Appendix 3 Quality assessment and analysis of the included studies

The numbering of included studies is based on <u>Appendix 4: Detailed overview of the included studies</u> in order to avoid potential changes in numbering tied to reference management in the main manuscript.

Standards for Reporting Qualitative Research (SRQR) (O'Brien, Harris, Beckman, Reed, & Cook, 2014)

Item																																										
Title and abstract	3	4	5	6	7	8	9	12	13	14	16	17	19	22	23	25	26	27	28	29	31	34	36	37	38	43	45	47	49	50	43	54	55	57	60	61	64	65	67	68	71	72
S1 Title Concise description of the nature and topic of the study Identifying the study as qualitative or indicating the approach (e.g., ethnography, grounded theory) or data collection methods (e.g., interview, focus group) is recommended	-	-	-	-	-	-	-	*	-	-	1	*	1	*	-	*	*	*	-	1	-	1	-	-	-	-	1	*	1	1	*	*	1	-	-	*	-	ı	-	-	-	-
S2 Abstract Summary of key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results, and conclusions	*	*	*	*	*	-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	-	*	*	*	*	*	*	-	*	*	-
Introduction																																										
S3 Problem formulation Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
S4 Purpose or research question Purpose of the study and specific objectives or questions Methods	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
S5 Qualitative approach and research paradigm Qualitative approach (e.g., ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., postpositivist, constructivist/ interpretivist) is also recommended; rationale s	*	*	*	*	*	-	*	*	*	*	*	*	*	*	*	-	*	*	-	-	-	-	-	*	*	*	*	1	1	*	*	*	1	1	-	*	*	-	-	*	*	*
S6 Researcher characteristics and reflexivity Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, and/or presuppositions; potential or actual interaction between researchers' characteristics and the researchers' characteristics and the research questions,		-	*	-	-	-	-	-	-	-	-		-	-	-	-	*	-	*	-	-	-	-	-	-	-	-	*	*	-	-	-	-	*	-	*	-	-	-	-	*	*

approach, methods, results,			1				1						1														I	1												l	1	
and/or transferability S7 Context	*	*	*	*	*		*	*	*			*	*	*			*	*	*	*	*	*	*	*	*		*		*	*		*				*		*	*	*	*	
Setting/site and salient contextual factors; rationale b		_		-	-	-				-	-				-	-		-		-					-	-		-			-	-	-	-	-		-				_	-
S8 Sampling strategy How and why research	*	*	*	*	*	-	*	*	*	*	*	*	*	*	*	*	*	-	*	-	-	*	*	*	*	*	-	*	*	*	*	*	*	*	*	*	*	*	-	*	-	*
participants, documents, or																																										
events were selected; criteria for deciding when no further																																										
sampling was necessary (e.g.,																																										
sampling saturation); rationale _b																																										
S9 Ethical issues	-	*	*	-	*	-	*	-	-	-	*	*	-	*	-	*	*	*	*	-	-	-	-	-	*	*	-	*	-	*	*	-	-	*	-	*	-	-	-	*	*	*
pertaining to human subjects																																										
Documentation of approval by																																										
an appropriate ethics review board and participant consent,																																										
or explanation for lack thereof;																																										
other confidentiality and data security issues																																										
S10 Data collection	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	-	*	*	*	-	-	*	*	*	*	*	-	*	*	*	*	*	*	*	-	*	*	*	-	*	*	*
methods Types of data collected;																																										
details of data collection																																										
procedures including (as appropriate) start and stop																																										
dates of data collection and																																										
analysis, iterative process, triangulation of																																										
sources/methods, and																																										
modification of procedures in response to evolving study																																										
findings; rationaleb																																					_					
S11 Data collection instruments and	*	*	*	-	*	-	*	-	*	*	*	*	*	*	-	-	*	-	-	-	-	*	*	*	*	*	-	*	-	*	*	*	*	*	-	*	*	*	-	*	-	*
technologies																																										
Description of instruments (e.g., interview guides,																																										
questionnaires) and devices																																										
(e.g., audio recorders) used for data collection; if/how the																																										
instrument(s) changed over																																										
the course of the study S12 Units of study	*	*	*	*	*	*	*	*	*	*	*	*	*	*	_	*	*	*	*	_	_	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	_	*	*	*
Number and relevant															-					-	_																		_			
characteristics of participants, documents, or events																																										
included in the study; level of																																										
participation (could be reported in results)																																										
S13 Data processing	*	*	*		*	-	*	-	*	*	-	*	*	*	*	-	*	*	*	-	-	-	-	*	*	*	-	*	*	*	*	*	-	*	-	*	*		-	*	-	*
Methods for processing data prior to and during analysis,																																										
including transcription, data																																										
entry, data management and security, verification of data																																										
integrity, data coding, and anonymization/deidentification																																										
of excerpts																																										
S14 Data analysis	*	*	*	*	*	-	*	*	*	*	*	*	*	*	*	*	*	*	*	-	-	*	*	*	-	*	*	*	*	*	*	*	-	*	-	*	*	-	-	*	*	*
Process by which inferences, themes, etc., were identified							l																																			
and developed, including the researchers involved in data							l																																			
analysis; usually references a	1	l	l		l		l	1																																l		
specific paradigm or approach; rationale b																																										
S15 Techniques to	† -	*	*	-	-	-	*	 	-	-	*	*	-	-	-	-	*	*	*	-	-	-	*	*	-	*	- 1	*	-	*	*	*	-	*	-	-	*	-	-	*	-	-
enhance trustworthiness							l																																			
Techniques to enhance	1	l	l		l		l	1																																l	1	
trustworthiness and credibility	1		l		1			1	1																														1		1	
trustworthiness and credibility of data analysis (e.g., member																																										
trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale b																																										

Supplemental material

S16 Synthesis and interpretation	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or																																										
model, or integration with prior research or theory																																										
S17 Links to empirical data Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	*	*	*	*	*	-	*	*	*	*	*	*	*	*	*	*	*	*	*	1	1	*	*	*	*	*	*	*	*	*	*	*	-	*	-	*	*	-	*	*	*	*
Discussion																																										
S18 Integration with prior work, implications, transferability, and contribution(s) to the field	*	*	*	*	*	-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	-	*	-	*	*
Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of																																										
earlier scholarship; discussion of scope of application/ generalizability; identification of unique contribution(s) to scholarship in a discipline or field																																										
S19 Limitations Trustworthiness and limitations of findings	*	*	*	-	*	-	*	*	-	*	*	*	-	*	*	*	*	-	*	-	-	-	1	*	-	*	1	*	-	*	*	*	-	-	-	*	-	*	*	*	-	*
Other																																										
S20 Conflicts of interests Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	-	*	-	-	*	*	*	-	*	*	*	-	*	*	*	*	*	-	-	*	*	*	-	-	-	*	-	*	-	*	*	-	*	*	-	*	-	-	*	-	-	-
S21 Funding Sources of funding and other support; role of funders in data collection, interpretation, and reporting	-	*	*	-	*	*	*	-	*	-	*	*	*	*	*	*	*	*	*	*	-		*	*	-	*	-	*	*	*	*	-	*	*	-	*	-	*	*	-	*	-
Total items reported Average score 14.6	15	19	19	12	18	7	19	14	16	15	17	19	16	19	14	14	21	16	17	8	7	13	14	17	14	18	10	19	14	19	19	16	11	17	7	20	14	11	9	16	14	15

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 leader ship 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 perform- ance.	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.
Data bases searched	3	4	3	8	3	1	4	-	4	8
Keywords, search terms	*	*	*	*	*	*	*	-	*	*
Years searched	*	*	*	*	*	*	-	-	*	*
5. Applied restrictions	*	*	*	*	*	*	*	-	*	*
6. Selection process	*	*	*	*	*	*	-	-	*	*
7. Eligibility criteria	*	*	*	*	*	*	-	-	-	*
No. of reviewers	*	*	*	*	*	*	-	*	*	*
No. of included studies	*	*	*	*	*	*	*	-	-	*
 Quality assessment of included studies 	-	*	*	-	*	-	-	-	-	-
 Methods for data extraction 	*	*	*	*	*	*	-	-	-	-
 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	Quantitati	ve descriptive	studies															
item	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	Can't tell	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
Are the measurements appropriate?	No	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
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

Item	Mixed metho	ods
item	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 <u>Appendix 4: Detailed overview of the included studies</u> 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. Sociol Health Illn 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. Soc Sci Med 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. Aust Health Rev 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. Health Care Manage Rev 2017;42:213–25.	Makes no unique conceptual contribution. Relevant due to having its setting in primary care which has baring 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>	Makes no unique conceptual contribution. Relevant due to having its setting in primary care and from Norway which has baring on the transferability of the synthesis.
29	2012;12:421. 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 baring on the transferability of the synthesis.
34	Noordegraaf M, Schneider MME, Van Rensen ELJ, et al. Cultural Complementarity: Reshaping professional and organizational logics in developing frontline medical leadership. Public Manag Rev 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 baring 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, et al. Potential challenges facing distributed leadership in health care: Evidence from the UK National Health Service. Sociol Health Illn 2015;37:14–29.	Makes no unique conceptual contribution. Relevant due to having its setting in primary and secondary care which has baring 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, et al. 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, et al. 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	Makes relevant conceptual contributions in terms of knowledge management. Poor reporting score is likely tied to a
	knowledge: Organizational challenges and	publication in a different discipline.
	managerial futures for the UK medical	
	profession. Organ Stud 2009;30:755–78.	
65	Epstein AL, Bard MA. Selecting Physician	Makes no unique conceptual contribution.
	Leaders for Clinical Service Lines: Critical	
	Success Factors. Acad Med 2008;83:226–34.	
67	Lega F. Lights and shades in the	Makes no unique conceptual contribution. Relevant due to being conducted in Italy which has baring on the
	managerialization of the Italian National Health	transferability of the synthesis.
	Service. Heal Serv Manag Res 2008;21:248-	
	61.	
71	Sorensen R, ledema R. Redefining	Makes important conceptual contributions. Relevant also due to its ethnographic study design.
' '	accountability in health care: managing the	makes important conceptual contributions. Helevant also due to its etimographic study design.
	plurality of medical interests. <i>Heal An</i>	
	Interdiscip J Soc Study Heal Illn Med	
	2008;12:87–106.	
	LITERATURE REVIEWS	
40		Makes important apparent of authority of the first property of the first literature various in the field but adde litate in
48	Lega F, Prenestini A, Spurgeon P. Is	Makes important conceptual contributions due to being one of the first literature reviews in the field but adds little in
	Management Essential to Improving the	the light on more recent reviews.
	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.	
51	Mallon WT, Buckley PF. The current state and	Makes a minor contribution in terms of the importance of talent management thinking in recruitment of medical
	future possibilities of recruiting leaders of	leaders. Published in a reputable journal but with very limited reporting possibly tied to the word limits.
	academic health centers. Acad Med	
	2012;87:1171–6.	
	QUANTITATIVE DESCRIPTIVE STUDIES	
41	Spurgeon P, Long P, Clark J, et al. Do we	Makes important conceptual contributions in terms of questioning the idea of medical leadership by introducing the
	need medical leadership or medical	concept of medical engagement. Given the authors' primary interest in the medical engagement scale, other
	engagement? Leadersh Heal Serv	aspects of the study were not elaborated enough.
	2015;28:173–84	, , , , , , , , , , , , , , , , , , , ,
46	Nelson MF, Merriman CS, Magnusson PT, et	Makes no unique conceptual contribution.
	al. Creating a physician-led quality imperative.	
	Am J Med Qual 2014:29:508–16.	
	7111 0 MGG Quai 2014,23.300-10.	