BMJ Open

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Journal:	*BMJ Open*
Manuscript ID	bmjopen-2016-014825
Article Type:	Research
Date Submitted by the Author:	29-Oct-2016
Complete List of Authors:	Levesque, Jean-Frederic; Bureau of Health Information Sutherland, Kim; Bureau of Health Information
Primary Subject Heading:	Health services research
Secondary Subject Heading:	Public health, Health policy
Keywords:	Quality in health care < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Organisational development < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Change management < HEALTH SERVICES ADMINISTRATION & MANAGEMENT

The role of performance information in securing improvement:

An Integrated conceptual framework of levers for change in healthcare

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Abstract

Objective: Across healthcare systems, there is consensus on the need for independent and impartial assessment of performance. There is less agreement about how measurement and reporting performance improves healthcare. This paper draws on academic theories to develop a conceptual framework – one that classifies in an integrated manner the ways in which change can be leveraged by healthcare performance information. **Methods:** A synthesis of published literature. **Results:** The framework identifies eight levers for change enabled by performance information, spanning internal and external drivers, and emergent and planned processes: 1) cognitive levers provide awareness and understanding; 2) mimetic levers inform about the performance of others to encourage emulation; 3) supportive levers provide facilitation, implementation tools or models of care to actively support change; 4) formative levers develop capabilities and skills through teaching, mentoring and feedback; 5) normative levers set performance against guidelines, standards, certification and accreditation processes; 6) coercive levers use policies, regulations incentives and disincentives to force change; 7) structural levers modify the physical environment or professional cultures and routines; 8) competitive levers attract patients or funders. **Conclusion:** This framework highlights how performance measurement and reporting can contribute to eight different levers for change. It provides guidance into how to align performance measurement and reporting into quality improvement programs.

Article Summary – Strengths and Limitations of this Study

- This paper draws on academic theories to develop a conceptual framework that classifies in an integrated manner the ways in which change can be leveraged by healthcare performance information
- The framework identifies eight levers for change enabled by performance information, spanning internal and external drivers, and emergent and planned processes
- The paper draws on a range of theoretical sources to describe different types of organisational change and various facilitators and barriers to such change and synthesises levers into a straightforward typology
- The model development is based on the synthesis of published literature and available grey literature – and so could be affected by any publication bias where levers that did not work in a particular context may not have featured in the retrieved publications
- The framework provides insights and guidance into how performance information can be used in healthcare systems to leverage change.

Keyword: Quality improvement; performance measurement; healthcare system change; conceptual framework
Abstract word count: 208 words
Manuscript word count: 3171

Introduction

That performance measurement is essential in healthcare systems is broadly accepted (1,2,3). Measurement and reporting of performance play a clear role both in terms of management and in providing accountability; but also in terms of their contribution to improvement efforts. When properly defined, applied and interpreted, performance measures provide insight into absolute and relative achievement of outcomes, patterns of delivery and efficiency of care, highlighting variation and areas where there are opportunities to improve (4).

Performance however relates to real processes, actions and outcomes rather than to the structural, potential or planned delivery of services. Just as actors perform on stage and athletes perform on the field, surgeons perform in surgical theatres and nurses perform at the bedside or in community centres. Measuring performance in healthcare is therefore about quantifying what healthcare

systems, organisations and professionals are really achieving rather than about how well they are designed or qualified. Meaningful performance measurement focuses on aspects such as services delivered relative to patient needs and expectations, processes and models of care relative to evidence and clinical workloads, and patient outcomes relative to their presenting problems and the resources invested.

Some studies have shown that the impact of performance measurement and reporting varies (5), and that they can have unintended consequences that result in deterioration of performance (6). However, the weight of accumulating evidence attests to the potential benefits and power of performance reporting, particularly in terms of securing change among clinicians and delivery organisations (7,8,9). This evidence suggests that performance measurement makes a contribution to improvement efforts but is not always sufficient to achieve, on its own, meaningful change in healthcare (7,10).

Quality improvement efforts draw on a much broader array of activities than simply providing information about the performance of providers, organisations or systems (10,11,12,13,14,15). Change in complex systems is shaped by a range of factors including history, culture, social and legal context, policies and structures, availability of evidence, technology, and economic incentives. Researchers from many different disciplines have investigated how such factors influence change processes and have described different ways in which change can be initiated, driven and managed both within (16,17) and outside (18,19,20) the healthcare sector.

While recent research has assessed the impact of performance measurement and reporting on various aspects, most studies seem to assume that public reporting of performance information either works on its own or only through patients' choice of providers. To date, no integrative framework that conceptualises the role of performance information and the way in which this information interacts with and facilitates different levers that support healthcare system change has been developed. This paper presents a typology and proposes an integrated conceptual framework of levers for change in healthcare systems and discussed the ways in which health performance measurement and reporting can act on these levers to promote change and quality improvement.

Methods

This paper draws on a synthesis of academic literature around behavioural and system change as well as evidence about how performance measurement and reporting supports healthcare improvement. CINAHL, Cochrane Effective Practice, MEDLINE, ProQuest, PsycInfo, PubMed and Web of Science databases were searched for papers using the keywords: "behaviour change", "behavioural interventions", "health behaviour", "levers for change", "organisational change", "performance indicators", "performance measurement", "performance reporting", "quality improvement", "quality measurement" and "theories of behaviour change".

Three types of supplementary searches were conducted. First, textbooks on healthcare performance measurement were searched for relevant chapters, second the grey literature was searched using Google Scholar and third, a snowballing approach of reference lists of retrieved reports and articles.

Publications were screened according to whether they outlined a conceptual framework or defined different types of approaches used to secure improvement in healthcare organisations and systems. Authors independently reviewed the frameworks and typologies, clustering conceptually similar levers for change. Any mismatch in clustering was resolved through discussion between authors.

Results

Theoretical foundation

Several levers are grounded in institutional theory which suggested that normative, coercive and mimetic pressures drive conformity among organisations through processes of comparing, compelling and copying (21). Similarly, studies on the diffusion of innovation have highlighted the

roles that evidence, social context, perceptions about existing practice, organisational structures, and norms, as well as attitudes and values play in promoting adoption of an innovation (22,23).

Other levers are grounded in theories of behaviour change which focus on explaining, predicting and changing individual behaviour (24). These propose that change is influenced by factors that include attitudes, perception of norms and motivation to comply with these norms, as well as the perception of control over the behaviour (25). In a similar line, sociological theories identify factors that influence behaviour change such as intrinsic and extrinsic motivators, perceptions of fear or threat, as well as norms, attitudes and intentions (26,27,28).

Many of these streams characterise change in terms of the source of motivation - whether it comes from within or outside the professionals, managers, organisations or systems involved. Internally driven change is a result of self-awareness, self-reflection, or tailored and specific feedback about performance – with subsequent catalysis of action or response. Data and information relevant to and reflective of the unit's performance can result in a readiness for change (29). Externally driven change, on the other hand, involves professionals, organisations and systems responding to directives, policies and economic or structural forces emanating from outside their direct control.

Other streams characterise change as occurring in a planned or emergent manner (30,31,32). Planned change is the result of a deliberate effort, conscious reasoning and considered actions. It has been described as comprising a series of sequential steps enacted with the intention of changing the behaviours of individuals and organisations to secure improvement (33,34,35,36). Emergent change on the other hand, unfolds in a reactive or spontaneous way (37). It is iterative and develops as people adapt to the circumstances, constraints and requirements of their environment and seek to improve some aspect of performance (38). Emergent change is often shaped by the inherent complexity in human behaviours, practices, organisations and systems and the way they respond in unpredictable ways to different stimuli. Although planned and emergent change have often been portrayed as distinct and substitutive (one or the other), more recently they have been regarded to occur in concert - complementary rather than competing, with approaches that target both types of change having a legitimate place in efforts to manage and change organisations (31).

An integrated framework

When these two dimensions (internal or external sources of motivation and emergent or planned change) are considered together, a matrix consisting of four quadrants is formed. Each quadrant represents a different way in which change occurs. Our review of the literature further suggests that each quadrant contains two different levers for change – resulting in a typology of eight levers in total (Figure 1).

[Insert Figure 1]

In the bottom left quadrant of the model are levers that seek to secure emergent and internally motivated change. **Cognitive** levers (4,39,40) provide a means to gauge one's own performance. They codify performance, quantifying it so that achievements are discernible and temporal trends can be tracked. The role of data provides feedback and self-assessment – it is most compelling in objective performance measurement. **Mimetic** levers (4,21,39,40,41,42,43) set this performance in a wider context, revealing the performance of peers. Mimetic levers act on a desire to belong, to conform to a respected group, to outperform - or at the very least, not be roundly outperformed by - our peers. The role of data in mimetic levers is to enable comparisons and identify clearly who is performing well and who is not performing well.

In the top left quadrant of the model, where change is planned and internally motivated – levers rely heavily on evidence and knowledge about best practice. Variation in performance can be due to differences in knowledge, capabilities and competencies. **Formative** levers (4,10,41,42,43,44) provide feedback – often in a timely way, guiding change in dynamic situations. They are important in situations where change and adaptation is continuous. While often used in circumstances where

change is deliberate and an evidence-based goal or model of best practice is clearly articulated, formative levers are flexible and responsive in terms of data provision. The role of data in formative levers is to clearly capture salient elements of the change process, guide action and signal when there is a need to respond to changing circumstances or unanticipated developments. **Supportive** levers (4,10,43,44) enable, encourage and help change. They provide mentorship, guidance and facilitate learning. Data are used to inform where efforts should focus and guide learning processes.

In the top right quadrant, where change is planned and externally motivated – levers rely heavily on power and influence. Performance data are used primarily for monitoring or quality assurance purposes, ensuring minimum standards. **Coercive** levers (4,21,39,40,43,44,45) are based on organisational power and often feature targets and powerful incentives and sanctions that drive change. Often referred to as 'carrots and sticks', coercive levers are favoured in circumstances where there is a powerful policy or strategic imperative. Goals are set, milestones defined and levers are used to ensure that objectives are achieved – often within a defined timeframe. Coercive levers may appear effective but on careful assessment be shown to result in unanticipated consequences. **Normative** levers (4,21,39,40,41,42,45) are based on professional standards and well defined norms of acceptable performance. They are often enacted through licensing, registration, revalidation and accreditation processes with membership of professional groups or associations acting as key motivators for change. The role of data is to target where the levers should be applied and to monitor anticipated and unanticipated effects.

In the bottom right quadrant, where change is emergent and externally driven – levers are primarily impersonal relying neither on negotiation nor counselling nor cajoling. **Structural** levers (41,42) are based on organisational constraints such as staffing, defined roles and responsibilities or characteristics that contain and shape performance. They can include physical limits or barriers but also organisational processes and professional routines that channel professional and organisational behaviours. While the role of data is traditionally less prominent in supporting structural levers, it informs the placement of levers and monitoring their impact. **Competitive** levers (10,39,40,43,44,45) rely on market forces that shape professional and organisation behaviour to attract or retain clients and funding. Performance data are often seen as playing a role in competitive levers through supporting patients' choices and managers' commissioning decisions. Ultimately, competitive levers work through fear of losing market share or clients; or through incentivising greater market share or increased client bases or service users.

Discussion

A comprehensive and coherent framework of levers for change

The framework described in this paper provides a way to navigate the multitude of approaches available to secure change. It does so in two complementary ways. Firstly, from a deductive perspective, it draws on a range of theoretical sources to describe different types of organisational change and various facilitators and barriers to such change. Secondly, from an inductive perspective, it brings together and describes levers previously described in the literature and by healthcare organisations internationally, synthesising and summarising them into a straightforward typology. The model provides a way to categorise levers, to inform decisions about the judicious application and use of levers both in isolation and in combination, to define information requirements and to set expectations about potential effects. Table 1 presents the eight levers and relates them to key publications retrieved through the literature review. While various existing models have touched on different aspects or levers, this framework integrates their perspectives.

[Insert table 1]

The framework provides insights and guidance into how performance information can be used in healthcare systems to leverage change. The distinction between planned and emergent change is key. Routine release of information can guide planned efforts to improve, and provide formative

feedback according to agreed regular schedules. However, routine reporting can also lose salience if too many measures or too frequent reporting generates indicator chaos or fatigue. Performance measurement and reporting, if used only in the context of planned change, acts more as a monitoring tool (providing reassurance or accountability) rather than as a catalyst or lever for change. If meaningful change at an organisational or provider level is an objective, the framework highlights that performance measurement is more powerful if also applied in efforts to promote emergent change – capitalising on organisational learning, where information plays a role in building a felt need for change, an appreciation of the complexity of systems, and sustaining and guiding efforts to improve.

The framework also highlights how those seeking to secure change should be cognisant of the distinction between internal and external sources of motivation. Internal motivation is supported by information that can reasonably be attributed to an individual provider or organisation. Non-attributable, non-specific information is at risk of being explained away as outside the individual's or organisation's nexus of control. If responsibility for performance is diffuse and if opportunities to make change are limited, public release of performance data can be counterproductive. External motivation in contrast, is principally supported by power and influence and valued benefits or feared consequences. The ability of performance information to secure change is largely determined by the extent to which external motivators are sustained; and perceptions about the value or impact of consequences.

Levers for change: in concert or conflict?

Data, information and knowledge support clinical delivery, the redesign of models of care and the consolidation of organisational structures to respond to changing population needs (20,46). The levers identified in this framework all rely, to varying degrees, on data – the result of codification of real phenomena into a form which can be systematically explored or interrogated. Their power relies on the transformation of these data into information, where numbers convey meaning about the measured phenomena, in order to build knowledge about how a system, organisation or clinician is performing.

Levers are the way to harness the power of data to secure improvement. However, a lever rarely operates in isolation – any system, organisation or healthcare professional is subject to multiple levers simultaneously. Meaningful and sustained change is more likely to be secured when different levers work in concert – aligning and reinforcing efforts to improve. Conversely, when levers are in conflict – for example when externally driven change objectives run counter to internally grounded self-assessment and felt need for change - change is unlikely to proceed smoothly.

The efficacy of levers is context dependent – both in terms of where they are directed and who is directing them. For example, it would be difficult for a single organisation to have both the internal capacity and the external credibility to operate in a supportive facilitator role and simultaneously act as a coercive 'watchdog' that penalises poor performance. Similarly, it would be challenging to simultaneously support mimetic influences while using competitive approaches such as patients' choice or purchasing and commissioning functions. Specialisation or concentration of levers in separate organisations can allow systems to better use their potential. While some levers are synergistic, many are in tension and a multi-agency approach across collaborating yet different organisations would help allow these tensions to be identified and resolved.

A system perspective to address the variety of levers and change perspectives

Researchers, managers, clinicians, policymakers and patients agree that securing sustained and meaningful improvement in performance is an important objective across healthcare systems internationally. There is not as much consensus however about how to secure such change, with a wide range of approaches, initiatives and interventions available. While there are many to select from, they are all variants of the core eight types of levers for change (Table 2).

[Insert Table 2]

When it comes to securing change in complex organisations and systems and in professional practice, it is clear there are no magic bullets (47,48). That is not to say that levers are ineffective. Levers are powerful but need informed and often nuanced application. This means that for wide scale change, a deliberate assessment of the role of different levers is needed together with a coordinated approach to their application. In addition, in complex systems, there are many actors or organisations that have some recourse to various levers. However, no one group or organisation is able to apply all types of leverage with equal effectiveness.

For example, the public release of hospital level mortality data mobilises cognitive and mimetic levers for change such as the capacity to self-identify and identify peers in performance reporting. Subsequent mobilisation of normative, supportive and formative levers, such as guidelines, quality improvement or training programs, guides and sustains efforts to improve by professionals, providers and systems. Continuing poor performance can also be met with coercive levers such as regulatory interventions, financial penalties or contractual consequences. Ultimately, local communities, if informed about the results, can add to building a strong case for change.

Limitations of the framework

This study is not without limitations. First, the inductive component of the model development is based on the synthesis of published literature and available grey literature – and so will be affected by any publication bias where levers that did not work in a particular context may not have featured in the retrieved publications. Second, the deductive component of the model development did not comprehensively review the relevant disciplines to ensure an exhaustive set of conceptual constructs. Despite these two limitations, the concordance of various previously published models with the proposed framework and the fact that no other models contained all the elements of the proposed framework suggest that it provides a clear contribution to the field. Finally, the model has not to date been tested empirically and so the relative effects of context have not been fully elucidated. However, the model has face validity and resonates with published accounts about how performance reporting influences change.

Conclusion

The assertion that information is not enough to secure meaningful change or quality improvement in healthcare is uncontested. However information is a key and often essential component of most levers for change. Data and information tell us how we are doing, whether we differ from our peers, it provides a way to explore and compare options for new ways of working, delivers feedback as change progresses, informs policy and managerial decision-making, and measures impact. The framework suggested in this paper raises awareness of the implications of applying levers in isolation without due regard for context.

Clearly, there is a wide variety of levers in use. In healthcare systems, the impetus for change can vary from subtle to strident; it can be founded on fear or on hope; built on pressure to conform or an imperative to be distinguished; adopt an attitude of support or challenge; can be tacit or codified; and focused or pervasive in scope. Pressure to change can come from within or from outside – inducements can take the form of hugs, nudges or shoves. Levers for change are varied and multifaceted and have been successfully applied in a range of contexts. In complex adaptive systems such as health, multiple levers are needed and multimodal approaches have been shown to have the biggest impact. This paper provides a clear framework to support better planning and evaluation of efforts to measure and publicly report performance in the healthcare sector.

Data Sharing Statement

No additional data available

Contribution Statement

Dr Levesque generated the original idea, presented the original ideas in scientific plenaries, participated in the scoping of the literature, conceptualised the framework and drafted the manuscript. Dr Sutherland participated in the scoping of the literature and in the conceptualisation of the framework and drafted the manuscript. Both authors deliberated the findings and produced the discussion of the manuscript.

Ethics and Funding

This work was conducted without direct contact with patients or providers, representing a synthesis of published academic and grey literature.

The work did not receive specific academic or commercial funding and no conflicts of interest are to be declared.

Competing interest statement

The authors do not have competing interest to declare.

Acknowledgements

An earlier version of this work was presented at the Canadian Association for Health Services and Policy Research conference, May 26 – 28, 2015, Montreal, QC in a keynote address entitled “Health System Improvement In Australia: Knowledge Organizations As Enablers”. We would like to thank Christopher Papadopoulos for his assistance to the literature search and revision of retrieved manuscripts.

References

1. Murray C, Frenk J. A framework for assessing the performance of health systems. *Bulletin of the World Health Organization* 2000;78:717-31.

2. Organization for Economic Cooperation and Development. Measuring Up: Improving Health System Performance in OECD Countries. Paris: OECD 2002.

3. Institute of Medicine. Vital signs: Core Metrics for Health and Health Care. Washington: National Academies Press 2015.

4. Veillard J, Huynh T, Ardal S, Kadandale S, Klazinga NS, Brown AD. Making health system performance measurement useful to policy makers: aligning strategies, measurement and local health system accountability in Ontario. Healthc Policy. 2010 Feb;5(3):49-65.

5. Sandmeyer B, Fraser I. New Evidence on What Works in Effective Public Reporting. *Health Serv Res*. 2016 Jun;51 Suppl 2:1159-66. doi: 10.1111/1475-6773.12502.

6. Braithwaite RS, Caplan A. Who is watching the watchmen: Is quality reporting ever harmful? *SAGE Open Med.* 2014 Feb 18;2:2050312114523425.

7. Fung C, Lim Y, Mattke S, et al. Systematic review: the evidence that publishing patient care performance data improves quality of care. *Ann Intern Med.* 2008 Jan 15;148(2):111-23.

8. Pearse J and Mazevska D, The impact of public disclosure of health performance data: a rapid review. Sydney: Sax Institute 2010.

9. Campanella P, Vukovic V, Parente P, et al. The impact of Public Reporting on clinical outcomes: a systematic review and meta-analysis. B*MC Health Serv Res*. 2016 Jul 22;16:296. doi: 10.1186/s12913-016-1543-y.

10. Berwick D, James B and Coye M. Connections between Quality Measurement and Improvement. *Med Care.* 2003 Jan;41(1 Suppl):I30-8.

11. McGlynn E, Asch S, Adams J, et al. The quality of health care delivered to adults in the United States. *N Engl J Med.* 2003 Jun 26;348(26):2635-45.

12. McGlynn E. Introduction and overview of the conceptual framework for a national quality measurement and reporting system. *Med Care.* 2003;41(1 Suppl):I1-7.

13. McLoughlin V, Leatherman S, Fletcher M, et al. Improving performance using indicators. Recent experiences in the United States, the United Kingdom, and Australia. I*nt J Qual Health Care*. 2001;13(6):455-62.

14. Bohmer R. The hard work of health care transformation. NEJM 2016: 375(8): 709-711.

15. Molloy A, Martin S, Gardner T, et al. A clear road ahead: creating a coherent quality strategy for the English NHS. London: The Health Foundation; 2016

16. Custers T, Hurley J, Klazinga NS, Brown AD. Selecting effective incentive structures in health care: A decision framework to support health care purchasers in finding the right incentives to drive performance. BMC Health Serv Res. 2008 Mar 27;8:66. doi: 10.1186/1472-6963-8-66.

17. Grol R, Wensing M, Eccles M, et al.,eds. Improving Patient Care: The Implementation of Change in Health Care, [2nd ed]. Wiley-Blackwell, 2013.

18. Caldwell S, Herold D, Fedor D. Toward an understanding of the relationships among organizational change, individual differences, and changes in person-environment fit: a cross-level study. *Journal of Applied Psychology*, 2004; 89(5):868

19. Pettigrew A, Whipp R. Managing change for competitive success. Oxford: Blackwell 1991.

20. Walker H, Armenakis A, Bernerth J, (2007) Factors influencing organizational change efforts: An integrative investigation of change content, context, process and individual differences. *J Organ Change Manag*, 2007; 20(6):761-773.

21. DiMaggio P, Powell W. The iron cage revisited Institutional Isomorphism and Collective Rationality in Organization Fields. In: Powell W, DiMaggio P, eds. The New Institutionalism in Organizational Analysis. Chicago: University of Chicago Press 1991.

22. Rogers E. Diffusion of innovations, 5th ed. New York: Free Press 2003.

23. Greenhalgh T, Robert G, Bate P, et al. Diffusion of Innovations in Health Service Organisations: A Systematic Review. London: Blackwell 2005.

24. Michie S. ABC of Behaviour Change Theories. London: Lulu publishing 2014.

25. Ajzen, I. The theory of planned behaviour. *Organizational Behaviour and Human Decision Processes,* 1991;50: 179–211.

26. Glanz K., Lewis F, Rimers B, eds. Health Behaviour and Health Education: Theory, Research, and Practice. San Francisco: Jossey-Bass 1990

27. Perry, C, Barnowski T, Parcel, G. How individuals, environments, and health behaviour interact: Social learning theory. In Glanz K, Lewis F, Rimer B, eds. Health Behaviour and Health Education: Theory, Research and Practice. San Francisco: Jossey-Bass 1990.

28. Bandura, A. Social foundations of thought and action: A social cognitive theory. Englewood Cliffs, NJ: Prentice-Hall 1986.

29. Cummings T, Worley C. Organization Development and Change 10th ed. California: Cengage Learning 2015.

30. Bamford D, Forrester P. Managing planned and emergent change within an operations management environment*. Int J Operations Product Manage*. 2003; 23(5): 546-564.

31. Burnes, B. Managing Change: A Strategic Approach to Organisational Dynamics, 4th ed Harlow: Prentice Hall 2004.

32. Liebhart M, Garcia-Lorenzo L. Between planned and emergent change: decision maker's perceptions of managing change in organisations. *Int J Knowledge, Culture Change Manage* 2010; 5: 214-225.

33. Burns B. Kurt Lewin and the planned change approach to change: a reappraisal. In: Gallos J, ed. Organisational Development. San Francisco: Jossey-Bass 2006.

34. Livne-Tarandach R, Bartunek J. A new horizon for organizational change and development scholarship: Connecting planned and emergent change. In Woodman R, Pasmore W, Shani A, eds. *Research in Organizational Change and Development*. 2009; 17:1 – 35.

35. Burns B. Complexity theories and organisational change. *Int J of Management Reviews*. 2005; 7(2): 73-90

36. Lewin K. Field Theory in Social Science. New York: Harper and Row 1951.

37. Weick K, Quinn R. Organizational change and development . *Ann Rev Psychol* 1999; 50:361-386.

38. Stacey R. Managing the Unknowable: Strategic Boundaries Between Order and Chaos in Organizations. San Francisco: Jossey-Bass 1992.

39. Institute of Medicine. Crossing the Quality Chasm: A New Health System for the 21st Century. Washington: National Academies Press 2001.

40. Leatherman S. Applying Performance Indicators to Health System Improvement. In: Organization for Economic Development and Cooperation. Measuring Up: Improving Health System Performance in OECD Countries. Paris: OECD 2002.

41. Plsek P, Greenhalgh T. Complexity science: The challenge of complexity in health care. *BMJ*. 2001;323(7313):625-8.

42. Plsek P, Wilson T. Complexity, leadership, and management in healthcare organisations. *BMJ*. 2001;323(7315):746-9.

43. National Quality Board. NQB's Quality Strategy Workstream. London: NQB; 2015.

44. Naylor D, Iron K, Handa K. Measuring health system performance: Problems and Opportunities in the Era of Assessment and Accountability. In: Organisation for Economic Cooperation and Development Measuring up: Improving Health Systems Performance in OECD Countries. Paris: OECD 2002.

45. Leatherman S, Sutherland K. The Quest for Quality: Refining the NHS Reforms. London: Nuffield Trust 2008.

46. Bevan G. Incentives and models of governance. Health Economics Policy and Law 2015; 10(3):345-50.

47. Oxman A, Thomson M, Davs D, et al. No magic bullets: a systematic review of 102 trials of interventions to improve professional practice. *CMAJ* 1995;153(10):1423-31.

48. Burnes B. No such thing as ... a "one best way" to manage organizational change. Manage Decision 1996;34(10): 11-18.

Table 1: Mapping of published frameworks and levers for change

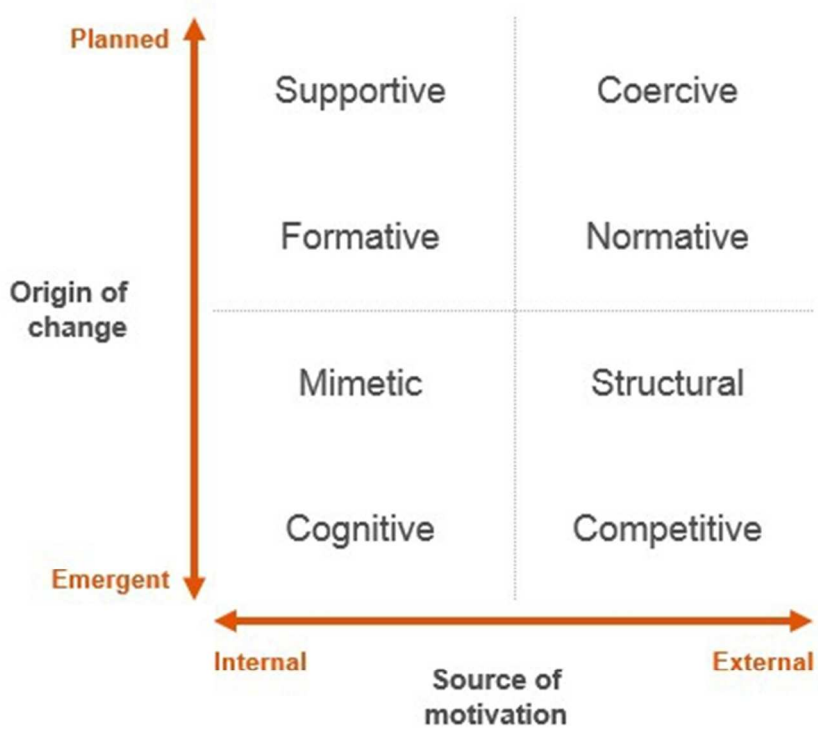
	Cognitive	Mimetic	Formative	Supportive	Normative	Coercive	Structural	Competitive	Number of levers
DiMaggio & Powell (21)		*			*	*			3
Plsek & Greenhalgh (41)		*			*	*	*		4
Institute of Medicine (39)	*		*		*	*		*	5
Leatherman (40)	*	*		*	*	*		*	6
Naylor, Iron & Handa (44)				*	*	*		*	4
Berwick, James & Coye (10)			*	*			*	*	4
Leatherman & Sutherland (45)	*				*	*		*	4
Veillard et al. (4)	*		*	*	*	*		*	6
NHS Quality Framework (43)	*		*	*	*	*		*	6
Bevan (46)	*	*	*	*		*		*	6
Number of models	6	4	5	6	8	9	2	8	

Table 2: Key types of improvement efforts, associated levers for change and their nexus of control

Key applications	Application secondary lever (s)	Controlled by
COGNITIVE		
Performance profiles / report cards / dashboards Benchmarking / league tables Root cause analyses / Morbidity and mortality reviews	Mimetic Mimetic/Competitive Formative/Normative	Performance reporting efforts such as profiles, report cards or benchmarking often incorporate a range of performance indicators covering different patient groups and aspects of care. They are usually enacted by independent reporting agencies or by government departments or ministries. The more analytic applications such as root cause analyses provide cognition about specific events and are usually enacted by healthcare provider organisations, professional groups or safety agencies.
MIMETIC		
Local champions / opinion leaders Demonstrator sites / beacon practices Case studies Study tours / exchange programs Secondments / rotations	Supportive Formative Formative Supportive/Formative Supportive/Formative	Efforts to identify and highlight organisations or providers who are leaders in their field, articulate lessons and diffuse learning from their approaches and methods are usually coordinated by improvement organisations, professional groups or healthcare provider organisations.
FORMATIVE		
Continuing professional development / training / fellowships Clinical governance / Grand rounds Mentorship programs Local consensus building / deliberative processes Organisational learning / action research / systems thinking Communities of practice / Learning circles / Academies Feedback	Cognitive/Normative Cognitive/Normative/Supportive Cognitive/Supportive Cognitive Cognitive Cognitive/Supportive Cognitive	Providing feedback is generally enacted by professional groups or colleagues and healthcare improvement agencies. Formative levers are often used in concert with cognitive levers – tracking performance as change takes place.
SUPPORTIVE		
Quality improvement / cultural change programs Plan Do Study Act processes Targeted initiatives e.g. IHI 100,000 lives Facilitators / management consultants Innovation funds Collaboratives Models of care / Pathways Decision support / reminders / alerts	Formative Cognitive /Supportive Normative Formative Competitive Formative Normative Normative	Processes that seek to facilitate, support and guide change are often enacted by quality improvement agencies, government departments or ministries. Add academic institutions and professional organisations

Table 2: Key types of improvement efforts, associated levers for change and their nexus of control (continued)

Key applications	Application secondary lever (s)	Controlled by
NORMATIVE		
Inspection and accreditation Registration, licensing and revalidation Audit and feedback KPIs / performance agreement Guidelines / Standards Awareness campaigns (such as Choosing wisely)	Cognitive/Coercive Cognitive/Coercive Cognitive/Formative Cognitive/Coercive Supportive Mimetic	Efforts to alter performance to bring it into line with defined and codified practice – 'what should be done' are generally enacted by professional groups and by regulators.
COERCIVE		
Legislation and policy / rules / contracts Targets Incentives / Penalties Pay for performance 'Special measures' (supplanting local management)	Normative Normative/Competitive Normative/Competitive Normative/Competitive	Coercive levers are principally enacted by government departments, ministries or regulators. They are often based on clearly defined objectives that are quantified and monitored. Meeting objectives or failing to meet objectives has salient consequences for the organisation or provider being monitored.
STRUCTURAL		
Reorganisation / restructure Capital investments / Funding arrangements Decommissioning / sunsetting Staffing / Skill mix Hub and spoke networks Physical arrangements Business Process Reengineering Devolution	Coercive Competitive - - Formative Supportive Formative Formative	Physical changes can be enacted by healthcare provider organisations seeking to secure localised change; and by government departments seeking to secure system-wide change.
COMPETITIVE		
Patient choice / personal health budgets Markets / Internal markets / purchaser-provider splits Tendering	Cognitive Structural	Government departments and policymakers typically enact at a system level market mechanisms and competition. Local providers may apply competitive levers in seeking to change particular services, such as cleaning, through tendering processes.



Integrated conceptual framework of levers for change in healthcare

138x111mm (96 x 96 DPI)

BMJ Open

What role does performance information play in securing improvement in healthcare? A conceptual framework for levers of change

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2016-014825.R1
Article Type:	Research
Date Submitted by the Author:	09-Jun-2017
Complete List of Authors:	Levesque, Jean-Frederic; Bureau of Health Information Sutherland, Kim; Bureau of Health Information
Primary Subject Heading:	Health services research
Secondary Subject Heading:	Public health, Health policy
Keywords:	Quality in health care < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Organisational development < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Change management < HEALTH SERVICES ADMINISTRATION & MANAGEMENT

What role does performance information play in securing improvement in healthcare? A conceptual framework for levers of change

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Abstract

Objective: Across healthcare systems, there is consensus on the need for independent and impartial assessment of performance. There is less agreement about how measurement and reporting performance improves healthcare. This paper draws on academic theories to develop a conceptual framework – one that classifies in an integrated manner the ways in which change can be leveraged by healthcare performance information. **Methods:** A synthesis of published frameworks. **Results:** The framework identifies eight levers for change enabled by performance information, spanning internal and external drivers, and emergent and planned processes: 1) cognitive levers provide awareness and understanding; 2) mimetic levers inform about the performance of others to encourage emulation; 3) supportive levers provide facilitation, implementation tools or models of care to actively support change; 4) formative levers develop capabilities and skills through teaching, mentoring and feedback; 5) normative levers set performance against guidelines, standards, certification and accreditation processes; 6) coercive levers use policies, regulations incentives and disincentives to force change; 7) structural levers modify the physical environment or professional cultures and routines; 8) competitive levers attract patients or funders. **Conclusion:** This framework highlights how performance measurement and reporting can contribute to eight different levers for change. It provides guidance into how to align performance measurement and reporting into quality improvement programs.

Strengths and Limitations of this Study

- This paper draws on academic theories to develop a conceptual framework that classifies in an integrated manner the ways in which change can be leveraged by healthcare performance information
- The paper draws on a range of theoretical work to describe different types of organisational change and various facilitators and barriers to such change and synthesises levers into a straightforward typology
- The framework provides insights and guidance into how performance information can be used in healthcare systems to leverage change
- The model development is based on the synthesis of published literature and available grey literature – and so could be affected by any publication bias where levers that did not work in a particular context may not have featured in the retrieved publications
- The literature was reviewed using a layered approach, selecting seminal papers and reports through a iterative approach, and did not consist of a systematic review.

Keyword: Quality improvement; performance measurement; healthcare system change; conceptual framework
Abstract word count: 208 words; Manuscript word count: 3678

Introduction

That performance measurement is essential in healthcare systems is broadly accepted (1,2,3). Measurement and reporting of performance play a clear role in terms of management and in providing accountability; but also in terms of making a contribution to improvement efforts. When properly defined, applied and interpreted, performance measures provide insights into absolute and relative achievement of outcomes, patterns of delivery and efficiency of care, highlight variation and areas where there are opportunities to improve (4).

Performance however relates to real processes, actions and outcomes rather than to the structural, potential or planned delivery of services. Just as actors perform on stage and athletes perform on the field, surgeons perform in surgical theatres and nurses perform at the bedside or in community centres. Measuring performance in healthcare is therefore about quantifying what healthcare systems, organisations and professionals are really achieving rather than about how well they are designed or qualified. Meaningful performance measurement focuses on aspects such as services delivered relative to patient needs and expectations, processes and models of care relative to evidence and clinical workloads, and patient outcomes relative to their presenting problems and the resources invested.

Some studies have shown that the impact of performance measurement and reporting varies (5), and that they can have unintended consequences that result in deterioration of performance (6). However, the weight of accumulating evidence attests to the potential benefits and power of performance reporting, particularly in terms of securing change among clinicians and delivery organisations (7,8,9). This evidence suggests that performance measurement makes a contribution to improvement efforts but is not always sufficient to achieve, on its own, meaningful change in healthcare (7,10).

Quality improvement efforts draw on a much broader array of activities than simply providing information about the performance of providers, organisations or systems (10,11,12,13,14,15). Change in complex systems is shaped by a range of factors including history, culture, social and legal context, policies and structures, availability of evidence, technology, and economic incentives. Researchers from many different disciplines have investigated how such factors influence change processes and have described different ways in which change can be initiated, driven and managed both within (16,17) and outside (18,19,20) the healthcare sector.

While recent research has assessed the impact of performance measurement and reporting on various aspects, most studies seem to assume that public reporting of performance information either works on its own or only through patients' choice of providers. To date, no integrative framework that conceptualises the role of performance information and the way in which this information interacts, with and facilitates different levers that support healthcare system change, has been developed. This paper presents a typology and proposes an integrated conceptual framework of levers for change in healthcare systems and discusses the ways in which health performance measurement and reporting can act on these levers to promote change and quality improvement.

Methods

The literature relevant to a review of the role of performance measurement in behavioural and organisational change is vast and unwieldy. Behaviour and organisational change literature has roots in substantial knowledge bases that span sociology, psychology, organisation sciences, health policy, management and economics. The breadth of the available literature overwhelms efforts to systematically synthesise it. Despite the huge number of studies and publications, well-delineated conceptual models that proffer typologies of levers for change are relatively rare. This means that there is simultaneously too much and too little literature. In order to overcome this dilemma, a layered inquiry was undertaken and the paper is underpinned by a targeted search strategy rather than the more usual systematic review.

The purpose of this paper is not to review all papers published but rather to canvass and classify the main levers for change in use in healthcare, with a particular focus on levers that rely on performance information. As a result, the paper draws on a mix of theoretical expositions, prescriptive models of change and descriptive accounts or typologies of the utilisation of performance information in pursuit of change (21,22,23,24).

The starting point was a collection of seminal works by renowned experts in performance measurement. A snowballing approach was then adopted to explore references cited in their work and to review their theoretical underpinnings. In addition, key data bases were searched CINAHL, Cochrane Effective Practice, MEDLINE, ProQuest, PsycInfo, PubMed and Web of Science databases for papers using the keywords: "behaviour change", "behavioural interventions", "health behaviour", "levers for change", "organisational change", "performance indicators", "performance measurement", "performance reporting", "quality improvement", "quality measurement" and "theories of behaviour change". Publications were screened according to whether they outlined a conceptual framework or defined different types of approaches used to secure improvement in healthcare organisations and systems. Authors independently reviewed the frameworks and

typologies, clustering conceptually similar levers for change. Any mismatch in clustering was resolved through discussion.

Further, the typology and conceptual framework developed by this paper is informed by the authors' experience in measurement and change in healthcare systems, particularly Australia, Canada and the United Kingdom. The authors combined their assessment and iteratively synthesized the dimensions useful to organise levers into a coherent framework. The resulting framework was then mapped to the original studies to assess integrity and comprehensiveness of the integrated framework. Appendix 1 summarizes the main published work selected to build an integrated framework of levers for change.

Results

Theoretical foundation

Several levers for change are grounded in institutional theory which suggests that normative, coercive and mimetic pressures drive conformity among organisations through processes of comparing, compelling and copying (21). Similarly, studies on the diffusion of innovation have highlighted the roles that evidence, social context, perceptions about existing practice, organisational structures, and norms, as well as attitudes and values play in promoting adoption of an innovation (22,23).

Other levers are grounded in theories of behaviour change which focus on explaining, predicting and changing individual behaviour (24). These theories propose that change is influenced by factors that include attitudes, perceptions and motivation to comply with norms, as well as the perception of control over the behaviour (25). In a similar line, sociological theories identify factors that influence behaviour change such as intrinsic and extrinsic motivators, perceptions of fear or threat, as well as norms, attitudes and intentions.

Two clear organising dimensions emerge. The first dimension (from psychology and sociology literature) focuses on why change occurs, and is based on the distinction between intrinsic and extrinsic motivation (26,27,28). Intrinsic motivation is grounded in self-awareness, self-reflection, or tailored and specific feedback about performance – with subsequent catalysis of action or response. Data and information relevant to and reflective of the unit's performance can result in a readiness for change (29). Extrinsic motivation, on the other hand, involves professionals, organisations and systems responding to directives, policies and economic or structural forces emanating from outside their direct control.

The second organising dimension (from innovation and organisational change literature) is based on the distinction between planned and emergent change (30,31,32). Planned change is the result of a deliberate effort, conscious reasoning and considered actions, and typically involves sequential steps enacted with the intention of changing the behaviours of individuals and organisations to secure improvement (33,34,35,36). Emergent change unfolds in a reactive or spontaneous way (37). It is iterative and develops as people adapt to the circumstances, constraints and requirements of their environment and seek to improve some aspect of performance (38).

An integrated framework

When the previously described two dimensions are considered together, a matrix consisting of four quadrants is formed. Each quadrant represents a different way in which change occurs. Our review of the literature further suggests that each quadrant contains two different levers for change – resulting in a typology of eight levers in total (Figure 1).

[Insert Figure 1]

In the bottom left quadrant of the model are levers that seek to secure emergent and internally motivated change.

Cognitive levers (4,39,40), such as the provision of information through report cards, league tables and root cause analysis summaries, provide a means to gauge one's own performance. They codify performance, quantifying it so that achievements are discernible and temporal trends can be tracked. In healthcare, this lever aims to improve clinicians' and managers' awareness of gaps. It is recognised as the starting point of many types of quality improvement processes.

Mimetic levers (4,21,39,40,41,42,43), such as the provision of benchmarking data that identifies best performers and their adopted models of care, set performance in a wider context, revealing the performance of peers. Mimetic levers act on a desire to belong, to conform to a respected group, to outperform - or at the very least, not be roundly outperformed by - peers. The role of data in mimetic levers is to enable comparisons and identify clearly who is performing well and who is not performing well. In the healthcare sector, public reporting of hospital or clinical units' performance on a nominal basis can act on the desires of clinicians or organisations to emulate the activities and processes implemented in high performance units.

In the top left quadrant of the model, where change is planned and internally motivated – levers rely heavily on evidence and knowledge about best practice. Variation in performance can be due to differences in knowledge, capabilities and competencies.

Formative levers (4,10,41,42,43,44), such as continuing professional education and development programmes and healthcare redesign courses, are based on the provision of feedback – often in a timely way, guiding change in dynamic situations. While often used in circumstances where change is deliberate and an evidence-based goal or model of best practice is clearly articulated, formative levers are flexible and responsive in terms of data provision. The role of data in formative levers is to clearly capture salient elements of the change process, guide action and signal when there is a need to respond to changing circumstances or unanticipated developments.

Supportive levers (4,10,43,44), such as quality improvement programmes and clinical collaboratives, enable, encourage and help change. They provide mentorship, guidance and facilitate learning. Data are used to inform where efforts should focus and guide change processes and investments.

In the top right quadrant, where change is planned and externally motivated – levers rely heavily on power and influence. Performance data are used primarily for monitoring or quality assurance purposes, ensuring minimum standards.

Coercive levers (4,21,39,40,43,44,45), such as pay for performance programs or regulatory or legal frameworks, are based on organisational power and often feature targets and powerful incentives and sanctions that drive change. Often referred to as 'carrots and sticks', coercive levers are favoured in circumstances where there is a powerful policy or strategic imperative. Goals are set, milestones defined and levers are used to ensure that objectives are achieved – often within a defined timeframe. Coercive levers may appear effective but on careful assessment be shown to result in unanticipated consequences. Key performance indicators and performance monitoring frameworks are clear example of how data is used to support coercive levers.

Normative levers (4,21,39,40,41,42,45), such as memberships of medical associations and organisations that define the state of current best practice, are based on professional standards and well defined norms of acceptable performance. They are often enacted through licensing, registration, revalidation and accreditation processes acting as key motivators for change. The role of data is to target where the levers should be applied and to monitor anticipated and unanticipated effects.

In the bottom right quadrant, where change is emergent and externally driven – levers are primarily impersonal, relying neither on negotiation, counselling nor cajoling.

Structural levers (41,42) are based on organisational constraints such as staffing, defined roles and responsibilities or characteristics that contain and shape performance. They can include physical

limits or barriers (e.g. architectural design of clinical space, information and communication technologies) but also organisational processes and professional routines that channel professional and organisational behaviours (e.g. clinical pathways, team-based processes, models of care). While the role of data is traditionally less prominent in supporting structural levers, it informs the placement of levers and monitoring their impact.

Competitive levers (10,39,40,43,44,45), such as the pressures imposed by the need to attract clients or contracts, rely on market forces that shape professional and organisation behaviour to attract or retain clients and funding. Performance data are often seen as playing a role in competitive levers through supporting patients' choices and managers' commissioning decisions. Ultimately, competitive levers work through fear of losing market share or clients; or through incentivising greater market share or increased client bases or service users. Commissioning and processes supporting patients' selection of providers are examples of competitive levers in healthcare.

Discussion

A comprehensive and coherent framework of levers for change

The framework described in this paper provides a way to navigate the multitude of approaches available to secure change. It does so in two complementary ways. Firstly, from a deductive perspective, it draws on a range of theoretical sources to describe different types of organisational change and various facilitators and barriers to such change. Secondly, from an inductive perspective, it brings together and describes levers previously described in the literature and by healthcare organisations internationally, synthesising and summarising them into a straightforward typology. The model provides a way to categorise levers, to inform decisions about the judicious application and use of levers both in isolation and in combination, to define information requirements and to set expectations about potential effects. Table 1 presents the eight levers and relates them to key publications retrieved through the literature review. While various existing models have touched on different aspects or levers, this framework integrates their perspectives.

[Insert table 1]

The framework provides insights and guidance into how performance information can be used in healthcare systems to leverage change. The distinction between planned and emergent change is key. Routine release of information can guide planned efforts to improve, and provide formative feedback according to agreed regular schedules. However, routine reporting can also lose salience if too many measures or too frequent reporting generates indicator chaos or fatigue. Performance measurement and reporting, if used only in the context of planned change, acts more as a monitoring tool (providing reassurance or accountability) rather than as a catalyst or lever for change. If meaningful change at an organisational or provider level is an objective, the framework highlights that performance measurement is more powerful if also applied in efforts to promote emergent change – capitalising on organisational learning, where information plays a role in building a felt need for change, an appreciation of the complexity of systems, and sustaining and guiding efforts to improve.

The framework also highlights how those seeking to secure change should be cognisant of the distinction between internal and external sources of motivation. Internal motivation is supported by information that can reasonably be attributed to an individual provider or organisation. Non-attributable, non-specific information is at risk of being explained away as outside the individual's or organisation's nexus of control. If responsibility for performance is diffuse and if opportunities to make change are limited, public release of performance data can be counterproductive. External motivation in contrast, is principally supported by power and influence and valued benefits or feared consequences. The ability of performance information to secure change is largely determined by the extent to which external motivators are sustained; and perceptions about the value or impact of consequences.

Levers for change: in concert or conflict?

Data, information and knowledge support clinical delivery, the redesign of models of care and the consolidation of organisational structures to respond to changing population needs (20,46). The levers identified in this framework all rely, to varying degrees, on data – the result of codification of real phenomena into a form which can be systematically explored or interrogated. Their power relies on the transformation of these data into information, where numbers convey meaning about the measured phenomena, in order to build knowledge about how a system, organisation or clinician is performing.

Levers are the way to harness the power of data to secure improvement. However, a lever rarely operates in isolation – any system, organisation or healthcare professional is subject to multiple levers simultaneously. Meaningful and sustained change is more likely to be secured when different levers work in concert – aligning and reinforcing efforts to improve For example, normative levers, such as the publication of guidelines, have been shown to have a modest effect on behaviour when applied in isolation (47,48). When applied with cognitive, mimetic or coercive levers they have been shown to be more effective (49). Similarly, as a lever based on competition, the quasi-market reforms in the NHS have not been proven to bring about the beneficial outcomes that classical economic theory would predict of markets, due to misaligned levers political interference, weak purchasers, and barriers to exit and entry, as well as a lack of a stable policy environment to inspire staff commitment and enthusiasm (50).

Conversely, when levers are in conflict – for example when externally driven change objectives run counter to internally grounded self-assessment and felt need for change - change is unlikely to proceed smoothly. For example, when the cognitive levers of performance information suggests a need to improve but remains in conflict with current recognised professional practice or clinicians' sense of competence, change is unlikely. Similarly, coercive levers have been shown to be ineffective when in conflict with other levers that seek to improve or maintain non-incentivised aspects of care (for example in the implementation of the Quality Outcomes Framework in the UK (51).

A system perspective to address the variety of levers and change perspectives

Finally, the efficacy of levers is context dependent – both in terms of where they are directed and who is directing them. For example, it would be difficult for a single organisation to have both the internal capacity and the external credibility to operate in a supportive facilitator role and simultaneously act as a coercive 'watchdog' that penalises poor performance. Similarly, it would be challenging to simultaneously support mimetic influences while using competitive approaches such as patient choice or purchasing and commissioning functions. Specialisation or concentration of levers in separate organisations can allow systems to better use each potential type of lever. While some levers are synergistic, many are in tension and a multi-agency approach across collaborating yet different organisations would help allow these tensions to be identified and resolved.

Researchers, managers, clinicians, policymakers and patients agree that securing sustained and meaningful improvement in performance is an important objective across healthcare systems internationally. There is not as much consensus however about how to secure such change, with a wide range of approaches, initiatives and interventions available. While there are many to select from, they are all variants of the core eight types of levers for change (Table 2).

[Insert Table 2]

When it comes to securing change in complex organisations and systems and in professional practice, it is clear there are no magic bullets (47,52). That is not to say that levers are ineffective. Levers are powerful but need informed and often nuanced application. This means that for wide scale change, a deliberate assessment of the role of different levers is needed together with a coordinated approach to their application. In addition, in complex systems, there are many actors or

organisations that have some recourse to various levers. However, no one group or organisation is able to apply all types of leverage with equal effectiveness.

For example, the public release of hospital level mortality data mobilises cognitive and mimetic levers for change such as the capacity to self-identify and identify peers in performance reporting. Subsequent mobilisation of normative, supportive and formative levers, such as guidelines, quality improvement or training programs, care guides and sustains efforts to improve by professionals, providers and systems. Continuing poor performance can also be met with coercive levers such as regulatory interventions, financial penalties or contractual consequences. Ultimately, local communities, if informed about the results, can add to building a strong case for change.

Limitations of the framework

This study is not without limitations. First, the inductive component of the model development is based on the synthesis of published literature and available grey literature – and so will be affected by any publication bias where levers that did not work in a particular context may not have featured in the retrieved publications. Second, the deductive component of the model development did not comprehensively review the relevant disciplines to ensure an exhaustive set of conceptual constructs. Despite these two limitations, the concordance of various previously published models with the proposed framework and the fact that no other models contained all the elements of the proposed framework suggest that it provides a clear contribution to the field. Finally, the model has not to date been tested empirically and so the relative effects of context have not been fully elucidated. However, the model has face validity and resonates with published accounts about how performance reporting influences change.

Conclusion

The assertion that information is not enough to secure meaningful change or quality improvement in healthcare is uncontested. However information is a key and often essential component of most levers for change. Data and information tell us how we are doing, whether we differ from our peers, it provides a way to explore and compare options for new ways of working, delivers feedback as change progresses, informs policy and managerial decision-making, and measures impact. The framework suggested in this paper raises awareness of the implications of applying levers in isolation without due regard for context.

Clearly, there is a wide variety of levers in use. In healthcare systems, the impetus for change can vary from subtle to strident; it can be founded on fear or on hope; built on pressure to conform or an imperative to be distinguished; adopt an attitude of support or challenge; can be tacit or codified; and focused or pervasive in scope. Pressure to change can come from within or from outside – inducements can take the form of hugs, nudges or shoves. Levers for change are varied and multifaceted and have been successfully applied in a range of contexts. In complex adaptive systems such as health, multiple levers are needed and multimodal approaches have been shown to have the biggest impact. This paper provides a clear framework to support better planning and evaluation of efforts to measure and publicly report performance in the healthcare sector.

Acknowledgements

An earlier version of this work was presented at the Canadian Association for Health Services and Policy Research conference, May 26 – 28, 2015, Montreal, QC in a keynote address entitled “Health System Improvement In Australia: Knowledge Organizations As Enablers”. We would like to thank Christopher Papadopoulos for his assistance to the literature search and revision of retrieved manuscripts.

Data Sharing Statement

No additional data available

Contribution Statement

Dr Levesque generated the original idea, presented the original ideas in scientific plenaries, participated in the scoping of the literature, conceptualised the framework and drafted the manuscript. Dr Sutherland participated in the scoping of the literature and in the conceptualisation of the framework and drafted the manuscript. Both authors deliberated the findings and produced the discussion of the manuscript.

Ethics and Funding

This work was conducted without direct contact with patients or providers, representing a synthesis of published academic and grey literature. The work did not receive specific academic or commercial funding and no conflicts of interest are to be declared.

Competing interest statement

The authors do not have competing interest to declare.

References

1. Murray C, Frenk J. A framework for assessing the performance of health systems. *Bulletin of the World Health Organization* 2000;78:717-31.

2. Organization for Economic Cooperation and Development. Measuring Up: Improving Health System Performance in OECD Countries. Paris: OECD 2002.

3. Institute of Medicine. Vital signs: Core Metrics for Health and Health Care. Washington: National Academies Press 2015.

4. Boland T, Fowler A. A systems perspective of performance management in public sector organisations. Journal Public Sector Management 2000 13: 417-46.

5. Sandmeyer B, Fraser I. New Evidence on What Works in Effective Public Reporting. *Health Serv Res*. 2016 Jun;51 Suppl 2:1159-66. doi: 10.1111/1475-6773.12502.

6. Braithwaite RS, Caplan A. Who is watching the watchmen: Is quality reporting ever harmful? *SAGE Open Med.* 2014 Feb 18;2:2050312114523425.

7. Fung C, Lim Y, Mattke S, et al. Systematic review: the evidence that publishing patient care performance data improves quality of care. *Ann Intern Med.* 2008 Jan 15;148(2):111-23.

8. Pearse J and Mazevska D, The impact of public disclosure of health performance data: a rapid review. Sydney: Sax Institute 2010.

9. Campanella P, Vukovic V, Parente P, et al. The impact of Public Reporting on clinical outcomes: a systematic review and meta-analysis. B*MC Health Serv Res*. 2016 Jul 22;16:296. doi: 10.1186/s12913-016-1543-y.

10. Berwick D, James B and Coye M. Connections between Quality Measurement and Improvement. *Med Care.* 2003 Jan;41(1 Suppl):I30-8.

11. McGlynn E, Asch S, Adams J, et al. The quality of health care delivered to adults in the United States. *N Engl J Med.* 2003 Jun 26;348(26):2635-45.

12. McGlynn E. Introduction and overview of the conceptual framework for a national quality measurement and reporting system. *Med Care.* 2003;41(1 Suppl):I1-7.

13. McLoughlin V, Leatherman S, Fletcher M, et al. Improving performance using indicators. Recent experiences in the United States, the United Kingdom, and Australia. I*nt J Qual Health Care*. 2001;13(6):455-62.

14. Bohmer R. The hard work of health care transformation. NEJM 2016: 375(8): 709-711.

15. Molloy A, Martin S, Gardner T, et al. A clear road ahead: creating a coherent quality strategy for the English NHS. London: The Health Foundation; 2016

16. Custers T, Hurley J, Klazinga NS, Brown AD. Selecting effective incentive structures in health care: A decision framework to support health care purchasers in finding the right incentives to drive performance. BMC Health Serv Res. 2008 Mar 27;8:66. doi: 10.1186/1472-6963-8-66.

17. Grol R, Wensing M, Eccles M, et al.,eds. Improving Patient Care: The Implementation of Change in Health Care, [2nd ed]. Wiley-Blackwell, 2013.

18. Caldwell S, Herold D, Fedor D. Toward an understanding of the relationships among organizational change, individual differences, and changes in person-environment fit: a cross-level study. *Journal of Applied Psychology*, 2004; 89(5):868

19. Pettigrew A, Whipp R. Managing change for competitive success. Oxford: Blackwell 1991.

20. Walker H, Armenakis A, Bernerth J, (2007) Factors influencing organizational change efforts: An integrative investigation of change content, context, process and individual differences. *J Organ Change Manag*, 2007; 20(6):761-773.

21. DiMaggio P, Powell W. The iron cage revisited Institutional Isomorphism and Collective Rationality in Organization Fields. In: Powell W, DiMaggio P, eds. The New Institutionalism in Organizational Analysis. Chicago: University of Chicago Press 1991.

22. Rogers E. Diffusion of innovations, 5th ed. New York: Free Press 2003.

23. Greenhalgh T, Robert G, Bate P, et al. Diffusion of Innovations in Health Service Organisations: A Systematic Review. London: Blackwell 2005.

24. Michie S. ABC of Behaviour Change Theories. London: Lulu publishing 2014.

25. Ajzen, I. The theory of planned behaviour. *Organizational Behaviour and Human Decision Processes,* 1991;50: 179–211.

26. Glanz K., Lewis F, Rimers B, eds. Health Behaviour and Health Education: Theory, Research, and Practice. San Francisco: Jossey-Bass 1990

27. Perry, C, Barnowski T, Parcel, G. How individuals, environments, and health behaviour interact: Social learning theory. In Glanz K, Lewis F, Rimer B, eds. Health Behaviour and Health Education: Theory, Research and Practice. San Francisco: Jossey-Bass 1990.

28. Bandura, A. Social foundations of thought and action: A social cognitive theory. Englewood Cliffs, NJ: Prentice-Hall 1986.

29. Cummings T, Worley C. Organization Development and Change 10th ed. California: Cengage Learning 2015.

30. Bamford D, Forrester P. Managing planned and emergent change within an operations management environment*. Int J Operations Product Manage*. 2003; 23(5): 546-564.

31. Burnes, B. Managing Change: A Strategic Approach to Organisational Dynamics, 4th ed Harlow: Prentice Hall 2004.

32. Liebhart M, Garcia-Lorenzo L. Between planned and emergent change: decision maker's perceptions of managing change in organisations. *Int J Knowledge, Culture Change Manage* 2010; 5: 214-225.

33. Burns B. Kurt Lewin and the planned change approach to change: a reappraisal. In: Gallos J, ed. Organisational Development. San Francisco: Jossey-Bass 2006.

34. Livne-Tarandach R, Bartunek J. A new horizon for organizational change and development scholarship: Connecting planned and emergent change. In Woodman R, Pasmore W, Shani A, eds. *Research in Organizational Change and Development*. 2009; 17:1 – 35.

35. Burns B. Complexity theories and organisational change. *Int J of Management Reviews*. 2005; 7(2): 73-90

36. Lewin K. Field Theory in Social Science. New York: Harper and Row 1951.

37. Weick K, Quinn R. Organizational change and development . *Ann Rev Psychol* 1999; 50:361-386.

38. Stacey R. Managing the Unknowable: Strategic Boundaries Between Order and Chaos in Organizations. San Francisco: Jossey-Bass 1992.

39. Institute of Medicine. Crossing the Quality Chasm: A New Health System for the 21st Century. Washington: National Academies Press 2001.

40. Leatherman S. Applying Performance Indicators to Health System Improvement. In: Organization for Economic Development and Cooperation. Measuring Up: Improving Health System Performance in OECD Countries. Paris: OECD 2002.

41. Plsek P, Greenhalgh T. Complexity science: The challenge of complexity in health care. *BMJ*. 2001;323(7313):625-8.

42. Plsek P, Wilson T. Complexity, leadership, and management in healthcare organisations. *BMJ*. 2001;323(7315):746-9.

43. National Quality Board. NQB's Shared commitment to quality. London: NQB; 2017.

44. Naylor D, Iron K, Handa K. Measuring health system performance: Problems and Opportunities in the Era of Assessment and Accountability. In: Organisation for Economic Cooperation and Development Measuring up: Improving Health Systems Performance in OECD Countries. Paris: OECD 2002.

45. Leatherman S, Sutherland K. The Quest for Quality: Refining the NHS Reforms. London: Nuffield Trust 2008.

46. Bevan G. Incentives and models of governance. Health Economics Policy and Law 2015; 10(3):345-50.

47. Oxman A, Thomson M, Davs D, et al. No magic bullets: a systematic review of 102 trials of interventions to improve professional practice. *CMAJ* 1995;153(10):1423-31.

48. Oxman AD. Helping people make well-informed decisions about health care: old and new challenges to achieving the aim of the Cochrane Collaboration. Syst Rev. 2013 Sep 20;2:77. doi: 10.1186/2046-4053-2-77.

49. National Institute for Health and Clinical Excellence. How to change practice. Understand, identify and overcome barriers to change. December 2007 ISBN 1-84629-565-3.

50. Brereton L, Vasoodaven V. The impact of the NHS market: An overview of the literature. CIVITAS: Institute for the Study of Civil Society. London. February 2010

51. Doran T, Roland M. Lessons from major initiatives to improve primary care in the United Kingdom. Health Aff (Millwood). 2010 May;29(5):1023-9.

52. Burnes B. No such thing as ... a "one best way" to manage organizational change. Manage Decision 1996;34(10): 11-18.

Table 1: Mapping of published frameworks and levers for change

	Cognitive	Mimetic	Formative	Supportive	Normative	Coercive	Structural	Competitive	Number of levers
DiMaggio & Powell (21)		*			*	*			3
Plsek & Greenhalgh (41)	*	*	*	*	*	*	*		7
Institute of Medicine (39)	*		*		*	*			4
Leatherman (40)	*	*		*	*	*		*	6
Naylor, Iron & Handa (44)	*	*	*	*	*	*	*	*	8
Berwick, James & Coye (10)			*	*			*	*	4
Leatherman & Sutherland (45)	*				*	*		*	4
Boland and Fowler (4)	*		*	*	*	*		*	6
NHS Quality Board (43)	*		*	*	*	*		*	6
Bevan (46)	*	*	*	*		*		*	6
Number of models	8	5	7	7	8	9	3	8	

Table 2: Key applications of levers and examples of applications in healthcare systems

Key applications	How has this been applied in healthcare systems?
COGNITIVE	
Performance profiles / report cards / dashboards Benchmarking / league tables Root cause analyses / Morbidity and mortality reviews Clinical feedback	Performance reporting efforts such as profiles, report cards or benchmarking often incorporate a range of performance indicators covering different patient groups and aspects of care. They are usually enacted by independent reporting agencies or by government departments or ministries. The more analytic applications such as root cause analyses provide cognition about specific events and are usually enacted by healthcare provider organisations, professional groups or safety agencies. Examples: In the US, the Hospital Compare initiative of the Centers for Medicaid and Medicare (CMS); and in New South Wales (NSW), Australia, the Bureau of Health Information (BHI) publish hospital level data on risk-adjusted 30-day mortality and readmissions. Time series data show that improvements have been associated with public release of this information. In the English NHS, a 'star rating' regime introduced in 2003 was predominantly cognitive in nature but was coupled with coercive levers that were applied forcefully – bonus payments and earned autonomy, 'three-star' rating and hospital Chief Executive job losses with zero ratings.
MIMETIC	
Local champions / opinion leaders Demonstrator sites / beacon practices Case studies Study tours / exchange programs Secondments / rotations	Efforts to identify and highlight organisations or providers who are leaders in their field, articulate lessons and diffuse learning from their approaches and methods are usually coordinated by improvement organisations, professional groups or healthcare provider organisations. Examples: Many healthcare systems have sought to emulate the Kaiser Permanente model with numerous study tours and case studies. Within the English NHS, change initiatives have often used beacon and accelerator sites to share good practice, promulgate change and provide expert advice. In Australia, demonstrator and pilot sites are frequently used to lead and leverage wider change.
FORMATIVE	
Continuing professional development / training / fellowships Clinical governance / Grand rounds Mentorship programs Local consensus building / deliberative processes Organisational learning / action research / systems thinking Communities of practice / Learning circles / Academies	Providing feedback is generally enacted by professional groups or colleagues and healthcare improvement agencies. Formative levers are often used in concert with cognitive levers – tracking performance as change takes place. Examples: Continuing professional development was introduced by the American Medical Association and by 1960 had incorporated a coercive lever /credit system to reward physicians for attending. It is now a key feature in most healthcare systems. Many clinical training programs based on feedback on performance have emerged in the Canadian context. In England in 1997, the concept of clinical governance was introduced with the aim of embedding a comprehensive approach to improve clinical quality and secure change. The concept has subsequently been adopted by many healthcare systems, including Australia and Canada.
SUPPORTIVE	
Quality improvement / cultural change programs Plan Do Study Act processes Facilitators / management consultants Innovation funding Collaboratives Models of care / Care pathways Decision support / reminders / alerts	Processes that seek to facilitate, support and guide change are often enacted by quality improvement agencies, government departments or ministries, academic institutions and professional organisations. Examples: Internationally, a number of organisations mandated to secure change have relied primarily on supportive levers, such as the Modernisation Agency in England in 2000; recast subsequently as the NHS Institute for Innovation and Improvement (2006), NHS Improving Quality (2013) and the Sustainable Improvement Team (2016). In the US, the Institute for Healthcare Improvement uses a range of levers, particularly supportive and mimetic in nature that offer opportunities to learn from, collaborate with, and be inspired by experts. In NSW, the Agency for Clinical Innovation uses supportive levers to secure change in the public hospital sector. In the Canadian context, the Canadian Institute for Health Improvement uses performance data to support change programs but also supports capacity-building with regards to the ability for healthcare systems stakeholders to use performance information to support change.

Table 2: Key applications of levers and examples of applications in healthcare systems (continued)

NORMATIVE	
Inspection and accreditation Registration, licensing and revalidation Clinical audits Guidelines / Standards Awareness campaigns	Efforts to alter performance to bring it into line with defined and codified practice – 'what should be done' are generally enacted by professional groups and by regulators. Examples: Inspection and accreditation regimes were introduced in the English NHS by the Commission for Health Improvement (CHI, 1999), subsequently renamed the Commission for Healthcare Audit and Inspection (CHAI, 2004) and the Care Quality Commission (CCQ, 2009). Also in England, national service frameworks were introduced in 1998 – articulating guidelines for organising and delivering care. In NSW, centrally defined 'models of care' provide detailed guidance for care delivery for different patient groups and diseases. Medical revalidation was introduced in England in 2012 and is about to be introduced in Australia. The National Institute for Clinical Excellence was introduced in 1999 in England (renamed the National Institute for Health and Care Excellence 2005 after merging with the Health Development Agency) and has been a template for health technology assessment and clinical guideline development across many healthcare systems. Choosing Wisely has been implemented in more than 20 healthcare systems – seeking to leverage change and reduce unnecessary care. Clinical audits are ubiquitous across healthcare systems.
COERCIVE	
Legislation and policy / rules / contracts Targets KPIs / performance agreement Incentives / Penalties Pay for performance 'Special measures' (supplanting local management)	Coercive levers are principally enacted by government departments, ministries or regulators. They are often based on clearly defined objectives that are quantified and monitored. Examples: Meeting objectives or failing to meet objectives have salient consequences for the organisation or provider being monitored. Targets were a key policy instrument for change in the English NHS in the late 1990s. There has been particular criticism of the targets for waiting times and the strong coercive levers that accompanied them but, the strength of the target regime has been established empirically – albeit with attendant unanticipated consequences. Pay for performance has been of considerable interest in healthcare systems in the past decade – in primary care in England's NHS (the Quality and Outcomes Framework) and in CMS-mediated penalties for adverse events, and poor patient outcomes in the US, (and proposed in Australia). Most health systems use performance agreements and compacts to leverage change.
STRUCTURAL	
Reorganisation / restructure Capital investments / Funding arrangements Decommissioning / "sun setting" Staffing / Skill mix Hub and spoke networks Physical arrangements Business Process Reengineering	Physical changes can be enacted by healthcare provider organisations seeking to secure localised change; and by government departments seeking to secure system-wide change. Examples: Specific examples of levers that have been implemented include information technology (Connecting for Health in England's NHS; e-Health in NSW); skill mix changes (introduction of nurse practitioners in the NHS) and organisational restructures (regional health authorities split into local health authorities in the NHS, Canada and in New South Wales, Australia).
COMPETITIVE	
Patient choice / personal health budgets Markets / Internal markets / purchaser-provider splits Tendering processes Commissioning	Government departments and policymakers typically enact at a system level market mechanisms and competition. Local providers may apply competitive levers in seeking to change particular services, such as cleaning, through tendering processes. Examples: In England, the Patient Choice Framework (2016) seeks to secure change, particularly in hospital waiting times. Quasi-markets were introduced in the NHS in the 1990s – seeking to leverage competition within public funded healthcare system; the US introduced various programs to support the provision of information to patients in order to guide their choice of providers. Many organisations are now reporting publicly and transparently performance information in Australia, Canada, the UK and the US to inform choice.

Appendix 1: Scoping of published frameworks and levers for change

Author/s, Year	Publication definitional elements and identified levers for Change
DiMaggio and Powell, 1991 (21)	Organisations become increasingly similar (isomorphic) over time because of two main pressures – competitive and institutional. DiMaggio and Powell focus on institutional isomorphism and identify three distinct types of processes that drive change (towards conformity). 1. **Coercive isomorphism**: similarity springs from pressures applied, either explicitly or implicitly (or both); from other organisations or from society. Specific levers include government mandates, contract law, reporting requirements. 2. **Mimetic isomorphism**: similarity springs from emulation, from seeking to copy from other organisations that appear to have greater legitimacy or success. Often apparent in the context of uncertainty about cause and effect. Specific levers include management consultancy, case studies, study tours. 3. **Normative isomorphism**: similarity springs from characteristics of the professionals who work in the organisation – established in shared education, licensing and reinforced through inter-organisational networks of specialists. Specific levers include registration and revalidation, medical colleges, special interest groups.
Plsek and Greenhalgh, 2001 (41)	In complex adaptive systems such as healthcare, unpredictability and paradox are omnipresent. Clinical practice, organisation, information management, research, education, and professional development are interdependent and change should use conceptual frameworks that incorporate dynamic, emergent, creative, and intuitive perspectives. Imperatives for managing change in complex adaptive systems include: 1. **Manage generative relationships**: establish goals and resourcing with a view towards the whole system, rather than artificially allocating them to parts of the system to support creative innovations among staff and stakeholders. Specific levers include organisational structures and clusters; staffing and funding mechanisms 2. **Define minimum specifications rather than prescriptive models of practice**: creative progress towards a difficult goal emerges from a few, flexible, simple rules or principles. Minimum specifications cover: direction pointing; boundaries; resources; permissions. Specific levers include: codification of clear objectives, resources 3. **Understand attraction for change**: Rather than battle resistance, focus on attraction – understand what motivates individual and organisational desire for change. Judicious sharing of information to and from natural 'attractors' or leaders can build an imperative so that others feel they must change. Specific levers include the use of beacon sites as inspiration 4. **Develop capability through transformational learning**: Individuals and systems change because they learn. The process of developing new behaviours in the context of real life experiences enables individuals to adapt to new situations. Specific levers include timely feedback, support for critical learning
Institute of Medicine, 2001 (39)	Acknowledging that healthcare is a complex adaptive system, this publication articulates an agenda for the redesign of the US healthcare systems. Informed by the research literature and a group of experts, recommended levers for change include: 1. **Commitment to a national statement of purpose,** leadership at many levels that can provide clear strategic and sustained direction and a coherent set of values and incentives to guide group and individual actions as well as the identification of priorities 2. **Adoption of principles to guide the redesign of care processes**: make effective use of information technologies; manage clinical knowledge and skills; develop effective teams; coordinate care across patient conditions, services, and settings over time; incorporate performance and outcome measurements for improvement and accountability. 3. **Create an environment that fosters and rewards improvement by**: creating an infrastructure to support evidence-based practice; facilitating the use of information technology; aligning payment incentives; preparing the workforce to better serve patients in a world of expanding knowledge and rapid change.
Leatherman, 2002 (40)	Highlights how public reporting of performance information plays a role in regulation and public accountability, purchasing and commissioning decisions, consumer selection and choice and provider behaviour change. A categorisation of interventions for change identifies: 1. **External oversight**: use of specific levers of review, inspection, accreditation and licensing, performance targets. 2. **Patient engagement / empowering consumers**: facilitating consumer choice, enacting patient charters / patients' rights. 3. **Regulation**: with specific levers of professional self-regulation and government regulation. 4. **Knowledge / skill enhancement of providers**: with specific levers of peer review and feedback, use of guidelines and protocols. 5. **Incentives**: with specific levers of financial (pay for performance) and non-financial rewards and sanctions.
Naylor, Iron and Handa, 2002 (44)	Acknowledges that information can catalyse change but notes that in the absence of specific steps to make change both necessary and possible, professional and organisational inertia can stall change. Levers for change can be: 1. **Economic or non-economic incentives**: payment systems; consistent performance feedback; point of decision information tools for patients or providers; training and supporting opinion leaders; repeated education interventions; strong evidence for burning issues. 2. **Mechanisms for bringing performance information to bear**: regulatory; administrative / professional; market-based. 3. **Actors whose behaviour can change**: consumers (through choice); purchasers/funders (through commission and contract); professionals/managers (through allocation of resources).

Berwick, James and Coye, 2003 (10)	Clear purpose, focused goals, and valid and reliable performance metrics set the stage for the use of measurement to pursue change through two pathways: 1. **Measurement for selection** can be used for reward, recognition, punishment, payment, and other forms of decision with more continuous properties. Regulators can affect quality by using selection directly (such as suspending a license) or indirectly, using the threat of action to motivate changes among providers of care who wish to avoid that threat. 2. **Organisational processes** that support change and improvement of care are: reliable flow of useful information; education and training in the techniques of process improvement; investment in the time and change management required to alter core work processes; alignment of organisational incentives with care improvement objectives; and leadership to inspire and model care improvement.
Leatherman and Sutherland, 2008 (45)	Three broad models of accountability underpin different levers for change: 1. **Professional** model: healthcare is a transaction between patients and professionals controls on those who can gain admittance into healthcare fields (e.g., through licensure) and continued education and training should be exercised alongside ongoing education and clinical governance, patient engagement 2. **Market** model: healthcare is a commodity and market forces affect change including competition for customers (with consumers selecting the best available healthcare services and providers), commissioning, public reporting to inform choice 3. **Governmental** (or **political**) model: healthcare is an essential service or public good and centralised bureaucracies use tools such as legislation, regulation, standard setting, targets, public reporting for accountability This framework proposes that the three categories of levers for change should be used in conjunction with each other.
Boland and Fowler, 2000 (4)	Presents performance indicators and associated improvement initiatives, as typically applied in public sector organisations. Notes that change is usually implemented as a causal loop established between perceived performance and resulting actions,. A two-dimensional matrix model is founded on two independent dimensions: 1) S**ource of control**: Internal and External; 2) **Nature of expected actions**: Formative/ Supportive and Punitive/ Summative The levers for change are: 1. **Continuous quality improvement**: when internal source of control and formative/ supportive context (performance assessment as a tool for hospital managers for the evaluation and improvement of hospital systems). 2. **Accreditation**: when external source of control and formative/ supportive context (development of hospital quality standards and accreditation processes). 3. **Internal evaluation**: when internal source of control and punitive/ summative context (performance reporting for internal hospital evaluation). 4. **External accountability**: when external source of control and punitive/ summative context (improvements in hospital accountability and performance management through public performance reporting and quality-based purchasing).
Bevan, 2015 (46)	Identifies four models of health governance with different levers to secure change 1. **Trust and altruism** – assume that actors are able to accurately assess patient needs and are motivated to meet those needs in the best possible way 2. **Choice and competition** – create external incentives through market mechanisms, using patient choice to affect market share 3. **Naming and shaming** – public rankings, published and widely disseminated 4. **Targets and terror** – actors and organisations are held to account against a limited set of targets that clearly signal priorities and with strong threats of sanctions for failure and rewards for success
NHS Quality Board, 2017 (43)	Seven steps to improve quality are articulated 1. **Setting direction and policy** – establishing clear, collective and consistent priorities for quality 2. Bringing clarity to quality – establish **standards** and **guidelines**; establish safe levels of staffing resources 3. **Measuring and publishing** quality – align measurement and monitoring activities to measure what matters 4. **Recognising and rewarding** quality – incentives aligned around shared view of quality 5. **Safeguarding quality** – through **surveillance**, **regulatory** interventions 'special measures', risk summits to share best practice 6. **Building capacity** – develop improvement and leadership capacity, deliver **education** and **training** ,

Figure legend:

Figure 1. Integrated conceptual framework of levers for change in healthcare

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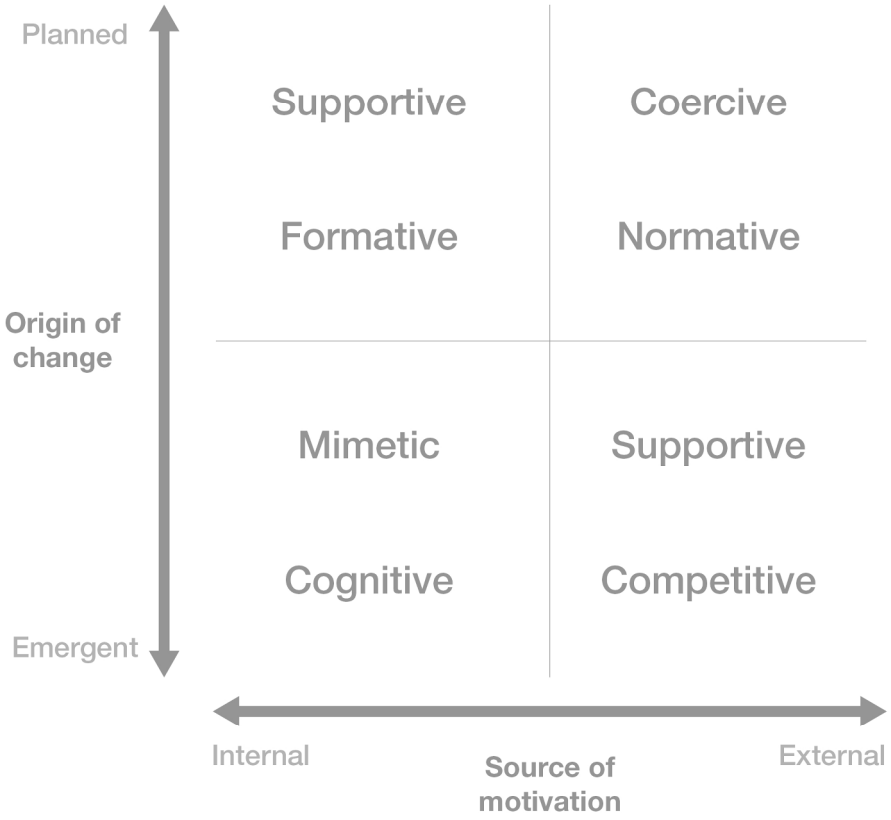

Figure 1. Integrated conceptual framework of levers for change in healthcare

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BMJ Open

What role does performance information play in securing improvement in healthcare? A conceptual framework for levers of change

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2016-014825.R2
Article Type:	Research
Date Submitted by the Author:	12-Jul-2017
Complete List of Authors:	Levesque, Jean-Frederic; Bureau of Health Information Sutherland, Kim; Bureau of Health Information
Primary Subject Heading:	Health services research
Secondary Subject Heading:	Public health, Health policy
Keywords:	Quality in health care < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Organisational development < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Change management < HEALTH SERVICES ADMINISTRATION & MANAGEMENT

What role does performance information play in securing improvement in healthcare? A conceptual framework for levers of change

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Abstract

Objective: Across healthcare systems, there is consensus on the need for independent and impartial assessment of performance. There is less agreement about how measurement and reporting performance improves healthcare. This paper draws on academic theories to develop a conceptual framework – one that classifies in an integrated manner the ways in which change can be leveraged by healthcare performance information. **Methods:** A synthesis of published frameworks. **Results:** The framework identifies eight levers for change enabled by performance information, spanning internal and external drivers, and emergent and planned processes: 1) cognitive levers provide awareness and understanding; 2) mimetic levers inform about the performance of others to encourage emulation; 3) supportive levers provide facilitation, implementation tools or models of care to actively support change; 4) formative levers develop capabilities and skills through teaching, mentoring and feedback; 5) normative levers set performance against guidelines, standards, certification and accreditation processes; 6) coercive levers use policies, regulations incentives and disincentives to force change; 7) structural levers modify the physical environment or professional cultures and routines; 8) competitive levers attract patients or funders. **Conclusion:** This framework highlights how performance measurement and reporting can contribute to eight different levers for change. It provides guidance into how to align performance measurement and reporting into quality improvement programs.

Strengths and Limitations of this Study

- One strength of this conceptualisation is that it draws on academic theories and integrates various streams of thinking
- The paper draws on a range of theoretical work to describe different types of organisational change and various facilitators and barriers to such change and synthesises levers into a straightforward typology
- The framework provides insights and guidance into how performance information can be used in healthcare systems to leverage change
- The model development is based on the synthesis of published literature and available grey literature – and so could be affected by any publication bias where levers that did not work in a particular context may not have featured in the retrieved publications
- The literature was reviewed using a layered approach, selecting seminal papers and reports through a iterative approach, and did not consist of a systematic review.

Keyword: Quality improvement; performance measurement; healthcare system change; conceptual framework
Abstract word count: 208 words; Manuscript word count: 3678

Introduction

That performance measurement is essential in healthcare systems is broadly accepted (1,2,3). Measurement and reporting of performance play a clear role in terms of management and in providing accountability; but also in terms of making a contribution to improvement efforts. When properly defined, applied and interpreted, performance measures provide insights into absolute and relative achievement of outcomes, patterns of delivery and efficiency of care, highlight variation and areas where there are opportunities to improve (4).

Performance however relates to real processes, actions and outcomes rather than to the structural, potential or planned delivery of services. Just as actors perform on stage and athletes perform on the field, surgeons perform in surgical theatres and nurses perform at the bedside or in community centres. Measuring performance in healthcare is therefore about quantifying what healthcare systems, organisations and professionals are really achieving rather than about how well they are designed or qualified. Meaningful performance measurement focuses on aspects such as services delivered relative to patient needs and expectations, processes and models of care relative to evidence and clinical workloads, and patient outcomes relative to their presenting problems and the resources invested.

Some studies have shown that the impact of performance measurement and reporting varies (5), and that they can have unintended consequences that result in deterioration of performance (6). However, the weight of accumulating evidence attests to the potential benefits and power of performance reporting, particularly in terms of securing change among clinicians and delivery organisations (7,8,9). This evidence suggests that performance measurement makes a contribution to improvement efforts but is not always sufficient to achieve, on its own, meaningful change in healthcare (7,10).

Quality improvement efforts draw on a much broader array of activities than simply providing information about the performance of providers, organisations or systems (10,11,12,13,14,15). Change in complex systems is shaped by a range of factors including history, culture, social and legal context, policies and structures, availability of evidence, technology, and economic incentives. Researchers from many different disciplines have investigated how such factors influence change processes and have described different ways in which change can be initiated, driven and managed both within (16,17) and outside (18,19,20) the healthcare sector.

While recent research has assessed the impact of performance measurement and reporting on various aspects, most studies seem to assume that public reporting of performance information either works on its own or only through patients' choice of providers. To date, no integrative framework that conceptualises the role of performance information and the way in which this information interacts, with and facilitates different levers that support healthcare system change, has been developed. This paper presents a typology and proposes an integrated conceptual framework of levers for change in healthcare systems and discusses the ways in which health performance measurement and reporting can act on these levers to promote change and quality improvement.

Methods

The literature relevant to a review of the role of performance measurement in behavioural and organisational change is vast and unwieldy. Behaviour and organisational change literature has roots in substantial knowledge bases that span sociology, psychology, organisation sciences, health policy, management and economics. The breadth of the available literature overwhelms efforts to systematically synthesise it. Despite the huge number of studies and publications, well-delineated conceptual models that proffer typologies of levers for change are relatively rare. This means that there is simultaneously too much and too little literature. In order to overcome this dilemma, a layered inquiry was undertaken and the paper is underpinned by a targeted search strategy rather than the more usual systematic review.

The purpose of this paper is not to review all papers published but rather to canvass and classify the main levers for change in use in healthcare, with a particular focus on levers that rely on performance information. As a result, the paper draws on a mix of theoretical expositions, prescriptive models of change and descriptive accounts or typologies of the utilisation of performance information in pursuit of change (21,22,23,24).

The starting point was a collection of seminal works by renowned experts in performance measurement. A snowballing approach was then adopted to explore references cited in their work and to review their theoretical underpinnings. In addition, key data bases were searched CINAHL, Cochrane Effective Practice, MEDLINE, ProQuest, PsycInfo, PubMed and Web of Science databases for papers using the keywords: "behaviour change", "behavioural interventions", "health behaviour", "levers for change", "organisational change", "performance indicators", "performance measurement", "performance reporting", "quality improvement", "quality measurement" and "theories of behaviour change". Publications were screened according to whether they outlined a conceptual framework or defined different types of approaches used to secure improvement in healthcare organisations and systems. Authors independently reviewed the frameworks and

typologies, clustering conceptually similar levers for change. Any mismatch in clustering was resolved through discussion.

Further, the typology and conceptual framework developed by this paper is informed by the authors' experience in measurement and change in healthcare systems, particularly in Australia, Canada and the United Kingdom. The authors combined their assessment and iteratively synthesized the dimensions useful to organise levers into a coherent framework. The resulting framework was then mapped to the original studies to assess integrity and comprehensiveness of the integrated framework. Appendix 1 summarizes the main published work selected to build an integrated framework of levers for change.

Results

Theoretical foundation

Several levers for change are grounded in institutional theory which suggests that normative, coercive and mimetic pressures drive conformity among organisations through processes of comparing, compelling and copying (21). Similarly, studies on the diffusion of innovation have highlighted the roles that evidence, social context, perceptions about existing practice, organisational structures, and norms, as well as attitudes and values play in promoting adoption of an innovation (22,23).

Other levers are grounded in theories of behaviour change which focus on explaining, predicting and changing individual behaviour (24). These theories propose that change is influenced by factors that include attitudes, perceptions and motivation to comply with norms, as well as the perception of control over the behaviour (25). In a similar line, sociological theories identify factors that influence behaviour change such as intrinsic and extrinsic motivators, perceptions of fear or threat, as well as norms, attitudes and intentions.

Two clear organising dimensions emerge. The first dimension (from psychology and sociology literature) focuses on why change occurs, and is based on the distinction between intrinsic and extrinsic motivation (26,27,28). Intrinsic motivation is grounded in self-awareness, self-reflection, or tailored and specific feedback about performance – with subsequent catalysis of action or response. Data and information relevant to and reflective of the unit's performance can result in a readiness for change (29). Extrinsic motivation, on the other hand, involves professionals, organisations and systems responding to directives, policies and economic or structural forces emanating from outside their direct control.

The second organising dimension (from innovation and organisational change literature) is based on the distinction between planned and emergent change (30,31,32). Planned change is the result of a deliberate effort, conscious reasoning and considered actions, and typically involves sequential steps enacted with the intention of changing the behaviours of individuals and organisations to secure improvement (33,34,35,36). Emergent change unfolds in a reactive or spontaneous way (37). It is iterative and develops as people adapt to the circumstances, constraints and requirements of their environment and seek to improve some aspect of performance (38).

An integrated framework

When the previously described two dimensions are considered together, a matrix consisting of four quadrants is formed. Each quadrant represents a different way in which change occurs. Our review of the literature further suggests that each quadrant contains two different levers for change – resulting in a typology of eight levers in total (Figure 1).

[Insert Figure 1]

In the bottom left quadrant of the model are levers that seek to secure emergent and internally motivated change.

Cognitive levers (4,39,40), such as the provision of information through report cards, league tables and root cause analysis summaries, provide a means to gauge one's own performance. They codify performance, quantifying it so that achievements are discernible and temporal trends can be tracked. In healthcare, this lever aims to improve clinicians' and managers' awareness of gaps. It is recognised as the starting point of many types of quality improvement processes.

Mimetic levers (4,15,21,39,40,41,42,43), such as the provision of benchmarking data that identifies best performers and their adopted models of care, set performance in a wider context, revealing the performance of peers. Mimetic levers act on a desire to belong, to conform to a respected group, to outperform - or at the very least, not be roundly outperformed by - peers. The role of data in mimetic levers is to enable comparisons and identify clearly who is performing well and who is not performing well. In the healthcare sector, public reporting of hospital or clinical units' performance on a nominal basis can act on the desires of clinicians or organisations to emulate the activities and processes implemented in high performance units.

In the top left quadrant of the model, where change is planned and internally motivated – levers rely heavily on evidence and knowledge about best practice. Variation in performance can be due to differences in knowledge, capabilities and competencies.

Formative levers (4,10,15,41,42,43,44), such as continuing professional education and development programmes and healthcare redesign courses, are based on the provision of feedback – often in a timely way, guiding change in dynamic situations. While often used in circumstances where change is deliberate and an evidence-based goal or model of best practice is clearly articulated, formative levers are flexible and responsive in terms of data provision. The role of data in formative levers is to clearly capture salient elements of the change process, guide action and signal when there is a need to respond to changing circumstances or unanticipated developments.

Supportive levers (4,10,15,43,44), such as quality improvement programmes and clinical collaboratives, enable, encourage and help change. They provide mentorship, guidance and facilitate learning. Data are used to inform where efforts should focus and guide change processes and investments.

In the top right quadrant, where change is planned and externally motivated – levers rely heavily on power and influence. Performance data are used primarily for monitoring or quality assurance purposes, ensuring minimum standards.

Coercive levers (4,15,21,39,40,43,44,45), such as pay for performance programs or regulatory or legal frameworks, are based on organisational power and often feature targets and powerful incentives and sanctions that drive change. Often referred to as 'carrots and sticks', coercive levers are favoured in circumstances where there is a powerful policy or strategic imperative. Goals are set, milestones defined and levers are used to ensure that objectives are achieved – often within a defined timeframe. Coercive levers may appear effective but on careful assessment be shown to result in unanticipated consequences. Key performance indicators and performance monitoring frameworks are clear example of how data is used to support coercive levers.

Normative levers (4,21,39,40,41,42,45), such as memberships of medical associations and organisations that define the state of current best practice, are based on professional standards and well defined norms of acceptable performance. They are often enacted through licensing, registration, revalidation and accreditation processes acting as key motivators for change. The role of data is to target where the levers should be applied and to monitor anticipated and unanticipated effects.

In the bottom right quadrant, where change is emergent and externally driven – levers are primarily impersonal, relying neither on negotiation, counselling nor cajoling.

Structural levers (41,42) are based on organisational constraints such as staffing, defined roles and responsibilities or characteristics that contain and shape performance. They can include physical limits or barriers (e.g. architectural design of clinical space, information and communication technologies) but also organisational processes and professional routines that channel professional and organisational behaviours (e.g. clinical pathways, team-based processes, models of care). While the role of data is traditionally less prominent in supporting structural levers, it informs the placement of levers and monitoring their impact.

Competitive levers (10,15,39,40,43,44,45), such as the pressures imposed by the need to attract clients or contracts, rely on market forces that shape professional and organisation behaviour to attract or retain clients and funding. Performance data are often seen as playing a role in competitive levers through supporting patients' choices and managers' commissioning decisions. Ultimately, competitive levers work through fear of losing market share or clients; or through incentivising greater market share or increased client bases or service users. Commissioning and processes supporting patients' selection of providers are examples of competitive levers in healthcare.

Discussion

A comprehensive and coherent framework of levers for change

The framework described in this paper provides a way to navigate the multitude of approaches available to secure change. It does so in two complementary ways. Firstly, from a deductive perspective, it draws on a range of theoretical sources to describe different types of organisational change and various facilitators and barriers to such change. Secondly, from an inductive perspective, it brings together and describes levers previously described in the literature and by healthcare organisations internationally, synthesising and summarising them into a straightforward typology. The model provides a way to categorise levers, to inform decisions about the judicious application and use of levers both in isolation and in combination, to define information requirements and to set expectations about potential effects. Table 1 presents the eight levers and relates them to key publications retrieved through the literature review. While various existing models have touched on different aspects or levers, this framework integrates their perspectives.

[Insert table 1]

The framework provides insights and guidance into how performance information can be used in healthcare systems to leverage change. The distinction between planned and emergent change is key. Routine release of information can guide planned efforts to improve, and provide formative feedback according to agreed regular schedules. However, routine reporting can also lose salience if too many measures or too frequent reporting generates indicator chaos or fatigue. Performance measurement and reporting, if used only in the context of planned change, acts more as a monitoring tool (providing reassurance or accountability) rather than as a catalyst or lever for change. If meaningful change at an organisational or provider level is an objective, the framework highlights that performance measurement is more powerful if also applied in efforts to promote emergent change – capitalising on organisational learning, where information plays a role in building a felt need for change, an appreciation of the complexity of systems, and sustaining and guiding efforts to improve.

The framework also highlights how those seeking to secure change should be cognisant of the distinction between internal and external sources of motivation. Internal motivation is supported by information that can reasonably be attributed to an individual provider or organisation. Non-attributable, non-specific information is at risk of being explained away as outside the individual's or organisation's nexus of control. If responsibility for performance is diffuse and if opportunities to make change are limited, public release of performance data can be counterproductive. External motivation in contrast, is principally supported by power and influence and valued benefits or feared

consequences. The ability of performance information to secure change is largely determined by the extent to which external motivators are sustained; and perceptions about the value or impact of consequences.

Levers for change: in concert or conflict?

Data, information and knowledge support clinical delivery, the redesign of models of care and the consolidation of organisational structures to respond to changing population needs (20,46). The levers identified in this framework all rely, to varying degrees, on data – the result of codification of real phenomena into a form which can be systematically explored or interrogated. Their power relies on the transformation of these data into information, where numbers convey meaning about the measured phenomena, in order to build knowledge about how a system, organisation or clinician is performing.

Levers are the way to harness the power of data to secure improvement. However, a lever rarely operates in isolation – any system, organisation or healthcare professional is subject to multiple levers simultaneously. Meaningful and sustained change is more likely to be secured when different levers work in concert – aligning and reinforcing efforts to improve For example, normative levers, such as the publication of guidelines, have been shown to have a modest effect on behaviour when applied in isolation (47,48). When applied with cognitive, mimetic or coercive levers they have been shown to be more effective than when acting on their own (49). For example, as a lever based on competition, the quasi-market reforms in the NHS have not been proven to bring about the beneficial outcomes that classical economic theory would predict of markets. This was due to misaligned levers and political interference, weak purchasers, and barriers to exit and entry, as well as a lack of a stable policy environment to inspire staff commitment and enthusiasm (50).

Conversely, when levers are in conflict – for example when externally driven change objectives run counter to internally grounded self-assessment and felt need for change - change is unlikely to proceed smoothly. For example, when cognitive levers of performance information suggest a need to improve but remain in conflict with current recognised professional practice or clinicians' sense of competence, change is unlikely. Similarly, coercive levers have been shown to be ineffective when in conflict with other levers that seek to improve or maintain non-incentivised aspects of care (for example in the implementation of the Quality Outcomes Framework in the UK (51).

In some cases change may fail because of a mismatch between levers and the purpose of a performance measurement initiative – whether it aims to secure improvement or to provide accountability (52). Efforts that seek to secure quality improvement are often embedded in programs that facilitate clinical acceptance and buy-in through confidential sharing of information, while those that seek to provide accountability are often coercive and public in nature. Perceptions about the underlying purpose of performance information can shape acceptance and effectiveness of different types of levers for change.

A system perspective to address the variety of levers and change perspectives

Finally, the efficacy of levers is context dependent – both in terms of where they are directed and who is directing them. For example, it would be difficult for a single organisation to have both the internal capacity and the external credibility to operate in a supportive facilitator role and simultaneously act as a coercive 'watchdog' that penalises poor performance. Similarly, it would be challenging to simultaneously support mimetic influences while using competitive approaches such as patient choice or purchasing and commissioning functions. Specialisation or concentration of levers in separate organisations can allow systems to better use each potential type of lever. While some levers are synergistic, many are in tension and a multi-agency approach across collaborating yet different organisations would help allow these tensions to be identified and resolved.

Researchers, managers, clinicians, policymakers and patients agree that securing sustained and meaningful improvement in performance is an important objective across healthcare systems

internationally. There is not as much consensus however about how to secure such change, with a wide range of approaches, initiatives and interventions available. While there are many to select from, they are all variants of the core eight types of levers for change (Table 2).

[Insert Table 2]

When it comes to securing change in complex organisations and systems and in professional practice, it is clear there are no magic bullets (47,53). That is not to say that levers are ineffective. Levers are powerful but need informed and often nuanced application. This means that for wide scale change, a deliberate assessment of the role of different levers is needed together with a coordinated approach to their application. In addition, in complex systems, there are many actors or organisations that have some recourse to various levers. However, no one group or organisation is able to apply all types of leverage with equal effectiveness.

For example, the public release of hospital level mortality data mobilises cognitive and mimetic levers for change such as the capacity to self-identify and identify peers in performance reporting. Subsequent mobilisation of normative, supportive and formative levers, such as guidelines, quality improvement or training programs, guides and sustains efforts to improve by professionals, providers and systems. Continuing poor performance can also be met with coercive levers such as regulatory interventions, financial penalties or contractual consequences. Ultimately, local communities, if informed about the results, can add to building a strong case for change.

Limitations of the framework

This study is not without limitations. First, the inductive component of the model development is based on the synthesis of published literature and available grey literature – and so will be affected by any publication bias where levers that did not work in a particular context may not have featured in the retrieved publications. Second, the deductive component of the model development did not comprehensively review the relevant disciplines to ensure an exhaustive set of conceptual constructs. Despite these two limitations, the concordance of various previously published models with the proposed framework and the fact that no other models contained all the elements of the proposed framework suggest that it provides a clear contribution to the field. Finally, the model has not to date been tested empirically and so the relative effects of context have not been fully elucidated. However, the model has face validity and resonates with published accounts about how performance reporting influences change.

Conclusion

The assertion that information is not enough to secure meaningful change or quality improvement in healthcare is uncontested. However information is a key and often essential component of most levers for change. Data and information tell us how we are doing, whether we differ from our peers, it provides a way to explore and compare options for new ways of working, delivers feedback as change progresses, informs policy and managerial decision-making, and measures impact. The framework suggested in this paper raises awareness of the implications of applying levers in isolation without due regard for context.

Clearly, there is a wide variety of levers in use. In healthcare systems, the impetus for change can vary from subtle to strident; it can be founded on fear or on hope; built on pressure to conform or an imperative to be distinguished; adopt an attitude of support or challenge; can be tacit or codified; and focused or pervasive in scope. Pressure to change can come from within or from outside – inducements can take the form of hugs, nudges or shoves. Levers for change are varied and multifaceted and have been successfully applied in a range of contexts. In complex adaptive systems such as health, multiple levers are needed and multimodal approaches have been shown to have the biggest impact. This paper provides a clear framework to support better planning and evaluation of efforts to measure and publicly report performance in the healthcare sector.

Acknowledgements

An earlier version of this work was presented at the Canadian Association for Health Services and Policy Research conference, May 26 – 28, 2015, Montreal, QC in a keynote address entitled "Health System Improvement In Australia: Knowledge Organizations As Enablers". We would like to thank Christopher Papadopoulos for his assistance to the literature search and revision of retrieved manuscripts.

Data Sharing Statement

No additional data available

Contribution Statement

Dr Levesque generated the original idea, presented the original ideas in scientific plenaries, participated in the scoping of the literature, conceptualised the framework and drafted the manuscript. Dr Sutherland participated in the scoping of the literature and in the conceptualisation of the framework and drafted the manuscript. Both authors deliberated the findings and produced the discussion of the manuscript.

Ethics and Funding

This work was conducted without direct contact with patients or providers, representing a synthesis of published academic and grey literature. The work did not receive specific academic or commercial funding and no conflicts of interest are to be declared.

Competing interest statement

The authors do not have competing interest to declare.

References

1. Murray C, Frenk J. A framework for assessing the performance of health systems. *Bulletin of the World Health Organization* 2000;78:717-31.

2. Organization for Economic Cooperation and Development. Measuring Up: Improving Health System Performance in OECD Countries. Paris: OECD 2002.

3. Institute of Medicine. Vital signs: Core Metrics for Health and Health Care. Washington: National Academies Press 2015.

4. Boland T, Fowler A. A systems perspective of performance management in public sector organisations. Journal Public Sector Management 2000 13: 417-46.

5. Sandmeyer B, Fraser I. New Evidence on What Works in Effective Public Reporting. *Health Serv Res*. 2016 Jun;51 Suppl 2:1159-66. doi: 10.1111/1475-6773.12502.

6. Braithwaite RS, Caplan A. Who is watching the watchmen: Is quality reporting ever harmful? *SAGE Open Med.* 2014 Feb 18;2:2050312114523425.

7. Fung C, Lim Y, Mattke S, et al. Systematic review: the evidence that publishing patient care performance data improves quality of care. *Ann Intern Med.* 2008 Jan 15;148(2):111-23.

8. Pearse J and Mazevska D, The impact of public disclosure of health performance data: a rapid review. Sydney: Sax Institute 2010.

9. Campanella P, Vukovic V, Parente P, et al. The impact of Public Reporting on clinical outcomes: a systematic review and meta-analysis. B*MC Health Serv Res*. 2016 Jul 22;16:296. doi: 10.1186/s12913-016-1543-y.

10. Berwick D, James B and Coye M. Connections between Quality Measurement and Improvement. *Med Care.* 2003 Jan;41(1 Suppl):I30-8.

11. McGlynn E, Asch S, Adams J, et al. The quality of health care delivered to adults in the United States. *N Engl J Med.* 2003 Jun 26;348(26):2635-45.

12. McGlynn E. Introduction and overview of the conceptual framework for a national quality measurement and reporting system. *Med Care.* 2003;41(1 Suppl):I1-7.

13. McLoughlin V, Leatherman S, Fletcher M, et al. Improving performance using indicators. Recent experiences in the United States, the United Kingdom, and Australia. I*nt J Qual Health Care*. 2001;13(6):455-62.

14. Bohmer R. The hard work of health care transformation. NEJM 2016: 375(8): 709-711.

15. Molloy A, Martin S, Gardner T, et al. A clear road ahead: creating a coherent quality strategy for the English NHS. London: The Health Foundation; 2016

16. Custers T, Hurley J, Klazinga NS, Brown AD. Selecting effective incentive structures in health care: A decision framework to support health care purchasers in finding the right incentives to drive performance. BMC Health Serv Res. 2008 Mar 27;8:66. doi: 10.1186/1472-6963-8-66.

17. Grol R, Wensing M, Eccles M, et al.,eds. Improving Patient Care: The Implementation of Change in Health Care, [2nd ed]. Wiley-Blackwell, 2013.

18. Caldwell S, Herold D, Fedor D. Toward an understanding of the relationships among organizational change, individual differences, and changes in person-environment fit: a cross-level study. *Journal of Applied Psychology*, 2004; 89(5):868

19. Pettigrew A, Whipp R. Managing change for competitive success. Oxford: Blackwell 1991.

20. Walker H, Armenakis A, Bernerth J, (2007) Factors influencing organizational change efforts: An integrative investigation of change content, context, process and individual differences. *J Organ Change Manag*, 2007; 20(6):761-773.

21. DiMaggio P, Powell W. The iron cage revisited Institutional Isomorphism and Collective Rationality in Organization Fields. In: Powell W, DiMaggio P, eds. The New Institutionalism in Organizational Analysis. Chicago: University of Chicago Press 1991.

22. Rogers E. Diffusion of innovations, 5th ed. New York: Free Press 2003.

23. Greenhalgh T, Robert G, Bate P, et al. Diffusion of Innovations in Health Service Organisations: A Systematic Review. London: Blackwell 2005.

24. Michie S. ABC of Behaviour Change Theories. London: Lulu publishing 2014.

25. Ajzen, I. The theory of planned behaviour. *Organizational Behaviour and Human Decision Processes,* 1991;50: 179–211.

26. Glanz K., Lewis F, Rimers B, eds. Health Behaviour and Health Education: Theory, Research, and Practice. San Francisco: Jossey-Bass 1990

27. Perry, C, Barnowski T, Parcel, G. How individuals, environments, and health behaviour interact: Social learning theory. In Glanz K, Lewis F, Rimer B, eds. Health Behaviour and Health Education: Theory, Research and Practice. San Francisco: Jossey-Bass 1990.

28. Bandura, A. Social foundations of thought and action: A social cognitive theory. Englewood Cliffs, NJ: Prentice-Hall 1986.

29. Cummings T, Worley C. Organization Development and Change 10th ed. California: Cengage Learning 2015.

30. Bamford D, Forrester P. Managing planned and emergent change within an operations management environment*. Int J Operations Product Manage*. 2003; 23(5): 546-564.

31. Burnes, B. Managing Change: A Strategic Approach to Organisational Dynamics, 4th ed Harlow: Prentice Hall 2004.

32. Liebhart M, Garcia-Lorenzo L. Between planned and emergent change: decision maker's perceptions of managing change in organisations. *Int J Knowledge, Culture Change Manage* 2010; 5: 214-225.

33. Burns B. Kurt Lewin and the planned change approach to change: a reappraisal. In: Gallos J, ed. Organisational Development. San Francisco: Jossey-Bass 2006.

34. Livne-Tarandach R, Bartunek J. A new horizon for organizational change and development scholarship: Connecting planned and emergent change. In Woodman R, Pasmore W, Shani A, eds. *Research in Organizational Change and Development*. 2009; 17:1 – 35.

35. Burns B. Complexity theories and organisational change. *Int J of Management Reviews.* 2005; 7(2): 73-90

36. Lewin K. Field Theory in Social Science. New York: Harper and Row 1951.

37. Weick K, Quinn R. Organizational change and development . *Ann Rev Psychol* 1999; 50:361-386.

38. Stacey R. Managing the Unknowable: Strategic Boundaries Between Order and Chaos in Organizations. San Francisco: Jossey-Bass 1992.

39. Institute of Medicine. Crossing the Quality Chasm: A New Health System for the 21st Century. Washington: National Academies Press 2001.

40. Leatherman S. Applying Performance Indicators to Health System Improvement. In: Organization for Economic Development and Cooperation. Measuring Up: Improving Health System Performance in OECD Countries. Paris: OECD 2002.

41. Plsek P, Greenhalgh T. Complexity science: The challenge of complexity in health care. *BMJ*. 2001;323(7313):625-8.

42. Plsek P, Wilson T. Complexity, leadership, and management in healthcare organisations. *BMJ*. 2001;323(7315):746-9.

43. National Quality Board. NQB's Shared commitment to quality. London: NQB; 2017.

44. Naylor D, Iron K, Handa K. Measuring health system performance: Problems and Opportunities in the Era of Assessment and Accountability. In: Organisation for Economic Cooperation and Development Measuring up: Improving Health Systems Performance in OECD Countries. Paris: OECD 2002.

45. Leatherman S, Sutherland K. The Quest for Quality: Refining the NHS Reforms. London: Nuffield Trust 2008.

46. Bevan G. Incentives and models of governance. Health Economics Policy and Law 2015; 10(3):345-50.

47. Oxman A, Thomson M, Davs D, et al. No magic bullets: a systematic review of 102 trials of interventions to improve professional practice. *CMAJ* 1995;153(10):1423-31.

48. Oxman AD. Helping people make well-informed decisions about health care: old and new challenges to achieving the aim of the Cochrane Collaboration. Syst Rev. 2013 Sep 20;2:77. doi: 10.1186/2046-4053-2-77.

49. National Institute for Health and Clinical Excellence. How to change practice. Understand, identify and overcome barriers to change. December 2007 ISBN 1-84629-565-3.

50. Brereton L, Vasoodaven V. The impact of the NHS market: An overview of the literature. CIVITAS: Institute for the Study of Civil Society. London. February 2010

51. Doran T, Roland M. Lessons from major initiatives to improve primary care in the United Kingdom. Health Aff (Millwood). 2010 May;29(5):1023-9.

52. Solberg LI1, Mosser G, McDonald S. The three faces of performance measurement: improvement, accountability, and research. Jt Comm J Qual Improv. 1997 Mar;23(3):135-47.

53. Burnes B. No such thing as ... a “one best way” to manage organizational change. Manage Decision 1996;34(10): 11-18.

Table 1: Mapping of published frameworks and levers for change

	Cognitive	Mimetic	Formative	Supportive	Normative	Coercive	Structural	Competitive	Number of levers
DiMaggio & Powell (21)		*			*	*			3
Plsek & Greenhalgh (41)	*	*	*	*	*	*	*		7
Institute of Medicine (39)	*		*		*	*			4
Leatherman (40)	*	*		*	*	*		*	6
Naylor, Iron & Handa (44)	*	*	*	*	*	*	*	*	8
Berwick, James & Coye (10)			*	*			*	*	4
Leatherman & Sutherland (45)	*				*	*		*	4
Boland and Fowler (4)	*		*	*	*	*		*	6
NHS Quality Board/ Health foundation (15, 43)	*		*	*	*	*		*	6
Bevan (46)	*	*	*	*		*		*	6
Number of frameworks	8	5	7	7	8	9	3	8	

Table 2: Key applications of levers and examples of applications in healthcare systems

Key applications	How has this been applied in healthcare systems?
COGNITIVE	
Performance profiles / report cards / dashboards Benchmarking / league tables Root cause analyses / Morbidity and mortality reviews Clinical feedback	Performance reporting efforts such as profiles, report cards or benchmarking often incorporate a range of performance indicators covering different patient groups and aspects of care. They are usually enacted by independent reporting agencies or by government departments or ministries. The more analytic applications such as root cause analyses provide cognition about specific events and are usually enacted by healthcare provider organisations, professional groups or safety agencies. Examples: In the US, the Hospital Compare initiative of the Centers for Medicaid and Medicare (CMS); and in New South Wales (NSW), Australia, the Bureau of Health Information (BHI) publish hospital level data on risk-adjusted 30-day mortality and readmissions. Time series data show that improvements have been associated with public release of this information. In the English NHS, a 'star rating' regime introduced in 2003 was predominantly cognitive in nature but was coupled with coercive levers that were applied forcefully – bonus payments and earned autonomy, 'three-star' rating and hospital Chief Executive job losses with zero ratings.
MIMETIC	
Local champions / opinion leaders Demonstrator sites / beacon practices Case studies Study tours / exchange programs Secondments / rotations	Efforts to identify and highlight organisations or providers who are leaders in their field, articulate lessons and diffuse learning from their approaches and methods are usually coordinated by improvement organisations, professional groups or healthcare provider organisations. Examples: Many healthcare systems have sought to emulate the Kaiser Permanente model with numerous study tours and case studies as well as a focus on learning from magnet hospitals – known for their desirable work environment. Within the English NHS, change initiatives have often used beacon and accelerator sites to share good practice, promulgate change and provide expert advice. In Australia, demonstrator and pilot sites are frequently used to lead and leverage wider change.
FORMATIVE	
Continuing professional development / training / fellowships Clinical governance / Grand rounds Mentorship programs Local consensus building / deliberative processes Organisational learning / action research / systems thinking Communities of practice / Learning circles / Academies	Providing feedback is generally enacted by professional groups or colleagues and healthcare improvement agencies. Formative levers are often used in concert with cognitive levers – tracking performance as change takes place. Examples: Continuing professional development was introduced by the American Medical Association and by 1960 had incorporated a coercive lever /credit system to reward physicians for attending. It is now a key feature in most healthcare systems. Many clinical training programs based on feedback on performance have emerged in the Canadian context. In England in 1997, the concept of clinical governance was introduced with the aim of embedding a comprehensive approach to improve clinical quality and secure change. The concept has subsequently been adopted by many healthcare systems, including Australia and Canada.
SUPPORTIVE	
Quality improvement / cultural change programs Plan Do Study Act processes Facilitators / management consultants Innovation funding Collaboratives Models of care / Care pathways Decision support / reminders / alerts	Processes that seek to facilitate, support and guide change are often enacted by quality improvement agencies, government departments or ministries, academic institutions and professional organisations. Examples: Internationally, a number of organisations mandated to secure change have relied primarily on supportive levers, such as the Modernisation Agency in England in 2000; recast subsequently as the NHS Institute for Innovation and Improvement (2006), NHS Improving Quality (2013) and the Sustainable Improvement Team (2016). In the US, the Institute for Healthcare Improvement uses a range of levers, particularly supportive and mimetic in nature that offer opportunities to learn from, collaborate with, and be inspired by experts. In NSW, the Agency for Clinical Innovation uses supportive levers to secure change in the public hospital sector. In the Canadian context, the Canadian Institute for Health Improvement uses performance data to support change programs but also supports capacity-building with regards to the ability for healthcare systems stakeholders to use performance information to support change.

Table 2: Key applications of levers and examples of applications in healthcare systems (continued)

NORMATIVE	
Inspection and accreditation Registration, licensing and revalidation Clinical audits Guidelines / Standards Awareness campaigns	Efforts to alter performance to bring it into line with defined and codified practice – 'what should be done' are generally enacted by professional groups and by regulators. Examples: Inspection and accreditation regimes were introduced in the English NHS by the Commission for Health Improvement (CHI, 1999), subsequently renamed the Commission for Healthcare Audit and Inspection (CHAI, 2004) and the Care Quality Commission (CCQ, 2009). Also in England, national service frameworks were introduced in 1998 – articulating guidelines for organising and delivering care. In NSW, centrally defined 'models of care' provide detailed guidance for care delivery for different patient groups and diseases. Medical revalidation was introduced in England in 2012 and is about to be introduced in Australia. The National Institute for Clinical Excellence was introduced in 1999 in England (renamed the National Institute for Health and Care Excellence 2005 after merging with the Health Development Agency) and has been a template for health technology assessment and clinical guideline development across many healthcare systems. Choosing Wisely has been implemented in more than 20 healthcare systems – seeking to leverage change and reduce unnecessary care. Clinical audits are ubiquitous across healthcare systems.
COERCIVE	
Legislation and policy / rules / contracts Targets KPIs / performance agreement Incentives / Penalties Pay for performance 'Special measures' (supplanting local management)	Coercive levers are principally enacted by government departments, ministries or regulators. They are often based on clearly defined objectives that are quantified and monitored. Examples: Meeting objectives or failing to meet objectives have salient consequences for the organisation or provider being monitored. Targets were a key policy instrument for change in the English NHS in the late 1990s. There has been particular criticism of the targets for waiting times and the strong coercive levers that accompanied them but, the strength of the target regime has been established empirically – albeit with attendant unanticipated consequences. Pay for performance has been of considerable interest in healthcare systems in the past decade – in primary care in England's NHS (the Quality and Outcomes Framework) and in CMS-mediated penalties for adverse events, and poor patient outcomes in the US, (and proposed in Australia). Most health systems use performance agreements and compacts to leverage change.
STRUCTURAL	
Reorganisation / restructure Capital investments / Funding arrangements Decommissioning / "sun setting" Staffing / Skill mix Hub and spoke networks Physical arrangements Business Process Reengineering	Physical changes can be enacted by healthcare provider organisations seeking to secure localised change; and by government departments seeking to secure system-wide change. Examples: Specific examples of levers that have been implemented include information technology (Connecting for Health in England's NHS; e-Health in NSW); skill mix changes (introduction of nurse practitioners in the NHS) and organisational restructures (regional health authorities split into local health authorities in the NHS, Canada and in New South Wales, Australia).
COMPETITIVE	
Patient choice / personal health budgets Markets / Internal markets / purchaser-provider splits Tendering processes Commissioning	Government departments and policymakers typically enact at a system level market mechanisms and competition. Local providers may apply competitive levers in seeking to change particular services, such as cleaning, through tendering processes. Examples: In England, the Patient Choice Framework (2016) seeks to secure change, particularly in hospital waiting times. Quasi-markets were introduced in the NHS in the 1990s – seeking to leverage competition within public funded healthcare system; the US introduced various programs to support the provision of information to patients in order to guide their choice of providers. Many organisations are now reporting publicly and transparently performance information in Australia, Canada, the UK and the US to inform choice.

Figure legend:

Figure 1. Integrated conceptual framework of levers for change in healthcare

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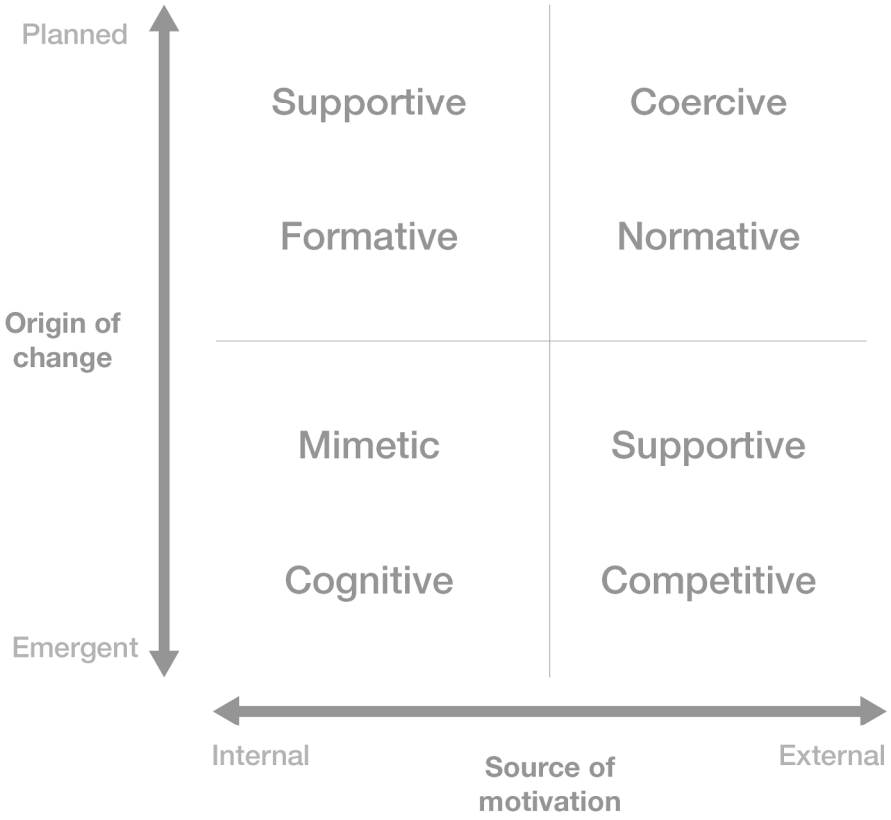

Figure 1. Integrated conceptual framework of levers for change in healthcare

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Appendix 1: Scoping of published frameworks and levers for change

Author/s, Year	Publication definitional elements and identified levers for Change
DiMaggio and Powell, 1991 (21)	Organisations become increasingly similar (isomorphic) over time because of two main pressures – competitive and institutional. DiMaggio and Powell focus on institutional isomorphism and identify three distinct types of processes that drive change (towards conformity). 1. **Coercive isomorphism**: similarity springs from pressures applied, either explicitly or implicitly (or both); from other organisations or from society. Specific levers include government mandates, contract law, reporting requirements. 2. **Mimetic isomorphism**: similarity springs from emulation, from seeking to copy from other organisations that appear to have greater legitimacy or success. Often apparent in the context of uncertainty about cause and effect. Specific levers include management consultancy, case studies, study tours. 3. **Normative isomorphism**: similarity springs from characteristics of the professionals who work in the organisation – established in shared education, licensing and reinforced through inter-organisational networks of specialists. Specific levers include registration and revalidation, medical colleges, special interest groups.
Plsek and Greenhalgh, 2001 (41)	In complex adaptive systems such as healthcare, unpredictability and paradox are omnipresent. Clinical practice, organisation, information management, research, education, and professional development are interdependent and change should use conceptual frameworks that incorporate dynamic, emergent, creative, and intuitive perspectives. Imperatives for managing change in complex adaptive systems include: 1. **Manage generative relationships**: establish goals and resourcing with a view towards the whole system, rather than artificially allocating them to parts of the system to support creative innovations among staff and stakeholders. Specific levers include organisational structures and clusters; staffing and funding mechanisms 2. **Define minimum specifications rather than prescriptive models of practice**: creative progress towards a difficult goal emerges from a few, flexible, simple rules or principles. Minimum specifications cover: direction pointing; boundaries; resources; permissions. Specific levers include: codification of clear objectives, resources 3. **Understand attraction for change**: Rather than battle resistance, focus on attraction – understand what motivates individual and organisational desire for change. Judicious sharing of information to and from natural 'attractors' or leaders can build an imperative so that others feel they must change. Specific levers include the use of beacon sites as inspiration 4. **Develop capability through transformational learning**: Individuals and systems change because they learn. The process of developing new behaviours in the context of real life experiences enables individuals to adapt to new situations. Specific levers include timely feedback, support for critical learning
Institute of Medicine, 2001 (39)	Acknowledging that healthcare is a complex adaptive system, this publication articulates an agenda for the redesign of the US healthcare systems. Informed by the research literature and a group of experts, recommended levers for change include: 1. **Commitment to a national statement of purpose,** leadership at many levels that can provide clear strategic and sustained direction and a coherent set of values and incentives to guide group and individual actions as well as the identification of priorities 2. **Adoption of principles to guide the redesign of care processes**: make effective use of information technologies; manage clinical knowledge and skills; develop effective teams; coordinate care across patient conditions, services, and settings over time; incorporate performance and outcome measurements for improvement and accountability. 3. **Create an environment that fosters and rewards improvement by**: creating an infrastructure to support evidence-based practice; facilitating the use of information technology; aligning payment incentives; preparing the workforce to better serve patients in a world of expanding knowledge and rapid change.
Leatherman, 2002 (40)	Highlights how public reporting of performance information plays a role in regulation and public accountability, purchasing and commissioning decisions, consumer selection and choice and provider behaviour change. A categorisation of interventions for change identifies: 1. **External oversight**: use of specific levers of review, inspection, accreditation and licensing, performance targets. 2. **Patient engagement / empowering consumers**: facilitating consumer choice, enacting patient charters / patients' rights. 3. **Regulation**: with specific levers of professional self-regulation and government regulation. 4. **Knowledge / skill enhancement of providers**: with specific levers of peer review and feedback, use of guidelines and protocols. 5. **Incentives**: with specific levers of financial (pay for performance) and non-financial rewards and sanctions.
Naylor, Iron and Handa, 2002 (44)	Acknowledges that information can catalyse change but notes that in the absence of specific steps to make change both necessary and possible, professional and organisational inertia can stall change. Levers for change can be: 1. **Economic or non-economic incentives**: payment systems; consistent performance feedback; point of decision information tools for patients or providers; training and supporting opinion leaders; repeated education interventions; strong evidence for burning issues. 2. **Mechanisms for bringing performance information to bear**: regulatory; administrative / professional; market-based. 3. **Actors whose behaviour can change**: consumers (through choice); purchasers/funders (through commission and contract); professionals/managers (through allocation of resources).

Berwick, James and Coye, 2003 (10)	Clear purpose, focused goals, and valid and reliable performance metrics set the stage for the use of measurement to pursue change through two pathways: 1. **Measurement for selection** can be used for reward, recognition, punishment, payment, and other forms of decision with more continuous properties. Regulators can affect quality by using selection directly (such as suspending a license) or indirectly, using the threat of action to motivate changes among providers of care who wish to avoid that threat. 2. **Organisational processes** that support change and improvement of care are: reliable flow of useful information; education and training in the techniques of process improvement; investment in the time and change management required to alter core work processes; alignment of organisational incentives with care improvement objectives; and leadership to inspire and model care improvement.
Leatherman and Sutherland, 2008 (45)	Three broad models of accountability underpin different levers for change: 1. **Professional** model: healthcare is a transaction between patients and professionals controls on those who can gain admittance into healthcare fields (e.g., through licensure) and continued education and training should be exercised alongside ongoing education and clinical governance, patient engagement 2. **Market** model: healthcare is a commodity and market forces affect change including competition for customers (with consumers selecting the best available healthcare services and providers), commissioning, public reporting to inform choice 3. **Governmental** (or **political**) model: healthcare is an essential service or public good and centralised bureaucracies use tools such as legislation, regulation, standard setting, targets, public reporting for accountability This framework proposes that the three categories of levers for change should be used in conjunction with each other.
Boland and Fowler, 2000 (4)	Presents performance indicators and associated improvement initiatives, as typically applied in public sector organisations. Notes that change is usually implemented as a causal loop established between perceived performance and resulting actions,. A two-dimensional matrix model is founded on two independent dimensions: 1) S**ource of control**: Internal and External; 2) **Nature of expected actions**: Formative/ Supportive and Punitive/ Summative The levers for change are: 1. **Continuous quality improvement**: when internal source of control and formative/ supportive context (performance assessment as a tool for hospital managers for the evaluation and improvement of hospital systems). 2. **Accreditation**: when external source of control and formative/ supportive context (development of hospital quality standards and accreditation processes). 3. **Internal evaluation**: when internal source of control and punitive/ summative context (performance reporting for internal hospital evaluation). 4. **External accountability**: when external source of control and punitive/ summative context (improvements in hospital accountability and performance management through public performance reporting and quality-based purchasing).
Bevan, 2015 (46)	Identifies four models of health governance with different levers to secure change 1. **Trust and altruism** – assume that actors are able to accurately assess patient needs and are motivated to meet those needs in the best possible way 2. **Choice and competition** – create external incentives through market mechanisms, using patient choice to affect market share 3. **Naming and shaming** – public rankings, published and widely disseminated 4. **Targets and terror** – actors and organisations are held to account against a limited set of targets that clearly signal priorities and with strong threats of sanctions for failure and rewards for success
NHS Quality Board, 2017/Health Foundation 2016 (15, 43)	Seven steps to improve quality are articulated 1. **Setting direction and policy** – establishing clear, collective and consistent priorities for quality 2. Bringing clarity to quality – establish **standards** and **guidelines**; establish safe levels of staffing resources 3. **Measuring and publishing** quality – align measurement and monitoring activities to measure what matters 4. **Recognising and rewarding** quality – incentives aligned around shared view of quality 5. **Safeguarding quality** – through **surveillance**, **regulatory** interventions 'special measures', risk summits to share best practice 6. **Building capacity** – develop improvement and leadership capacity, deliver **education** and **training** ,