantly associated with better <i>Quality congestion score</i> .

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
			Occupancy rate	Significantly associated with better <i>Quality congestion score</i> .
			Average length of stay	Significantly associated with better <i>Quality congestion score</i> .
			Cost/admission	Significantly associated with better <i>Quality congestion score</i> .
			Capital/bed	Significantly associated with better <i>Quality congestion score</i> .
			Full-time equivalent (FTE)/bed	Significantly associated with better <i>Quality congestion score</i> .
			Health maintenance organization (HMO) (%)	Significantly associated with better <i>Quality congestion score</i> .
			Bassinets	Significantly associated with better <i>Quality congestion score</i> .
			FTE Registered Nurses	No significant association with <i>Quality congestion score</i> .
			FTE Licensed Practical Nurses	No significant association with <i>Quality congestion score</i> .
			FTE other personnel	Significantly associated with better <i>Quality congestion score</i> .
			FTE interns/residents	No significant association with <i>Quality congestion score</i> .
			Other beds	No significant association with <i>Quality congestion score</i> .
			Acute beds	Significantly associated with worse <i>Quality congestion score</i> .

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Vina; Rhew; Weingarten, et al., 2009 ¹²²	Cross-sectional quantitative study	84 Hospitals, US	Quality improvement interventions (use of order sets, clinical pathways, educational programs, multi-disciplinary teams)	Significant positive associations with being in <i>Top two deciles on composite measure of outcomes and processes in acute myocardial infarction, coronary artery bypass graft surgery, heart failure, community-acquired pneumonia (Top performers)</i> , and hip and knee replacement in order sets (1 of 5 conditions), clinical pathways (4 of 5), multi-disciplinary teams (2 of 5).
			Data feedback techniques (systems used for collecting and reporting data on hospital-specific and physician-specific compliance to quality measures)	No significant associations.
			Organizational support for quality improvement (agreement to statements indicating support from administration, nursing, and physicians; participation level of physicians; and availability of resources)	Significantly more agreement in <i>Top performers</i> in reported nursing support for "adherence to quality improvement" and reported "adequate HR resources to increase adherence to quality indicators". No significant differences in other 4 organisational support propositions.
Wang; Hyun; Harrison, et al., 2006 ¹²³	Qualitative interview study cross-sectional	10 Provider organisations, US	Systematically establish and maintain infrastructure, processes, and performance appraisal systems that support continuous improvement	Identified in Interviews with experts and organisational key informants as common to organisations with <i>Successful system-wide change for quality</i> .

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Wang; O'Donnell; Mackay, et al., 2006 ¹²⁴	Cross-sectional quantitative study	638 Urban primary practices, UK (Scotland)	Practice size (Single-handed 1.00 WTE GP, Small practice 1.01–3.00 WTE, GPs Medium practice 3.01–5.00, WTE GPs, Large practice 5.01 GPs)	Practice size significantly associated with mean total <i>Quality and Outcomes Framework (QOF)</i> score, largest best. <i>Organisational points</i> the only significant component. No significant associations with <i>Clinical, Patient experience, Additional services, Holistic care points</i> and <i>Quality practice payment components</i> .
Weiner; Alexander; Baker, et al., 2006 ¹²⁵	Cross-sectional quantitative study	1784 Community hospitals, US	Extent of organizational quality improvement deployment	Significantly associated with worse <i>Post-operative complications index, Technical adverse events index, Technical difficulty with procedures index</i> and <i>Failure to rescue index</i> .
			Percentage of senior management on quality improvement teams	No significant associations with any outcome.
			Percentage of total FTEs on quality improvement teams	No significant associations with any outcome.
			Percentage of physicians on quality improvement teams	Significantly associated with better <i>Post-operative complications index</i> and worse <i>Technical difficulty with procedures index</i> . No significant associations with <i>Technical adverse events index</i> or <i>Failure to rescue index</i> .
			Percentage of FTEs on quality improvement teams	Significantly positively associated with <i>Inpatient hospital mortality for acute myocardial infarction, Inpatient hospital mortality for congestive heart failure, Inpatient hospital mortality for stroke, Inpatient hospital mortality for pneumonia, Bilateral catheterization</i> , not significantly associated with <i>Inpatient mortality for CABG</i> .

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
			Percentage of managers on quality improvement teams	Significantly positive associated with <i>Inpatient hospital mortality for acute myocardial infarction, Inpatient hospital mortality for congestive heart failure, Inpatient hospital mortality for stroke, Inpatient hospital mortality for pneumonia, Bilateral catheterization</i> , not significantly associated with <i>Inpatient mortality for CABG</i> .
			Percentage of physicians on quality improvement teams	No association with any measure.
Weiner; Alexander; Shortell, et al., 2006 ¹²⁶	Cross-sectional quantitative study	1784 Hospitals, US	Involvement of hospital units in quality improvement	Significantly positively associated with <i>Inpatient hospital mortality for acute myocardial infarction, Inpatient hospital mortality for congestive heart failure, Inpatient hospital mortality for stroke, Inpatient hospital mortality for pneumonia, Bilateral catheterization</i> . Not significantly associated with <i>Inpatient mortality for CABG</i> .
Westphal; Gulati; Shortell, 1997 ¹²⁷	Cross-sectional quantitative study	2712 Community general medical surgical hospitals (some analyses conducted on sub-sample of 269), US	Late TQM adoption	Significantly associated with greater <i>Conformity to TQM - normative measure</i> (number of TQM practices compared to organisations in network) and with higher probability of <i>Conformity to standard model of TQM</i> .
			Hospital legitimacy (accreditation score)	Significantly associated with greater <i>Conformity to TQM - normative measure</i> ; Significantly associated with higher probability of <i>Conformity to standard model of TQM</i> .

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
			Hospital efficiency	Significantly associated with decreased <i>Conformity to TQM</i> - normative measure by 3 measures of efficiency - CEO's perception, profitability and productivity, and with lower probability of <i>Conformity to standard model of TQM</i> .
			Alliance ties to adopters	No significant association with <i>Conformity to TQM</i> - normative measure, but significantly strengthens the association between Late adoption and Conformity No significant association with <i>Conformity to standard model of TQM</i> , but significantly strengthens the association between Late adoption and Conformity.
			System ties to adopters	No significant association with <i>Conformity to TQM</i> - normative measure, but significantly strengthens the association between Late adoption and Conformity. No significant association with <i>Conformity to standard model of TQM</i> , but significantly strengthens the association between Late adoption and Conformity.
Wouters; Heunis; Van Rensburg, et al., 2008 ¹²⁸	Longitudinal quantitative study	16 Primary health care facilities providing antiretroviral treatment, South Africa	Nurse vacancy rates	Significant correlation with <i>Satisfaction with services performed by nurses</i> in Whole sample (wave 1 + wave 4). Correlation reduces between wave 1 and wave 4.

Table 2: Summary of findings from meso level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Yu; Menachemi; Berner, et al., 2009 ¹²⁹	Cross-sectional quantitative study	3364 Hospitals providing information to database on hospital information systems, US	Entry of all physician orders via computerised physician order entry	Significantly associated with better performance in 5 of 6 <i>Acute myocardial infarction indicators</i> and 1 of 4 <i>Pneumonia indicators related to medication orders</i> , and 2 of 3 <i>Heart failure indicators not related to medication orders</i> . No significant association with 1 <i>Acute myocardial infarction indicator</i> , 1 <i>Heart failure indicator</i> and 3 <i>Pneumonia indicators related to medication orders</i> , and 2 <i>Acute myocardial infarction indicators</i> , 2 <i>Heart failure indicators</i> and 4 <i>Pneumonia indicators not related to medication orders</i> .
Zegers; de Bruijne; Spreeuwenberg, et al., 2011 ¹³⁰	Cross-sectional quantitative study	21 Acute care hospitals, Netherlands	Hospital type (university, tertiary teaching, general)	Significant variation in <i>Adverse events</i> . No significant variation in <i>Preventable adverse events</i> .
Zinn; Weech; Brannon, 1998 ⁵²	Cross-sectional quantitative study	241 Nursing homes, US	Nursing home size: Number of beds in the facility	No significant association with <i>TQM adoption</i> .
			Proportion Medicare Proportion of nursing home residents with Medicare coverage	Significant association with <i>TQM adoption</i> .
Zuvekas; Hill, 2004 ¹³¹	Cross-sectional quantitative study	2904 Privately insured, non-elderly HMO enrollees analysed by type of health plan, US	Health plan type (Group/staff, Other capitating model, Fee-for-service)	No significant difference between plans in whether had <i>Adult physician exam in past year</i> . No significant difference between plans in <i>Whether provider has night or weekend hours</i> , <i>Wait less than 15 minutes in office</i> , or whether <i>Usual source of care asks about treatments from other providers</i> (proxy for care co-ordination).

Table 3: Summary of findings from meso level psychological factors

	Study design	Organisations investigated	Contextual factor measure	Main findings
Aiken; Clarke; Sloane, et al., 2008 ¹³²	Cross-sectional quantitative study	168 Acute care hospitals providing surgical care, US	Care environment (Quality of care, leadership and collegial nurse-physician relationship subscales from Nursing Work Index)	Better environment significantly associated with better <i>30-day Mortality after surgery</i> . No significant association with <i>30-day Mortality in patients with complications from surgery (failure to rescue)</i> .
Benzer; Young; Stolzmman, et al., 2011 ¹³³	Cross-sectional quantitative study	223 VA primary care clinics with >5 employees selected through record linkage to patient database, US	Relational climate measured by 3 items on employee questionnaire	Significant positive association with <i>Foot exam in last year, HbA1c measured in last year, Blood pressure<140/90</i> . No significant associations with <i>LDL-C<120, HbA1c<9</i> .
			Task climate measured by 3 items on employee questionnaire	No significant associations with <i>Process or Intermediate outcome</i> measures.
Berlowitz; Young; Hickey, et al., 2003 ⁵⁷	Cross-sectional quantitative study	35 Nursing Homes, US	100 point developmental/group culture scale derived from Zammuto and Krakower 1991	Significant positive association with <i>Mean Quality Improvement implementation score</i> .
Bosch; Dijkstra; Wensing, et al., 2008 ¹³⁴	Cross-sectional quantitative study	30 General practices, Netherlands	Group culture (CVF)	Significantly worse <i>Adherence to clinical guidelines</i> . No significant association with <i>HbA1c, Systolic blood pressure, or Total cholesterol</i> .
			Developmental culture (CVF)	No significant associations with any outcome.
			Hierarchical culture (CVF)	No significant associations with any outcome.
			Rational culture (CVF)	No significant associations with any outcome.
			Balance across culture types (CVF)	Significantly better <i>Adherence to clinical guidelines</i> . No significant association with <i>HbA1c, Systolic blood pressure, or Total cholesterol</i> .

Table 3: Summary of findings from meso level psychological factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Bradley; Herrin; Mattera, et al., 2005 ⁶¹	Cross-sectional quantitative study	234 Hospitals participating in acute myocardial infarction registry, US	Organisational support for quality improvement	Significantly associated with being in <i>High or Medium group</i> for <i>Rate of appropriate beta-blocker prescription</i> .
			Organisational culture	Not significantly associated with being in <i>High or Medium group</i> for <i>Rate of appropriate beta-blocker prescription</i> independently of other contextual factors measured.
			Physician leader	Significantly associated with being in <i>High or Medium group</i> for <i>Rate of appropriate beta-blocker prescription</i> independently of other contextual factors measured.
Bradley; Holmboe; Mattera, et al., 2001 ⁶²	Qualitative interview study cross sectional	8 Hospitals of various types providing care for patients with acute myocardial infarction, US	Administrative support	Believed by interviewees to be associated with improved β -blocker use, and stronger support reported in <i>Higher performing hospitals</i> .
			Clinical support	Believed by interviewees to be associated with improved β -blocker use, and stronger support reported in <i>Higher performing hospitals</i> .
Braithwaite; Greenfield; Westbrook, et al., 2010 ¹⁰	Cross-sectional quantitative study	19 Health care organisations, Australia	Organizational culture	Significantly associated with <i>Accreditation score on 43 measures of patient experience, management, information management and human resources, patient safety and clinical performance</i> .
			Organizational climate	No significant association with <i>Accreditation score</i> .
			Leadership	Significantly associated with <i>Accreditation score</i> .
Bray; Cummings; Pharm, et al., 2009 ⁶⁵	Qualitative interview study cross sectional	13 Community health centres and private practices participating in quality improvement collaborative, US	Leadership commitment	Found in most practices <i>Sustaining quality improvement</i> .
		Collaborative environment in practice		

Table 3: Summary of findings from meso level psychological factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Castle; Longest, 2006 ¹³⁵	Cross-sectional quantitative study	~17000 Nursing homes, US	Deficiency citations (failure to meet state or federal requirements) for Administration (top management)	Significantly associated with higher than average <i>Catheterisation, Pressure ulcers, Contractures, Psychoactive drug use (excluding antidepressants)</i> . No significant association with <i>Restraint use</i> .
Charles; McKee; McCann, 2011 ⁶⁹	Qualitative interview study cross-sectional	8 Hospital trusts, UK (England)	Supportive culture	Resilient and adaptive trusts had high levels of organisational learning and were open and receptive to change, contrasting with Conservative and In-recovery trusts which were judged worse performers in patient safety and were less open to change. Decision-making in Resilient and Adaptive trusts was more participative.
Curry; Spatz; Cherlin, et al., 2011 ⁷¹	Qualitative interview study cross sectional	11 Hospitals, US	Organizational values and goals	Shared commitment to quality across the hospital in <i>High performers</i> , not found in <i>Low performers</i> .
			Senior management involvement	Senior commitment to quality in <i>High performers</i> , not found in <i>Low performers</i> .
			Communication and coordination among groups	Strong communication across disciplines and between departments in <i>High performers</i> , not found in <i>Low performers</i> .
			Problem solving and learning	Positive problem-solving approach in <i>High performers</i> , not found in <i>Low performers</i> .
Davies; Mannion; Jacobs, et al., 2006 ¹³⁶	Cross-sectional quantitative study	189 Acute hospitals, UK (England)	Organisational culture: (Clan, Developmental, Hierarchical, Rational)	Higher Clan and Hierarchical culture scores significantly associated with lower <i>Star rating</i> . No significant relationships with scores for other culture types.
Doyle; Ewer; Wagner, 2010 ¹³⁷	Cross-sectional quantitative study	2 Medical teams at single hospital affiliated to different academic institutions, US	Care from physician team from Program A affiliated to academic institution among top medical schools in US vs from Program B ranked lower in quality distribution	No significant differences in any of the following outcomes: <i>30-day readmission, 1-year readmission, 1-year readmission same major diagnosis, 30-day mortality, 1-year mortality, 5-year mortality</i> , although costs were significantly lower for Program A.

Table 3: Summary of findings from meso level psychological factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Feifer; Nemeth; Nietert, et al., 2007 ⁷⁴	Mixed methods: longitudinal quantitative, and qualitative interview study	9 Primary care practices, US	Focus on results	All 9 <i>High performing</i> practices shared a focus on results.
			Patient centered	All 9 <i>High performing</i> practices worked in partnership with patients.
			Archetype (Technophile, Motivated Team, Care Enterprise)	Researchers identified 3 archetypes among the 9 <i>High performing</i> practices: Technophiles characterised by technical competence with electronic medical record tools, focus on results and strong leadership; Motivated teams characterised by strong team working; Care enterprises characterised by innovative and responsive service delivery changes.
Friese; Lake; Aiken, et al., 2008 ⁷⁷	Cross-sectional quantitative study	164 Hospitals providing surgical oncology, US	Nurse practice environment (participation, quality of care, leadership, management and resource dimensions)	Worse environment significantly associated with higher <i>30-day Mortality following cancer surgery</i> and higher <i>Failure to rescue (30-day mortality in patients with complications following cancer surgery)</i> . No significant association with <i>Complications following cancer surgery</i> .
Garpenby, 1997 ²¹	Qualitative interview study cross-sectional	3 County councils, Sweden	Medical governance of clinical quality assurance	In one county council, competition stimulated stronger medical-led <i>Quality assurance</i> within providers in response to patient choice, while in another there was a top-down <i>Quality structure</i> receiving information on patient satisfaction and clinical measures, though medical engagement was limited. In a third, medical-led <i>Quality assurance</i> was seen as separate from organisational objectives.
Glickman; Boulding; Staelin, et al., 2007 ⁷⁹	Cross-sectional quantitative study	212 Hospitals participating in quality	Clinical commitment to quality (cardiology)	Significant positive correlation with difference in a <i>Composite process score for guideline adherence</i> in study year and 2 years earlier.

Table 3: Summary of findings from meso level psychological factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
		improvement program, US	Clinical commitment to quality (emergency medicine)	No significant correlation.
			Administrative commitment to quality	No significant correlation.
			'Culture': employee satisfaction scale on questionnaire survey	No significant correlation.
			Barriers to quality improvement (cultural/physician resistance to change)	No significant correlation.
Hansen; Williams; Singer, 2011 ¹³⁸	Cross-sectional quantitative study	67 Acute care hospitals, US	Patient safety climate in healthcare organisations (PSCHO)	Significantly associated with <i>30-day readmission for acute myocardial infarction</i> and <i>30-day readmission for heart failure</i> . No significant association with <i>30-day readmission for pneumonia</i> .
			PSCHO: Senior management vs frontline staff	Significantly associated with <i>30-day readmission for acute myocardial infarction</i> and <i>30-day readmission for heart failure</i> in frontline staff but not senior management.
			PSCHO: Physicians vs nurses	Significantly associated with <i>30-day readmission for acute myocardial infarction</i> in physicians but not nurses. Significantly associated with <i>30-day readmission for heart failure</i> in physicians but not nurses.
Hockey; Bates, 2010 ⁸⁴	Qualitative interview study cross sectional	5 Academic medical centres and community hospitals, US	Leadership characteristics	<i>High performers</i> on <i>Hospital quality performance score for pneumonia and congestive heart failure</i> distinguished from <i>Low performers</i> by senior management engaged with physicians in commitment to quality.

Table 3: Summary of findings from meso level psychological factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Kaissi; Kralewski; Dowd, et al., 2007 ¹³⁹	Cross-sectional quantitative study	78 Group practices, US	Autonomy (hypothesised as barrier)	No significant association with impact of electronic medical records, clinical prescription drug control system, benchmarking methodologies, or clinical practice guidelines on <i>Medication errors</i> .
			Collegiality	Significant association with greater impact of benchmarking methodologies and of clinical practice guidelines in reduction of <i>Medication errors</i> . No significant association with impact of electronic medical records or clinical prescription drug control system.
			Quality emphasis	Significant association with greater impact of benchmarking methodologies and of clinical practice guidelines in reduction of <i>Medication errors</i> . No significant association with impact of electronic medical records or clinical prescription drug control system.
Keroack; Youngberg; Cerese, et al., 2007 ⁸⁶	Mixed methods: cross-sectional observational quantitative, and qualitative interview study	6 Academic Medical Centres, US	Shared sense of purpose (developed from inductive analysis of case study interviews verified by researcher not involved in data collection)	All identified factors found at all 3 <i>High performers on composite measure incorporating patient safety, mortality, effectiveness [clinical] and equity</i> and no more than one <i>Not-high performer</i> , from interviews at case study sites.
			Accountability system for service, quality, and safety (developed from inductive analysis of case study interviews verified by researcher not involved in data collection)	
			A focus on results (developed from inductive analysis of case study interviews verified by researcher not involved in data collection)	

Table 3: Summary of findings from meso level psychological factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
			Collaboration (developed from inductive analysis of case study interviews verified by researcher not involved in data collection)	
Krein; Damschroder; Kowalski, et al., 2010 ⁸⁸	Qualitative interview study longitudinal	6 General medical/surgical hospitals, US	Structure (Co-ordination, Resources, Leadership)	Positive structure supports <i>Implementation of central line associated bloodstream infection prevention practices.</i>
			Culture (Shared mission and values)	Shared culture supports <i>Implementation of central line associated bloodstream infection prevention practices.</i>
			Emotion (Commitment and passion)	Commitment supports <i>Implementation of central line associated bloodstream infection prevention practices.</i>
Lee; Choi; Kang, et al., 2002 ⁸⁹	Cross-sectional quantitative study	67 Large Hospitals ≥400 beds, S Korea	Organisational culture: ≥50 on 100 point developmental/group culture scale derived from Zammuto and Krakower 1991	No significant association with <i>Mean Quality Improvement implementation score.</i>
			Strategic approach Defender, Analyzer, Prospector	No significant association with <i>Mean Quality Improvement implementation score.</i>
Lukas; Mohr; Meterko, 2009 ¹⁴⁰	Cross-sectional quantitative study	78 VA Medical Centres, US	Organisational culture (group vs hierarchical)	Neither Group nor Hierarchical culture significantly associated with <i>Extent of implementation.</i>
McDermott; Keating, 2012 ⁹¹	Qualitative interview study cross-sectional	3 Hospitals, Ireland	Climate for service improvement	<i>Improvement to services</i> linked to capacity for service improvement, determined by social context (strategic distraction, senior management support and social structures in place). Social structures most influential, and social context more influential than task context.
McNulty; Ferlie, 2002 ⁹³	Qualitative interview study	1 Large teaching hospital, UK	Receptive and non-receptive contexts for change: culture and leadership	Identified as explaining variation in the implementation and impact of process reengineering.

Table 3: Summary of findings from meso level psychological factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
	longitudinal	(England)	Approaches to planned change: leadership	
			Approaches to planned change: clinical-managerial relations	
Mannion; Davies; Marshall, 2005 ⁹⁴	Qualitative interview study cross sectional	6 Hospital trusts, UK (England)	Leadership	Strong, top-down leadership in <i>Higher performing trusts by performance Star rating</i> , while <i>Low performers</i> had weaker leadership characterised by cliques.
Mardon; Khanna; Sorra, et al., 2010 ¹⁴¹	Cross-sectional quantitative study	179 Hospitals, US	Safety culture survey composite: Communication openness	No significant association with <i>Composite score from 8 patient safety indicators</i> .
			Safety culture survey composite: Frequency of events reported	Significantly associated with <i>Composite patient safety score</i> .
			Safety culture survey composite: Feedback and communication about error	No significant association with <i>Composite patient safety score</i> .
			Safety culture survey composite: Handoffs and transitions	Significantly associated with <i>Composite patient safety score</i> .
			Safety culture survey composite: Management support for patient safety	No significant association with <i>Composite patient safety score</i> .
			Safety culture survey composite: Non-punitive response to error	No significant association with <i>Composite patient safety score</i> .
			Safety culture survey composite: Organizational learning - continuous improvement	Significantly associated with <i>Composite patient safety score</i> .
			Safety culture survey composite: Overall perceptions of patient safety	No significant association with <i>Composite patient safety score</i> .
			Safety culture survey composite: Staffing	Significantly associated with <i>Composite patient safety score</i> .

Table 3: Summary of findings from meso level psychological factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
			Safety culture survey composite: Supervisor/manager expectations and actions	No significant association with <i>Composite patient safety score</i> .
			Safety culture survey composite: Teamwork across units	Significantly associated with <i>Composite patient safety score</i> .
			Safety culture survey composite: Teamwork within units	Significantly associated with <i>Composite patient safety score</i> .
			Safety culture survey composite: composite average	Significantly associated with <i>Composite patient safety score</i> .
Mills; Weeks, 2004 ⁹⁶	Longitudinal quantitative study	134 Medical quality improvement teams participating in Breakthrough Series collaboratives, US	Systemic perspective of responsibility (measured at 2 time points)	No significant variations.
			Non-punitive methods of investigating errors (measured at 2 time points)	No significant variations.
			Part of strategic goals for organization (measured at 2 time points)	Significant variation between <i>Unsuccessful</i> and <i>Successful teams</i> at first meeting. No significant association between <i>Unsuccessful</i> and <i>Successful teams</i> at final meeting taking into account difference at first meeting.
			Project backed by mandate (measured at 2 time points)	No significant variations.
			Organizational leadership (grouping of some factors above, not specified))	No significant variations.
Øvretveit; Staines, 2007 ¹⁰⁰	Qualitative interview study cross-sectional	Hospital and its county council, Sweden	Consistency of leadership	Emerged from analysis as contributing to <i>Sustained Quality Improvement programme</i> .

Table 3: Summary of findings from meso level psychological factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Parsons; Cornett, 2011 ¹⁰¹	Qualitative interview study cross-sectional	15 Hospitals with Magnet recognition, US	Relentless quest for quality	Perceived by Chief Nursing Officers as facilitating sustained <i>Magnet recognition</i> (hospital excellence in nursing accreditation).
			Leadership involvement and participation of all staff	Perceived by Chief Nursing Officers as facilitating sustained <i>Magnet recognition</i> .
			Leadership and tenacity	Perceived by Chief Nursing Officers as facilitating sustained <i>Magnet recognition</i> .
			Turnover of executive management	Perceived by Chief Nursing Officers as a barrier to sustained <i>Magnet recognition</i> .
Pettigrew; Ferlie; McKee, 1992 ⁴¹	Qualitative interview study longitudinal	8 District health authorities , UK (England)	Key people leading change	Derived inductively from case studies of <i>Implementing strategic change</i> , including some examples of service improvement and others of operational change and retrenchment.
			Supportive organisational culture	
Rosen; Singer; Zhao, et al., 2010 ¹⁴²	Cross-sectional quantitative study	30 VA Hospitals, US	Overall safety climate, all hospital staff (given as percent problematic response i.e. higher is worse)	No significant association with <i>Composite score from 11 patient safety indicators</i> .
			Overall safety climate, senior personnel vs frontline workers	Frontline workers significantly associated with <i>Composite patient safety measure</i> .
Salge; Vera, 2009 ¹¹¹	Cross-sectional quantitative study	173 Hospital trusts, UK (England)	Practice-based innovativeness Score	Significantly associated with better <i>Patient mortality and Patient satisfaction</i> . Significantly associated with <i>Healthcare Commission Service quality rating</i> .
Schubert; Glass; Clarke, et al.,	Cross-sectional quantitative study	8 Acute care hospitals,	Nurse Work Environment Index subscale: Leadership	No significant association with <i>Overall patient satisfaction</i> .

Table 3: Summary of findings from meso level psychological factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
2008 ¹¹²		Switzerland	Nurse Work Environment Index subscale: Resources and autonomy	
			Nurse Work Environment Index subscale: Interdisciplinary collaboration and competence	
Shipton; Armstrong; West, et al., 2008 ¹⁴³	Cross-sectional quantitative study	86 Acute hospital trusts, UK (England)	Leadership effectiveness	Significantly associated with fewer <i>Patient complaints per 1,000 patients</i> . Test for mediation shows that the association with <i>Patient complaints</i> is mediated by Quality climate. Significantly associated with <i>Commission for Health Improvement star ratings</i> and <i>Clinical Governance Review ratings</i> . No evidence exists for a mediating effect of Quality climate on <i>Clinical Governance Review rating</i> .
			Quality climate	Significantly associated with fewer <i>Patient complaints per 1,000 patients</i> . Significantly associated with <i>Commission for Health Improvement star ratings</i> and <i>Clinical Governance Review ratings</i> .
Shortell; Jones; Rademaker, et al., 2000 ¹¹³	Longitudinal quantitative study	16 Hospitals providing CABG, US	Organisational culture: group culture score	Significantly shorter <i>Operating room time</i> and better <i>Health status measures</i> . Significantly longer <i>Postoperative intubation time</i> . No significant association with any <i>Patient satisfaction measure</i> .
Singer; Lin; Falwell, et al., 2009 ¹⁴⁴	Cross-sectional quantitative study	91 Acute care Medicare certified hospitals, US	Overall safety climate, all hospital staff	Significantly associated with <i>Composite score from 12 patient safety indicators</i> .
			Overall safety climate, senior personnel vs frontline workers	Frontline workers significantly associated with <i>Composite measure</i> . No significant association for senior personnel.

Table 3: Summary of findings from meso level psychological factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Smalarz, 2006 ¹⁴⁵	Cross-sectional quantitative study	50 Physician groups, US	Collegiality (all culture dimensions measured by the Kralewski et al culture survey instrument)	Significantly associated with worse <i>HbA1c control rates</i> . No significant association with <i>Diabetic eye exam rates, Cholesterol management, Adolescent well visits, Chlamydia screening</i> .
			Organizational trust/ identity	Significantly associated with better <i>Diabetic eye exam rates and Cholesterol management rates</i> and worse <i>Chlamydia screening rates</i> . No significant association with <i>HbA1c control rates or Adolescent well visit rates</i> .
			Innovativeness	Significantly associated with worse <i>HbA1c control rates</i> . No significant association with <i>Diabetic eye exam rates, Cholesterol management, Adolescent well visits or Chlamydia screening</i> .
			Quality emphasis	No significant associations.
			Information emphasis	Significantly associated with better <i>Diabetic eye exam rates</i> . No significant associations with <i>HbA1c control rates, Cholesterol management, Adolescent well visits or Chlamydia screening</i> .
			Cohesiveness	Significantly associated with better <i>Chlamydia screening rates</i> . No significant associations with <i>Diabetic eye exam rates, HbA1c control rates, Cholesterol management or Adolescent well visits</i> .

Table 3: Summary of findings from meso level psychological factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
			Business emphasis (hypothesised as barrier)	No significant associations.
			Autonomy (hypothesised as barrier)	Significantly associated with worse <i>HbA1c control</i> and worse Cholesterol management rates. No significant associations with <i>Diabetic eye exams</i> , <i>Adolescent well visits</i> or <i>Chlamydia screening</i> .
Stetler; Ritchie; Rycroft-Malone, et al., 2009 ⁴⁹	Mixed methods: cross-sectional observational quantitative, and qualitative interview study	2 Acute care hospitals, US	Key people leading change	Not influential in these cases in <i>Institutionalisation of evidence-based practice</i> .
Szecsenyi; Goetz; Campbell, et al., 2011 ¹¹⁸	Cross-sectional quantitative study	676 Primary care practices, Germany	Job satisfaction of the physician (practice principal)	No significant correlations.
			Job satisfaction of the physician (practice colleagues)	No significant correlations.
			Job satisfaction of the non-physicians (nurses)	Significantly correlated with greater <i>Patient satisfaction with physician</i> , <i>Patient satisfaction with organisation of the practice team</i> and <i>Patient intention not to change practice</i> .
Vina; Rhew; Weingarten, et al., 2009 ¹²²	Cross-sectional quantitative study	84 Hospitals, US	Physician leadership focused on identifying “physician champions”	No significant associations.
			Organizational culture (a broad measure of a hospital organization’s environment.)	Significantly more agreement in <i>Top performers</i> in 4 organizational culture propositions. No significant differences in 2 other organisational culture propositions.

Table 3: Summary of findings from meso level psychological factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Wang; Hyun; Harrison, et al., 2006 ¹²³	Qualitative interview study cross-sectional	10 Provider organisations, US	Direct involvement of top- and middle-level leaders	All identified in Interviews with experts and organisational key informants as common to organisations with <i>Successful system-wide change for quality</i> .
			Strategic alignment and integration of improvement efforts with organization priorities	
			Actively develop champions, teams, and staff involvement in redesign efforts	

Table 4: Summary of findings from micro level structural factors

	Study design	Organisations investigated	Contextual factor measure	Main findings
Blegen; Vaughn; Goode, 2001 ¹⁴⁶	Cross-sectional quantitative study	42 Units in acute hospitals, US in study 1 and 39 in study 2	Nurse education: % of Registered Nurses on the unit with BSN education (investigated in 2 studies reported in 1 paper)	Significantly higher <i>Medication error rates</i> in Study 1. No significant association in Study 2. No significant association in both studies with <i>Patient falls per 1,000 patient-days</i> .
			Nurse experience: % of Registered Nurses on the unit with more than 5 years' experience (study 1)	No significant association with either outcome.
			Nursing experience: average years of nursing experience of Registered Nurses on the unit (study 2)	Significantly lower <i>Medication error</i> and <i>Patient fall rates in Study 2</i> .
Davenport; Henderson; Mosca, et al., 2007 ¹⁴⁷	Cross-sectional quantitative study	52 Surgical services in teaching hospitals, US	Percent of respondents reporting positive communication and collaboration with specific roles (attending MDs, resident MDs, nurses and 'other')	Significant association for attending MD only with <i>Risk-adjusted morbidity</i> . No significant association with <i>Risk adjusted mortality</i> .
Dückers; Spreeuwenberg; Wagner, et al., 2009 ⁷³	Cross-sectional quantitative study	168 Quality Improvement teams, Netherlands	Team organisation	No significant correlation.
			Perceived success (overall judgement project leader)	No significant correlation.
			Number of applied changes	Significantly correlated with Improvement in indicator for <i>Quality Improvement Collaborative</i> (clinical effectiveness, patient safety, patient experience or process change).

Table 4: Summary of findings from micro level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Elliott; Kanouse; Edwards, et al., 2009 ¹⁴⁸	Cross-sectional quantitative study	132 General acute care hospitals, US	Variation by Hospitalisation type (23 medical/surgical and diagnostic category combinations, and obstetrics)	Significantly associated with variation in <i>Patient assessment of Communication with nurses, Communication about Pain management, Communication about medicines and Discharge information.</i> No significant association with variation in <i>Patient assessment of Responsiveness of hospital staff or Physical environment (cleanliness and quiet).</i>
Escarce; Kapur; Solomon, et al., 2003 ¹⁹	Cross-sectional quantitative study	144 Eye care practices, US	Practitioner specialism concordant with patient condition (Open Angle Glaucoma or Diabetic Retinopathy)	Significant positive association with <i>Satisfaction with physician care score.</i>
Ettner; Thompson; Stevens, et al., 2006 ²⁰	Cross-sectional quantitative study	6194 Diabetes patients, US	Main source of primary care physician income	Significantly better performance on <i>Foot exam during most or all visits</i> by physicians with high Direct salary than high Fee-for-service or high Capitation. No significant association with <i>Assessment of glycaemic control (HbA1c), Assessment of proteinuria, Assessment of lipids, Dilated eye exam or Advice to take aspirin.</i>
Furukawa; Raghu; Shao, 2010 ¹⁴⁹	Longitudinal quantitative study	326 Medical–surgical acute units within short-term, general acute care hospitals, US	Electronic Medical Record adoption stage 1	No significant association with <i>In-hospital mortality for procedures or In hospital mortality for conditions.</i> No significant association with <i>Patient safety indicator composite</i> in implementation year 1 or year 2, significantly worse in year 2.
			Electronic Medical Record adoption stage 2	No significant association with <i>In hospital mortality for procedures or In hospital mortality for conditions.</i> No significant association with <i>Patient safety indicator composite.</i>

Table 4: Summary of findings from micro level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
			Electronic Medical Record adoption stage 3	Significantly better <i>In hospital mortality for conditions</i> all 3 implementation years. No significant association with <i>In hospital mortality for procedures</i> . No significant association with <i>Patient safety indicator composite</i> .
Halm; Peterson; Kandels, et al., 2005 ¹⁵⁰	Cross-sectional quantitative study	6 Units in an acute hospital, US	Mean unit staffing per patient	No significant associations with <i>Mortality</i> or <i>Failure to rescue (Mortality following complication)</i> .
Hong; Atlas; Chang, et al., 2010 ⁸⁵	Cross-sectional quantitative study	162 Primary care physicians, US	Proportion of patients visiting more than 3 times a year	No significant association with <i>Change in practice ranking on Evidence-based practice score</i> .
			Mean patient age	Significant negative association with <i>Change (rise) in practice ranking on Evidence-based practice score</i> .
			Mean number of patient comorbidities	Significant negative association with <i>Change (rise) in practice ranking on Evidence-based practice score</i> .
			Proportion of patients non-English speaking	Significant positive association with <i>Change (rise) in practice ranking on Evidence-based practice score</i> .
			Proportion of patients privately insured	No significant association with <i>Change in practice ranking on Evidence-based practice score</i> .
			Proportion of Medicare patients	Significant negative association with <i>Change (rise) in practice ranking on Evidence-based practice score</i> .
			Proportion of Medicaid or uninsured patients	No significant association with <i>Change in practice ranking on Evidence-based practice score</i> .
Kendall-Gallagher; Blegen, 2009 ¹⁵¹	Cross-sectional quantitative study	48 Adult Intensive care units, US	Percentage of certified staff registered nurses	Significantly fewer <i>Total falls</i> . No association with <i>Medication administration errors, Skin breakdown, Central catheter infection, Bloodstream infection, Urinary tract infection</i> .

Table 4: Summary of findings from micro level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Kikano; Snyder; Callahan, et al., 2002 ¹⁵²	Cross-sectional quantitative study	138 Family physician, US	Insurance type (Fee for Service or Managed Care)	Fee-for-service significantly associated with greater <i>Satisfaction with site</i> . No significant association with <i>Satisfaction with doctor</i> , <i>Overall satisfaction for visit</i> , or <i>Degree to which expectations for visit met</i> .
Laine; Finne-Soveri; Björkgren, et al., 2005 ¹⁵³	Cross-sectional quantitative study	114 Long term care wards, Finland	Efficiency (Inputs: staffing and beds; Outputs: case-mix weighted patient days)	Significantly positively correlated with 6 of 41 measures of <i>Quality in long-term care</i> . Significantly negatively correlated with 9 measures of <i>Quality in long-term care</i> . No significant correlation with 26 measures, and no consistent direction for non-significant correlations.
Litaker; Ruhe; Weyer, et al., 2008 ¹⁵⁴	Longitudinal quantitative study	37 Community-based primary care practices taking part in a randomised controlled trial of an intervention to improve delivery of preventive care, US	Capacity for Change assessed by qualitative analysis of intervention facilitator's field notes about effort needed to motivate the practice and the amount of instrumental assistance to implement the intervention	Significantly associated with improvement in <i>Delivery of evidence-based preventive services</i> from baseline to 12 months (completion of intervention) and 24 months.
Louie; Cheema; Dodek, et al., 2010 ¹⁵⁵	Cross-sectional quantitative study	1 ICU in tertiary hospital, Canada	Number of 12-hour nurse shifts in last 72 hours	Significantly associated with <i>Hypoglycaemic event</i> in ICU patient with intravenous insulin infusion when a care management error was involved. No significant association when no care management error was involved.

Table 4: Summary of findings from micro level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Lukas; Mohr; Meterko, 2009 ¹⁴⁰	Cross-sectional quantitative study	78 VA Medical Centres, US	Team effectiveness	Two of 3 measures significantly associated with <i>Extent of implementation of Advanced Clinic Access initiative</i> in primary but not specialty care clinics. No significant association with 3rd measure.
Meyer; Goes, 1988 ³⁹	Longitudinal quantitative study	25 Private, non-profit hospitals, US	Innovation variables (Risk, Skill, Observability)	Significantly associated with <i>Assimilation of innovation</i> . Greater assimilation with observable innovations with low risk requiring little skill.
			Innovation-context interactions (Compatibility between innovation and medical staff specialisation, CEO advocacy)	Significantly associated with <i>Assimilation of innovation</i> . Greater assimilation with observable innovations championed by CEO.
Mills; Weeks, 2004 ⁹⁶	Longitudinal quantitative study	134 Medical quality improvement teams participating in Breakthrough Series collaboratives, US	Mutual respect among team members (measured at baseline only)	Significant variation between quality improvement teams which are <i>Unsuccessful</i> and <i>Successful in achievement of clinical effectiveness, patient safety and patient experience goals at first quality improvement collaborative learning session meeting</i> .
			Team familiar with measurement (measured at baseline only)	Significant variation between <i>Unsuccessful</i> and <i>Successful teams</i> at first meeting.
			Gathers data from patients (measured at 2 time points)	No significant variations.
			Teamwork skills (grouping of some factors above, not specified)	No significant variations.
			Prior Experience with Quality Improvement and Measurement (grouping of some factors above, not specified)	No significant variations.

Table 4: Summary of findings from micro level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Parsons; Cornett, 2011 ¹⁰¹	Qualitative interview study cross-sectional	15 Hospitals with Magnet recognition, US	Quality best practices outcomes structures and resources	Perceived by Chief Nursing Officers as facilitating sustained <i>Magnet recognition</i> .
Rabbani; Lalji; Abbas, et al., 2011 ⁴³	Qualitative interview study cross-sectional	4 Units of a philanthropic not-for-profit university hospital, Pakistan	Incentives	Identified as Desirable for <i>Implementation of balanced scorecard</i> .
			Supportive policies, resources and routine activities	
Rogers; Hwang; Scott, et al., 2004 ¹⁵⁶	Cross-sectional quantitative study	393 Registered nurses, US	Shift length	Significantly more <i>Shifts with one or more errors</i> and <i>Shifts with one or more near-errors</i> for over 12.5 hours than shorter shifts.
			Overtime worked	Significantly more <i>Shifts with one or more errors</i> and <i>Shifts with one or more near-errors</i> for over 12.5 hours followed by overtime than no overtime. No significant association with overtime following shorter shifts.
			Hours (scheduled and unscheduled) per week	Significantly more <i>Weeks with one or more errors</i> and <i>Weeks with one or more near-errors</i> for over 40 hours than shorter weeks.
Sasichay-Akkadechanunt; Scalzi; Jawad, 2003 ¹⁵⁷	Cross-sectional quantitative study	17 Medical and surgical units in University Hospital, Thailand	Ratio of total nursing staff to patients	Higher Ratio significantly associated with lower <i>In-hospital mortality (risk-adjusted)</i> .
			Proportion of Registered Nurses to total nursing staff	No significant associations.
			Mean of Registered Nurse experience	No significant associations.
			Percentage of Bachelor of Science in Nursing prepared nurses	No significant associations.

Table 4: Summary of findings from micro level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Shortell; Marsteller; Lin, et al., 2004 ¹⁵⁸	Cross-sectional quantitative study	40 Chronic care management teams taking part in Improving Chronic Illness Care collaborative, US	Perceived team effectiveness (also analysed as intermediate outcome, analysis not included in this review) assessed by Lemieux-Charles instrument	Significant positive association with <i>Number of change activities as a result of chronic care collaborative intervention, Depth of changes made.</i>
Shuval; Linn; Brezis, et al., 2010 ¹⁵⁹	Cross-sectional quantitative study	74 Primary care physicians, Israel	Total EBM score	Significantly associated with <i>Eye examinations, Microalbumin tests, HbA1C tests, LDL tests and Statin prescriptions.</i> No significant association with <i>Thiazide prescriptions.</i>
			Critical appraisal component of EBM score	Significantly associated with <i>Eye examinations, Microalbumin tests.</i> No significant association with, <i>HbA1C tests, LDL tests Statin prescriptions or Thiazide prescriptions.</i>
			Information retrieval component of EBM score	Significantly associated with <i>HbA1C tests.</i> No significant association with <i>Eye examinations, Microalbumin tests, LDL tests, Statin prescriptions or Thiazide prescriptions.</i>
Stevenson; Baker; Farooqi, et al., 2001 ¹⁶⁰	Longitudinal quantitative study	18 Primary practice teams taking part in diabetes care audit, UK (England)	Degree of involvement in audit	Significantly correlated with improved <i>Compliance with 6 evidence-based criteria of diabetes care.</i>

Table 4: Summary of findings from micro level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Thomas; Sexton; Lasky, et al., 2006 ¹⁶¹	Cross-sectional quantitative study	132 resuscitation teams, US	'Communication' constructed from 'information sharing' and 'inquiry'	Significantly correlated with lower <i>Non-compliance with guideline NRP items, Non-compliance with guideline NRP items - preparation and initial steps items only.</i> No significant correlation with <i>Non-compliance with guideline NRP items - oxygen administration items only.</i>
Unruh; Joseph; Strickland, 2007 ¹⁶²	Cross-sectional quantitative study	72 Nursing care units, US	Registered Nurse patient load=patient days per Registered Nurse hours	No significant association with any outcome.
			Registered Nurse absenteeism hours	Significant negative association with <i>Number of alternatives to restraints used.</i> No significant association with <i>Number of episodes of restraint use, Number of deaths.</i>
			Registered Nurse absenteeism hours given Registered Nurse patient load	Significant positive association with <i>Number of episodes of restraint use, Number of alternatives to restraints used, Number of Deaths.</i>
			Licensed Practical Nurse patient load=patient days per Licensed Practical Nurse hours	No significant association with any outcome.
			Licensed Practical Nurse absenteeism hours	No significant association with any outcome.
			Licensed Practical Nurse absenteeism hours given Licensed Practical Nurse patient load	No significant association with any outcome.
			Nurse Aide patient load=patient days per Nurse Aide hours	No significant association with any outcome.
			Nurse Aide absenteeism hours	No significant association with any outcome.

Table 4: Summary of findings from micro level structural factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
			Nurse Aide absenteeism hours given Nurse Aide patient load	No significant association with any outcome.
Van Wyck; Robertson; Nissenon, et al., 2010 ¹⁶³	Non-RCT controlled study	1110 Dialysis facilities owned by a single for-profit organisation, US	Length of ownership	Existing facilities significantly better at baseline on 2 laboratory <i>Adequacy management measures</i> for haemodialysis patients, 2 of 3 laboratory <i>Metabolic bone disease management measures</i> , 3 laboratory <i>Anaemia management measures</i> , 1 laboratory <i>Nutrition management measure</i> and significantly worse <i>Mortality measure</i> , than acquired facilities. No significant difference at baseline with second <i>Haemodialysis measure</i> . Difference in 1 <i>Adequacy management measure</i> and 3 <i>Anaemia management measures</i> still significant after 2 years, and <i>Mortality</i> significantly better. No significant difference after 2 years for another <i>Adequacy management measure</i> , any <i>Metabolic bone disease management measure</i> , or the <i>Nutrition management measure</i> .
Young; Charns; Daley, et al., 1997 ¹⁶⁴	Mixed methods: longitudinal quantitative, and qualitative interview study	20 Surgical Services, US	Number of co-ordination mechanisms including administrative processes, patient care processes, and medical care processes found in individual interviews, group interviews and walkrounds	'Low outliers' with lower than expected mortality and morbidity found by site visits to have more mechanisms than 'High outliers'.
Zegers; de Bruijne; Spreeuwenberg, et al., 2011 ¹³⁰	Cross-sectional quantitative study	21 Acute care hospitals, Netherlands	Hospital department (e.g. surgery, cardiology, neurology)	Significant variation in <i>Adverse events</i> and <i>Preventable adverse events</i> . Significantly greater variation by department than by hospital type.

Table 5: Summary of findings from micro level psychological factors

	Study design	Organisations investigated	Contextual factor measure	Main findings
Ancarani; Di Mauro; Giammanco, 2009 ¹⁶⁵	Cross-sectional quantitative study	47 Wards in Italian public hospitals, Italy	`Human relations' organisational climate measured by competing values framework	Significantly associated with better <i>Patient satisfaction</i> .
			`Open system' organisational climate measured by competing values framework	Significantly associated with better <i>Patient satisfaction</i> .
			`Rational goal' organisational climate measured by competing values framework	Significantly associated with worse <i>Patient satisfaction</i> .
Bosch; Dijkstra; Wensing, et al., 2008 ¹³⁴	Cross-sectional quantitative study	30 General practices, Netherlands	Team climate	No significant associations with any outcome.
Davenport; Henderson; Mosca, et al., 2007 ¹⁴⁷	Cross-sectional quantitative study	52 Surgical services in teaching hospitals, US	6 Factors in the Safety Attitudes Questionnaire Organizational Climate safety factors: Safety Climate, Teamwork Climate, Working Conditions, Recognition of Stress Effects, Job Satisfaction	No significant association with any outcome.
			Emotional exhaustion subscale of Maslach's burnout inventory	No significant association with any outcome.
Lukas; Mohr; Meterko, 2009 ¹⁴⁰	Cross-sectional quantitative study	78 VA Medical Centres, US	Management support	'Personal leadership support' (reflecting leader's visibly expressing support for the intervention) significantly associated with <i>Extent of implementation</i> in both settings. No significant association with 'Practical management support' (structures and processes to support the intervention).
Mills; Weeks, 2004 ⁹⁶	Longitudinal quantitative study	134 Medical quality	Shared vision of project goals (measured at 2 time points)	No significant variations.

Table 5: Summary of findings from micro level psychological factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
		improvement teams participating in Breakthrough Series collaboratives, US	Front-line staff support for project (Both meetings)	No significant variations.
			Physician an effective participant (measured at 2 time points)	No significant variations.
			Strong team leadership with clout (measured at 2 time points)	Significant variation between <i>Unsuccessful</i> and <i>Successful teams</i> at final meeting taking into account difference at first meeting. No significant association between <i>Unsuccessful</i> and <i>Successful</i> teams at first meeting.
			Team members can express opinions (measured at baseline only)	No significant variations.
			Have worked in a team before (measured at baseline only)	No significant variations.
			Have worked on quality improvement before (measured at baseline only)	No significant variations.
			Team members understand each other's strengths and weaknesses (measured at 2 time points)	Significant variation between <i>Unsuccessful</i> and <i>Successful teams</i> at first meeting. No significant association between <i>Unsuccessful</i> and <i>Successful teams</i> at final meeting taking into account difference at first meeting.
			The team can solve conflicts (measured at 2 time points)	No significant variations.

Table 5: Summary of findings from micro level psychological factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Mohr; Young; Meterko, et al., 2011 ¹⁶⁶	Cross-sectional quantitative study	216 VA primary care teams, US	Team job satisfaction	Significantly associated with <i>Intermediate outcome quality score (% appropriate levels of intermediate indicators in eligible patients)</i> and <i>Process quality score (% appropriate screens/tests in eligible patients)</i> .
Nurok; Evans; Lipsitz, et al., 2011 ¹⁶⁷	Non-RCT controlled study	105 Surgical teams performing thoracic operations, US	Emotional climate' (functional, less functional)	Functional emotional climate in sterile environment significantly associated with fewer <i>Threats to outcome</i> pre-team-skills training intervention period. No significant association in pre-intervention period in Anaesthesia environment and Circulating environment or in any setting in Post-intervention or Sustaining period.
Parsons; Cornett, 2011 ¹⁰¹	Qualitative interview study cross-sectional	15 Hospitals with Magnet recognition, US	Middle-management leadership	Perceived by Chief Nursing Officers as facilitating sustained <i>Magnet recognition</i> .
			Staff nurse practices	Perceived by Chief Nursing Officers as facilitating sustained <i>Magnet recognition</i> .
			Unit management turnover	Perceived by Chief Nursing Officers as a barrier to sustained <i>Magnet recognition</i> .
Rabbani; Lalji; Abbas, et al., 2011 ⁴³	Qualitative interview study cross-sectional	4 Units of a philanthropic not-for-profit university hospital, Pakistan	Participatory culture	Identified as Desirable for <i>Implementation of balanced scorecard</i> .
			Supportive leadership	
Shortell; Marsteller; Lin, et al., 2004 ¹⁵⁸	Cross-sectional quantitative study	40 Chronic care management teams taking part in Improving Chronic Illness	Organizational culture (balance between group, developmental, hierarchical and rational)	Significant positive association with <i>Number of change activities as a result of chronic care collaborative intervention, Depth of changes made</i> . Association reduced when <i>Perceived team effectiveness</i> is taken into account.

Table 5: Summary of findings from micro level psychological factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
		Care collaborative, US	Organizational commitment to quality improvement. Baldrige scale on patient satisfaction focus	Significant negative association with <i>Number of change activities as a result of chronic care collaborative intervention</i> . Association reduced when <i>Perceived team effectiveness</i> is taken into account. No association with <i>Depth of changes made</i> .
			Team champion (presence or absence reported by any team member)	No significant associations.
Singer; Lin; Falwell, et al., 2009 ¹⁴⁴	Cross-sectional quantitative study	91 Acute care Medicare certified hospitals, US	Dimensions of safety climate (interpersonal vs organisation and unit dimensions) all hospital staff	Both interpersonal factors significantly associated with <i>Composite measure</i> . No significant associations with 3 <i>Hospital level dimensions</i> or 2 <i>Unit level dimensions</i> .
Stevenson; Baker; Farooqi, et al., 2001 ¹⁶⁰	Longitudinal quantitative study	18 Primary practice teams taking part in diabetes care audit, UK (England)	Team attitude to audit	No significant correlation.
			Personal interest in diabetes	No significant correlation.
			Perception of degree of teamwork	Significantly correlated with improved <i>Compliance with 6 evidence-based criteria of diabetes care</i> .
			Recognises need to overcome obstacles	Significantly correlated with improved <i>Compliance with 6 evidence-based criteria of diabetes care</i> .
			Willing to audit again	Significantly correlated with improved <i>Compliance with 6 evidence-based criteria of diabetes care</i> .

Table 5: Summary of findings from micro level psychological factors (cont'd)

	Study design	Organisations investigated	Contextual factor measure	Main findings
Thomas; Sexton; Lasky, et al., 2006 ¹⁶¹	Cross-sectional quantitative study	132 resuscitation teams, US	'Management' [in resuscitation setting] constructed from 'workload management' and 'vigilance'	Significantly correlated with lower <i>Non-compliance with guideline NRP items</i> , <i>Non-compliance with guideline NRP items - preparation and initial steps items only</i> . No significant correlation with <i>Non-compliance with guideline NRP items - oxygen administration items only</i> .
			'Leadership' constructed from 'assertion', 'intentions shared', 'evaluation of plans', and 'leadership'	No significant correlation with <i>Non-compliance with guideline NRP items</i> , <i>Non-compliance with guideline NRP items - preparation and initial steps items only</i> , <i>Non-compliance with guideline NRP items - oxygen administration items only</i> .
Van Noord; De bruijne; Twisk, 2010 ¹⁶⁸	Cross-sectional quantitative study	33 Emergency departments, Netherlands	Patient safety culture	Hospital handoffs and transitions' dimension significantly associated with worse <i>Implementation of Patient record review</i> and <i>X-ray result reviews</i> but not with <i>Implementation of 5 other organisational patient safety defences</i> . 'Frequency of event reporting' significantly associated with <i>evaluation of residents' skills</i> but not with <i>Implementation of 6 other organisational patient safety defences</i> . 'Staffing' dimension significantly associated with <i>Implementation of Structured supervision</i> but not with <i>Implementation of 6 other organisational patient safety defences</i> . No significance between 9 other dimensions and <i>Implementation of any of 7 organisational patient safety defences</i> .

Findings from reviews

These summaries focus on outcomes eligible for our review – clinical effectiveness, patient safety, patient experience and quality improvement implementation.

Reviews evaluating the impact of several contextual factors on one primary outcome

Quality improvement and implementation of quality improvement interventions

Kaplan et al (2010)¹⁶⁹ aimed to identify the contextual factors associated with quality improvement success as meso and micro levels, using a range of outcomes, but including only studies with quantifiable outcomes, and we considered all 47 accepted studies by this team for inclusion in our review. Of the 47 studies, we included 13 in this review, 33 were rejected by our different criteria and one could not be traced. Although we took a different approach and used different methods, their main conclusions are supported by our review:

“Although most factors were examined in only a few studies, organizational characteristics (e.g., size, ownership, teaching status), leadership from top management, competition, organizational culture, years involved in quality improvement, and data infrastructure/information systems were examined in at least nine (20%) articles. With the exception of ownership, teaching status, and competition, all these factors were generally shown to influence quality improvement success, with more than half the associations tested being significantly associated with success. Other factors that were examined less frequently but that had fairly consistent associations with quality improvement success were board leadership for quality; organizational structure, particularly clinical integration across departments; customer focus; physician involvement in quality improvement; microsystem motivation to change; resources; and quality improvement team leadership.”

Powell; Rushmer; Davies, 2009¹⁷⁰ systematically reviewed the literature on health care and quality improvement with a focus on learning for NHS Scotland. Alignment with the strategic objectives, responsibility of all staff, engagement of doctors, leadership at different levels, participation by board members and senior managers, investment in training and development, support from a designated team, data of different kinds, resources to support quality improvement and training in using IT in new ways all emerged as necessary but not sufficient for successful implementation of quality improvement initiatives.

In a non-systematic review, Scott, 2009¹⁷¹ compared quality improvement strategies primarily driven by clinicians to those primarily driven by managers or policy makers. The research base was weak but suggested that there was little effect from manager-led quality improvement strategies such as continuous quality improvement programmes, public scorecards and clinical governance, while some clinician-led strategies such as physician practice profiling and clinical decision support systems showed some effect.

Patient safety

An expert-panel driven review of impact of context on patient safety practices described in two reports (Øvretveit, Shekelle, Dy, et al, 2011¹⁷² and Shekelle, Pronovost, Wachter, et al, 2010¹⁷³) and drawing on evidence from 5 diverse patient safety practices found that context was seldom investigated, and little evidence of context having an impact on outcome.

Walshe and Shortell (2004)¹⁷⁴ in a non-systematic review identified lack of management systems, fragmented organisational accountability, organisational and professional culture of secrecy, and fragmented accountability in external regulatory bodies as contributing to failure to prevent or address major failures (defined as breakdowns in health care services or provision that do substantial harm to many patients, and including UK failures leading to the Bristol child heart surgery and Shipman inquires).

Innovation

Robert, Greenhalgh, MacFarlane, et al (2010)¹⁷⁵ in a systematic review identified history, culture, interpersonal relationships, power and politics, decision-making processes, social influences, professionalism as influencing adoption of health technologies intended to improve health outcomes, and stressed that adoption should be seen as a process and not a single event.

Reviews evaluating the impact of one primary contextual factor by a range of outcomes

Health maintenance organisations

Seidman, Bass and Rubin (1998)¹⁷⁶ reviewed studies comparing US health maintenance organisations (HMOs) to other insurance types by cardiovascular care outcomes and found more positive results with process than health outcome measures. Of 11 studies using process measures, 4 were positive, 3 had mixed but predominantly positive results and 4 were non-significant. Of 10 studies using outcome measures, 3 had mixed results and 7 were non-significant.

Steiner and Robinson (1998)¹⁷⁷ reviewed US studies comparing managed care (various types) to Fee-for-service, and findings varied with the type of outcome. Managed care performed better in 32 of 44 observations of delivery of preventive services (more than one observation per study), worse in 2 observations, and there were no significant differences in 10. In 9 of 81 observations managed care performed better in process measures of care, worse in 4 observations, no significant differences in 68. In 6 of 37 observations managed care performed better in patient satisfaction, worse in 19 observations, no significant differences in 12. In 26 or 27 (not clear) of 114 observations managed care performed better in delivery of services to vulnerable groups, worse in 26 or 27 observations, no significant differences in 61.

Leadership

Parker et al (2011)¹⁷⁸ reviewed studies of leadership in the operating room. Of 10 studies reviewed only one used outcomes eligible for our review, which found a significant association between leadership and management scores for nurses and fewer procedural problems and errors and no significant association between leadership and management scores for anaesthetists or surgeons and clinical outcomes.

Øvretveit (2009)¹⁷⁹ in a non-systematic review found mixed findings from research on whether leaders can influence improvement. The authority of the leader, the nature of the quality improvement intervention, the organisational setting, organisational factors and environmental factors were all identified as affecting leaders' influence on implementation of quality improvement.

Culture

Scott et al., 2003^{180,181} conducted a systematic review the links between culture and performance in health care. Of 10 reviewed studies, 6 evaluated by patient satisfaction or clinical effectiveness/quality outcomes. One found an association between performance and non-attendance at paediatric outpatients, and another with "promptness of care, quality of nursing care and quality of medical care". Four others found no association.

Accreditation

In a systematic review Greenfield and Braithwaite (2008)¹⁸² found six studies with no significant association with quality measures (not defined), and one a positive association. Neither of two studies investigating consumer views or patient satisfaction found significant associations.

Publication of performance

A systematic review by Fung et al (2008)¹⁸³ evaluated the impact of publication of publication of performance at three levels. One study of health plans showed positive impact on technical performance and patient experience, although there were unintended consequences – one study

reported that lower-scoring health plans were more likely to cease public reporting than high scoring ones. Three studies in hospital settings reported positive effectiveness and patient safety outcomes and three found non-significant effects of publication. Six hospital studies reported changes to case mix or selection of healthier patients with implications for outcomes. One study of individual providers had a positive impact on mortality. Three individual provider studies found association with selection of healthier patients, and one with increased racial and ethnic disparities.

In their systematic review, Dudley et al (2004)¹⁸⁴ evaluated both pay-for-performance (summarised below) and publication of performance. In one randomised controlled trial of reporting performance scores, low performers were significantly more likely to engage in quality improvement activities.

In a non-systematic review Marshall et al (2000)¹⁸⁵ found that of 4 reviewed studies which evaluated publication of performance by quality of care, all reported positive results.

Pay for performance and other financial incentives

Town et al¹⁸⁶ evaluated economic incentives for preventive care in a systematic review. Seven of 8 findings in 6 studies showed no effect, with one positive result.

Petersen et al (2006)¹⁸⁷ found in their systematic review that at payment system level 1 of 2 studies reported a positive result, the other reported no positive finding and both reported 'gaming'. At provider group level, of 9 studies, 2 had positive findings, 5 partial, and 2 (both randomised controlled trials) were non-significant. One positive finding was reported as attributable to improved documentation only. At physician level, of 6 reviewed studies, 2 had positive findings, 3 partial and 1 non-significant. Both positive findings were reported to be primarily attributable to improved documentation.

Christianson, Leatherman and Sutherland's (2009)¹⁸⁸ best evidence review looked both at incentives for improved quality, and the quality outcomes of incentives designed to influence utilisation, and included both systematic reviews and primary research. Of 7 reviews reviewed, 3 had an overall positive finding and 3 showed no effect or negligible effects on quality outcomes. Of 10 evaluations of incentives on quality, 5 showed no effect and 5 were positive. Of positive studies, in at least 4 it was difficult for either the authors or the reviewers to attribute the change to the intervention. Of 27 evaluations of programmes involving a financial incentive, 22 were positive including at least 8 where the positive findings were hard to interpret, 4 showed no effect and 1 was negative. Of 7 reviews reported on where quality outcomes were reported for interventions designed to influence utilisation, 1 had a positive quality finding, 6 showed no mixed effect on quality outcomes, and one was negative. Of 14 evaluations at insurance plan level (managed care vs Fee-for-service), 10 were positive, 3 showed no or mixed effect on quality and 1 was negative. Of 9 evaluations at hospital level (mainly diagnostic-related groups), 2 were positive, 6 showed no or mixed effect on quality and 1 was negative. Of 12 evaluations at physician level, 1 was positive, 7 showed no or mixed effect on quality and 4 were negative.

Another review by the same team¹⁸⁹ found 10 eligible studies with positive results at physician level, but reviewers had concerns about the association in 3. At health plan level 2 studies had positive results but the reviewers had concerns about the methods. Four of 5 studies set in institutions had positive results, and 1 non-significant, and the reviewers had concerns about methods.

The systematic review by Dudley et al (2004)¹⁸⁴ found that of 10 measures investigated in 8 randomised controlled trials of performance-based payment, 6 were significantly positive and 4 showed no effect.

A non-systematic review by Rosenthal and Frank (2006)¹⁹⁰ included 6 studies, with 2 randomised controlled studies having non-significant findings, 2 with positive findings but reasons to question whether the change was attributable to the payment, and 2 with positive findings which could at least in part be attributed to improved documentation.

Achat, McIntyre and Burgess's (1999)¹⁹¹ non-systematic review of financial incentives for professionals in immunisation reviewed 2 studies of immunisation coverage following the 1990 UK

general practitioner contract and found positive results but the reviewers argued that these effects need not be associated with payment.

Shift length

Estabrooks et al (2009)¹⁹² reviewed studies of the impact of shift length (8 hour vs 12 hour) on patient safety. Of 6 studies evaluating any quality of care outcome, in one, 8-hour shifts were significantly worse than 12-hour (by 3 measures), in 3 there was no significant difference, and in 2, 8-hour shifts were significantly better.

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