

Items reported in the included literature reviews (Informed by (Smith, Devane, Begley, & Clarke, 2011) and (Shea et al., 2007))

Item	Literature reviews									
	1	2	11	15	18	35	48	51	52	66
1. Aim	To clarify the term "physician engagement."	To review the literature on the effectiveness of programmes to support leadership, the relationship between clinical leadership and integrated primary care, and important leadership skills for integrated primary care practice	To summarize the results of studies which use outcome measures from clinical registries to implement and monitor QI initiatives. The second objective is to identify a) facilitators and/or barriers that contribute to the realization of QI efforts, and b) how outcomes are being used as a catalyst to change outcomes over time.	To provide an overview of the scientific literature regarding the definitions of medical leadership, the activities and roles performed by a medical leader, the required knowledge and skills, and the influential factors	To determine if there is an association between leaders having a medical background and management performance, in terms of organisational performance or patient outcomes.	To map out and critically appraise quantitatively-oriented studies analysing the association between clinicians' involvement in senior leadership positions (i.e. CEO, top management and board of directors) and hospital performance.	To present and discuss the streams of knowledge regarding how management can influence the quality and sustainability of health systems and organizations.	Review the evidence on how a systematic approach to talent development has important organizational outcomes,	To provide a comprehensive overview of the studies dealing with the impact of management on professional control.	To examine the use of the term medical engagement and the existence of any empirical evidence for its linkage to organisational or clinical aspects of performance.
2. Data bases searched	3	4	3	8	3	1	4	-	4	8
3. Keywords, search terms	*	*	*	*	*	*	*	-	*	*
4. Years searched	*	*	*	*	*	*	-	-	*	*
5. Applied restrictions	*	*	*	*	*	*	*	-	*	*
6. Selection process	*	*	*	*	*	*	-	-	*	*
7. Eligibility criteria	*	*	*	*	*	*	-	-	*	*
8. No. of reviewers	*	*	*	*	*	*	-	*	*	*
9. No. of included studies	*	*	*	*	*	*	*	-	-	*
10. Quality assessment of included studies	-	*	*	-	*	-	-	-	-	-
11. Methods for data extraction	*	*	*	*	*	*	-	-	-	-
12. Methods for data analysis/synthesis	*	*	*	*	*	*	-	-	-	-
13. Sources of funding	-	*	*	-	-	*	*	*	*	*
14. Conflict of interest	*	*	*	-	*	*	*	*	-	-
Total items reported	12	14	14	11	13	13	7	4	8	10

Mixed methods appraisal tool (MMAT) (Hong et al., 2018)

Item	Quantitative descriptive studies																		
	10	20	24	32	33	39	40	41	42	44	46	56	58	59	62	69	70	73	
Is the sampling strategy relevant to address the research question?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Is the sample representative of the target population?	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Can't tell	No	Yes	Can't tell	No	Yes	Yes	Yes	Yes
Are the measurements appropriate?	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Is the risk of non-responsible bias low?	Yes	Can't tell	Yes	Yes	Yes	Yes	Yes	Can't tell	Can't tell	Yes	Can't tell	Yes	Can't tell	Can't tell	No	No	Yes	Can't tell	Can't tell
Is the statistical analysis appropriate to answer the research question?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Can't tell	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Item	Mixed methods	
	21	63
Is there an adequate rationale for using mixed methods design to address the research question?	Yes	Yes
Are there different components of the study effectively integrated to answer the research question?	Yes	Yes
Are the outputs of the integration of qualitative and quantitative components adequately interpreted?	Yes	Yes
Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?	N/A	Yes
Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?	Yes	Yes

Item	Non-randomized studies
	30
Are the participants representatives of the target population?	Yes
Are the measurements appropriate regarding both the outcome and intervention (or exposure)?	Yes
Are there complete outcome data?	Yes
Are the confounders accounted for in the design and analysis?	No
During the study period, is the intervention administered as intended?	Yes

Analysis of the studies scoring lower than the average

The numbering is based on [Appendix 4: Detailed overview of the included studies](#) in order to avoid potential changes tied to reference management in the main manuscript.

No	Reference	Authors' comment
	QUALITATIVE STUDIES	
6	Berghout MA, Oldenhof L, van der Scheer WK, et al. From context to contexting: professional identity un/doing in a medical leadership development programme. <i>Sociol Health Illn</i> Published Online First: October 2019.	Makes relevant conceptual contributions. An ethnographic study from the Netherlands, important for transferability of findings.
12	Berghout MA, Oldenhof L, Fabbricotti IN, et al. Discursively framing physicians as leaders: Institutional work to reconfigure medical professionalism. <i>Soc Sci Med</i> 2018;212:68–75.	Makes no unique conceptual contributions. A qualitative study based on observations and document analysis from the Netherlands, important for transferability of findings.
8	Jorm C, Hudson R, Wallace Am E. Turning attention to clinician engagement in Victoria. <i>Aust Health Rev</i> 2019;43:123–5.	Makes important conceptual contributions. Seems to be poorly reported due to the style of the publication/journal but is based on an extensive study from Australia
23	Kerrissey M, Satterstrom P, Leydon N, et al. Integrating: A managerial practice that enables implementation in fragmented health care environments. <i>Health Care Manage Rev</i> 2017;42:213–25.	Makes no unique conceptual contribution. Relevant due to having its setting in primary care which has bearing on the transferability of the synthesis.

25	Spehar I, Frich JC, Kjekshus LE. Clinicians' experiences of becoming a clinical manager: a qualitative study. <i>BMC Health Serv Res</i> 2012;12:421.	Makes no unique conceptual contribution. Relevant due to having its setting in primary care and from Norway which has bearing on the transferability of the synthesis.
29	Denis J-L, van Gestel N. Medical doctors in healthcare leadership: theoretical and practical challenges. <i>BMC Health Serv Res</i> 2016;16:158–69.	Makes no unique conceptual contribution.
31	Lega F, Sartirana M. Making doctors manage... but how? Recent developments in the Italian NHS. <i>BMC Health Serv Res</i> 2016;16.	Makes minor conceptual contribution. Relevant due to being conducted in Italy which has bearing on the transferability of the synthesis.
34	Noordegraaf M, Schneider MME, Van Rensen ELJ, <i>et al.</i> Cultural Complementarity: Reshaping professional and organizational logics in developing frontline medical leadership. <i>Public Manag Rev</i> 2016;18:1111–37.	Makes important conceptual contributions tied to the field of sociology of professions. Relevant due to being conducted in the Netherlands and focused on physicians in residency training which has bearing on the transferability of the synthesis.
36	Bresnen M, Hyde P, Hodgson D, <i>et al.</i> Leadership talk: From managerialism to leaderism in health care after the crash. <i>Leadership</i> 2015;11:451–70.	Makes no unique conceptual contribution.
38	Martin G, Beech N, MacIntosh R, <i>et al.</i> Potential challenges facing distributed leadership in health care: Evidence from the UK National Health Service. <i>Sociol Health Illn</i> 2015;37:14–29.	Makes no unique conceptual contribution. Relevant due to having its setting in primary and secondary care which has bearing on the transferability of the synthesis.
45	Moffatt F, Martin P, Timmons S. Constructing notions of healthcare productivity: The call for a new professionalism? <i>Sociol Health Illn</i> 2014;36:686–702.	Makes no unique conceptual contribution.
49	Fulop L. Leadership , clinician managers and a thing called “ hybridity ”. <i>J Health Organ Manag</i> 2012;26:578–604.	Makes no unique conceptual contribution.
55	Ham C, Clark J, Spurgeon P, <i>et al.</i> Doctors who become chief executives in the NHS: from keen amateurs to skilled professionals. <i>J R Soc Med</i> 2011;104:113–9.	Makes relevant conceptual contributions and is written by key authors in the field. Poor reporting score was most likely tied to the requirements or limitations of the journal.
60	Hayes C, Yousefi V, Wallington T, <i>et al.</i> Case study of physician leaders in quality and patient safety, and the development of a physician leadership network. <i>Healthc Q</i> 2010;13 Spec No:68–73.	Makes minor conceptual contribution with its unique focus on physicians in quality and safety.

64	Waring J, Currie G. Managing expert knowledge: Organizational challenges and managerial futures for the UK medical profession. <i>Organ Stud</i> 2009;30:755–78.	Makes relevant conceptual contributions in terms of knowledge management. Poor reporting score is likely tied to a publication in a different discipline.
65	Epstein AL, Bard MA. Selecting Physician Leaders for Clinical Service Lines: Critical Success Factors. <i>Acad Med</i> 2008;83:226–34.	Makes no unique conceptual contribution.
67	Lega F. Lights and shades in the managerialization of the Italian National Health Service. <i>Heal Serv Manag Res</i> 2008;21:248–61.	Makes no unique conceptual contribution. Relevant due to being conducted in Italy which has bearing on the transferability of the synthesis.
71	Sorensen R, Iedema R. Redefining accountability in health care: managing the plurality of medical interests. <i>Heal An Interdiscip J Soc Study Heal Illn Med</i> 2008;12:87–106.	Makes important conceptual contributions. Relevant also due to its ethnographic study design.
LITERATURE REVIEWS		
48	Lega F, Prenestini A, Spurgeon P. Is Management Essential to Improving the Performance and Sustainability of Health Care Systems and Organizations? A Systematic Review and a Roadmap for Future Studies Review of Literature. <i>Value Heal</i> 2013;16:S46–51.	Makes important conceptual contributions due to being one of the first literature reviews in the field but adds little in the light on more recent reviews.
51	Mallon WT, Buckley PF. The current state and future possibilities of recruiting leaders of academic health centers. <i>Acad Med</i> 2012;87:1171–6.	Makes a minor contribution in terms of the importance of talent management thinking in recruitment of medical leaders. Published in a reputable journal but with very limited reporting possibly tied to the word limits.
QUANTITATIVE DESCRIPTIVE STUDIES		
41	Spurgeon P, Long P, Clark J, <i>et al.</i> Do we need medical leadership or medical engagement? <i>Leadersh Heal Serv</i> 2015;28:173–84	Makes important conceptual contributions in terms of questioning the idea of medical leadership by introducing the concept of medical engagement. Given the authors' primary interest in the medical engagement scale, other aspects of the study were not elaborated enough.
46	Nelson MF, Merriman CS, Magnusson PT, <i>et al.</i> Creating a physician-led quality imperative. <i>Am J Med Qual</i> 2014;29:508–16.	Makes no unique conceptual contribution.