APPENDIX A. SEARCH STRATEGIES

Staffing

Database: Ovid MEDLINE(R)

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1 exp Medical Errors/
2 (medical errors or medication errors or diagnostic errors).mp.
3 quality of health care/
4 *safety/ or safety/st or safety management.mp.
5 Iatrogenic Disease/ or iatrogenic disease.mp.
6 quality assurance health care/
7 (patient safety or safety of patient$).mp.
8 *treatment outcome/
9 Patient$.ti
10 exp Physician-Patient Relations/
11 exp Patient Satisfaction/
12 or/1-11
13 workload/ or workload.mp. or overwork.mp.
14 exp professional competence/
15 work schedule tolerance/ or teamwork.tw.
16 "Personnel Staffing and Scheduling"/ or personnel staffing.mp.
17 Professional Autonomy/ or professional autonomy.mp.
18 professional power.mp.
19 exp Time Management/
20 or/13-19
21 12and 20
22 limit 21to (english language and humans) 23 limit 22 to yr="2000 -Current"
24 exp Physicians/
25 exp Nurse Practitioners/
26 exp Physician Assistants/
27 or/24-26
28 23 and 27
29 limit 28 to (comment or editorial or letter or news)
30 28 not 29

Workflow

Database: Ovid MEDLINE(R)

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1 exp Medical Errors/
2 (medical errors or medication errors or diagnostic errors).mp.
3 quality of health care/
4 *safety/ or safety/st or safety management.mp.
5 Iatrogenic Disease/ or iatrogenic disease.mp.
6 quality assurance health care/
7 (patient safety or safety of patient$).mp.
8 *treatment outcome/
9 Patient$.ti.
10 exp Physician-Patient Relations/
11 exp Patient Satisfaction/
12 or/1-11
13 exp Efficiency, Organizational/
14 exp "Task Performance and Analysis"/
15 exp Information Systems/
16 exp Electronic Health Records/
17 exp Equipment Design/
18 exp Equipment Safety/
19 Personnel Management/ or job performance.mp.
20 exp User-Computer Interface/
21 exp Expert Systems/
22 (distraction or interruption).mp.
23 multitask.mp.
24 paging.mp.
25 User-Computer Interface/ or human computer interactions.mp.
26 exp "Referral and Consultation"/
27 or/13-26
28 12 and 27
29 limit 28 to (english language and humans)
30 limit 29 to yr="2000-Current"
31 exp physicians/
32 exp nurse practitioners/ \33 exp physician assistants/
34 or/31-33
35 30 and 34
36 limit 35 to (comment or editorial or letter or news)
37 35 not 36

Organizational culture

Database: Ovid MEDLINE(R)

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1 exp Medical Errors/
2 (medical errors or medication errors or diagnostic errors).mp.
3 quality of health care/
4 *safety/ or safety/st or safety management.mp.
5 Iatrogenic Disease/ or iatrogenic disease.mp.
6 quality assurance health care/
7 (patient safety or safety of patient$).mp.
8 *treatment outcome/
9 Patient$.ti.
10 exp Physician-Patient Relations/
11 exp Patient Satisfaction/
12 or/1-11
13 exp Interprofessional Relations/ or exp Organizational Culture/ or professional culture.mp.
14 organizational climate.mp.
15 exp Leadership/
16 management style.mp.
17 managerial style.mp.
18 skill mix.mp.

19 exp Models, Organizational/ or shared leadership.mp. or exp Organizational Innovation/
20 open door policies.mp.
21 exp Management Quality Circles/
22 exp Institutional Management Teams/
23 or/13-22
24 12 and 23
25 limit 24 to (english language and humans)
26 limit 25 to yr="2000 -Current"
27 exp physicians/
28 exp nurse practitioners/
29 exp physician assistants/
30 or/27-29
31 26 and 30
32 limit 31 to (comment or editorial or letter or news)
33 31 not 32

Physical environment

Database: Ovid MEDLINE(R)

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1 exp Medical Errors/
2 (medical errors or medication errors or diagnostic errors).mp
3 quality of health care/
4 *safety/ or safety/st or safety management.mp.
5 Iatrogenic Disease/ or iatrogenic disease.mp.
6 quality assurance health care/
7 (patient safety or safety of patient$).mp.
8 *treatment outcome/
9 Patient$.ti.
10 exp Physician-Patient Relations/
11 exp Patient Satisfaction/
12 or/1-11
13 exp Air Pollution/
14 exp Air Pollution, Indoor/
15 exp Light/ or exp Lighting/ or indoor lighting.mp.
16 exp Acoustics/
17 exp Noise/ or indoor noise.mp.
18 exp "Interior Design and Furnishings"/
19 exp Humidity/
20 exp Ventilation/ or exp Temperature/ or indoor temperature.mp. or exp Environmental Monitoring/
21 exp "Facility Design and Construction"/ or clinic design.mp
22 human factors engineering.mp.
23 exp Environment Design/ or facility environment.mp.
24 or/13-23
25 12 and 24
26 limit 25 to (english language and humans)
27 limit 26 to yr="2000-Current"
28 exp physicians/
29 exp nurse practitioners/
30 exp physician assistants/
31 or/28-30
32 27 and 31
33 limit 32 to (comment or editorial or letter or news)
34 32 not 33

Team

Database: Ovid MEDLINE(R)

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1 exp Patient Care Team/ or team-based.mp.
2 practice based care team.mp.
3 shared case.mp.
4 exp Interprofessional Relations/ or shared care.mp.
5 collaborative care.mp.
6 multidisciplinary care teams.mp.
7 multidisciplinary care team.mp.
8 6 or 7
9 or/1-8
10 exp Medical Errors/
11 (medical errors or medication errors or diagnostic errors).mp.
12 quality of health care/
13 *safety/ or safety/st or safety management.mp.
14 Iatrogenic Disease/ or iatrogenic disease.mp.
15 quality assurance health care/
16 (patient safety or safety of patient$).mp.
17 *treatment outcome/
18 Patient$.ti.
19 exp Physician-Patient Relations/
20 exp Patient Satisfaction/
21 or/10-20
22 9 and 21
23 limit 22 to (english language and humans)
24 limit 23 to yr="2000 -Current"
25 exp Physicians/
26 exp Nurse Practitioners/
27 exp Physician Assistants/
28 or/25-27
29 24 and 28
30 limit 29 to (comment or editorial or letter or news)
31 29 not 30

APPENDIX B. CRITERIA USED IN QUALITY ASSESSMENT OF NON-RANDOMIZED STUDIES

We evaluated each non-randomized trial based on the five elements below. To be considered low risk of bias for any element, a "yes" response was required for each of the questions (a, b, c) pertaining to the element, if applicable. Plots were developed to show the percent of the non-randomized trials in each area (human resources practices, organizational culture, and physical environment) that were assigned a yes (met criteria) or no (failed to meet criteria) for each element.

1) **Population**

   a. Is the sample representative of the population of interest?
   b. Did researchers apply inclusion/exclusion criteria uniformly to all comparison groups and is the selection of the comparison group appropriate?
   c. Is the sampling method appropriate (i.e. appropriate database or sample for research question, adequate response rate for survey studies, etc.)?

2) **Outcomes**

   a. Are important outcomes assessed and *reported* (i.e. not just intermediate or surrogate outcomes)?
   b. Was the length of follow-up appropriate for the research questions (consider benefits and harms)?
   c. Is the impact of loss to follow-up (or differential loss to follow-up) considered in the analysis?

3) **Measurement**

   a. Are outcome, predictor and covariates assessed in the same way for everyone?
   b. Is this blinded such that, for example, a person's exposure status would not be known at the time outcome status was assessed? This is where recall bias and other types of differential assessment come into play.
   c. Are the tools used to assess exposures and outcomes accurate and reliable (i.e., are standard measures used)?

4) **Confounding**

   a. Are the statistical methods and study design adequate for minimizing confounding?
   b. Aside from the exposure of interest, are groups balanced in terms of factors that might bias the exposure and outcome association?
   c. Are the appropriate confounding factors included in the analysis?

5) **Intervention (if applicable)**

   a. Is the intervention clearly described and transferrable (i.e. could someone else repeat this study with different staff and patients and get similar results)?

APPENDIX C. PEER REVIEW COMMENTS/AUTHOR RESPONSES

REVIEWER COMMENT	RESPONSE
1. Are the objectives, scope, and methods for this review clearly described?	
Yes	No response needed
Yes, articulate and concise	No response needed
Yes	No response needed
Yes	No response needed
Yes. Well designed and conceptualized with appropriate questions to guide the review. Excellent use of criteria for literature search and review of the literature.	Thank you.
The rationale for choosing these 3 areas specifically: HR, organizational culture, and physical environment probably warrants some enhancement. Further, the definitions and limits of each of these categories seems somewhat arbitrary. For example, would sufficient staffing to ensure a appropriate roles/functions for team based care be considered HR or organizational culture? Regarding outcomes, you use the term patient safety, but it is often unclear that you really mean to include all quality metrics including typical clinical outcomes such as admissions and ED utilization. What about performance metrics such as chronic disease outcomes such as glycemic control etc?? I am still not sure if you included these as well.	We acknowledge that these categorizations are arbitrary, but we do not think that how we've organized this (by the categorizations that we've used) undermines our presentation of the evidence, which in most cases is lacking. Our main rationale for using these categorizations is that we wanted to build on the previous similar AHRQ report, but because of the substantial overlap collapsed a few of the categories. Nonetheless, we've inserted a disclaimer about this categorization. Regarding patient safety, this is a valid point. We agree that there may be some overlap with patient safety and effectiveness (which we point out in the report), where the latter would include "performance metrics such as chronic disease outcomes such as glycemic control etc." We have added some discussion to clarify this.
2. Is there any indication of bias in our synthesis of the evidence?	
No	No response needed
No	No response needed
No	No response needed
No	No response needed
No Good description of algorithm for choosing studies. Excellent use of criteria for quality of review and for systematic reporting of findings.	Thank you.
No	No response needed
3. Are there any published or unpublished studies that we may have overlooked?	
No	No response needed
It appears that a thorough literature review was conducted; however I have not done my own lit search on this topic to know if there are additional references	No response needed

REVIEWER COMMENT	RESPONSE
Here are a few suggestions: 1. Williams ES, Konrad TR, Linzer M, et al. Physician, Practice, and Patient Characteristics Related to Primary Care Physician Physical and Mental Health: Results from the Physician Worklife Survey. Health Serv Res 2002;37(1):121-143. 2. Clarke SP, Rockett JL, Sloane DM, et al. Organizational climate, staffing, and safety equipment as predictors of needlestick injuries and near-misses in hospital nurses. Am J Infection Control 2002;30(4):207-216 3. Aiken L, Clarke S, Sloane D, et al. Hospital nurse staffing and patient mortality, nurse burnout, and job dissatisfaction. JAMA 2002;288:1987–1993. 4. Needleman J, Buerhaus P, Mattke S, et al. Nurse-staffing levels and the quality of care in hospitals. NE Journal of Medicine 2002;346(22):1715–1722. 5. Stone PW, Harrison ML, Feldman P, et al. Organizational Climate of Staff Working Conditions and Safety—An Integrative Model. Advances in Patient Safety: From Re-search to Implementation. Volumes 1-4, AHRQ Publication Nos. 050021 (1-4). February 2005. Agency for Healthcare Research and Quality, Rockville, MD. http://www.ahrq.gov/qual/advances/ Volume 2, Concepts & Methodology, pp 467-481 These basic references/syntheses do not appear in the citations, but the first is mentioned on page 10, just not referenced. 1. Institute of Medicine. To Err is Human: Building a Safer Health System. Washington, DC: National Academy of Sciences; 2000. 2. Institute of Medicine. Crossing the Quality Chasm: A New Health System for the 21st Century. Washington, DC: National Academy of Sciences; 2001. 3. Institute of Medicine Committee on the Work Environment for Nurses and Patient Safety. Keeping Patients Safe: Transforming the Work Environment of Nurses. Ann Page, Editor. Washington DC: National Academy of Sciences; 2004.	Thank you for the additional suggested articles. We've pulled all of these references and discuss them here: 1. Williams et al. – this article does not have any patient outcomes that we examine so it does not meet our inclusion criteria. However, the study does relate well to some of our discussion of provider outcomes, so we will make sure this paper is added/discussed in that section. 2. Clarke et al. – this article does not meet our inclusion criteria because it is about needlesticks in hospital settings and deals with nurses' workplace condition (while we focus on MDs, PAs, and NPs only). 3. Aiken et al - this article does not meet our inclusion criteria because it deals with hospital settings and nurses' workplace condition (while we focus on MDs, PAs, and NPs only in primary care settings). 4. Needleman et al – same as #3. 5. Stone et al – we will add this citation to our background/framework section. We only cite the first Institute of Medicine report. We have changed the citation from Kohn et al. to Institute of Medicine.
No If there are other studies, I am not aware of them in the prescribed area of interest. There are studies looking at the effects of working conditions and workload of nurses.	No response needed
No Literature with data/results that I am familiar with has made it into this report.	No response needed

4. Additional suggestions or comments	
While the report concludes that the evidence of an association of working conditions with health care outcomes is often lacking, alternative hypotheses are not explicitly entertained. It may be that health professionals are capable of "buffering" pateints from the effects of adverse working conditions, leading to null or mixed effects.	We have added this caveat.
None, excellent work	Thank you.

p. 5 – 5th paragraph under Conclusions. The first sentence seems to indicate greater job satisfaction is associated with greater workloads and less control over work tasks. The sentence reads "…we found that greater workloads and less control over work tasks resulted in greater provider stress, burnout, and job satisfaction." I would suggest some rewording if this is not the intent. Page 38 – Recommendations for Future Research. This section was weak in comparison to the rest of the report. The content is very general with little specific direction or suggestion of priority areas for future research. Given the focus on general healthcare reform and the budget constraints what we are facing in the VA, the authors may want to speculate on some specific areas or research questions that need addressing to help us prepare for tough times ahead. Are there specific practices or aspects of culture or of the physical environment that their findings would point to as logical next steps for research? Thank you for the opportunity to review this report. I appreciated the detail and the clarity of presentation. This type of work is important as we advance this area of knowledge.	Re pg. 5, 5th paragraph: we've edited this. Re pg. 38: we've added some discussion.
It seems that there would be much overlap between HR, org culture, and physical environment. It is hard to know if some studies may have been overlooked because of the vagueness of these terms. This review will be helpful more to point out the limitations of the current literature, and the lack of clear relationship observed thus far between team staffing, training and function and specific outcomes.	This is a valid point, but we used fairly exhaustive lists of terms for all of these vague constructs, which may be unclear in the main part of the text (though can be seen in our appendices with search terms). We will add some discussion about this.

5. Please provide any recommendations on how this report can be revised to more directly address or assist implementation needs.	
You might consider creating as appendices short checklists or worksheets, designed for use by hospital administrators, safety professionals, and worker teams to help them a) identify working conditions that can adversely impact both employee health and quality/safety of patient care and b) develop interventions to improve those conditions. This is a step beyond standard hazard evaluations, because it would flag conditions most strongly associated with patient outcomes. Many of these would be work organization domains that hazard evaluations do not normally address. These worksheets would help drive hospital interventions to address systems-level problems	We have forwarded your suggestion to the topic nominator. .
This is valuable work as it relates to the healthcare personnel it represents in the clinic setting. Such work is also needed in the acute care settings. Given that the majority of the healthcare workforce is comprised of nurses in acute care settings, I would hope that a similar review would be conducted for acute care and include nurses as part of the population of interest. Studies related to nursing impact are being done but a systematic review has not been conducted and might be valuable as healthcare strives to become more effective with delivery of services and improvement in outcomes.	Thank you. Additional topics (such as acute care settings) can be nominated at the VA ESP Web site: http://www.hsrd.research.va.gov/publications/esp/
I can't help but wonder if other important studies evaluating effect and impact of PCMH have been inadvertently excluded here because did not specifically include the three categories mentioned above.	The evidence group at the Minneapolis VA has reviewed the literature on PCMH for another VA program. To our knowledge there are no additional published reports of PCMH interventions.

APPENDIX D. EVIDENCE TABLES

Appendix D, Table 1. Description of Human Resources Practices Studies – United States

Study Country *Funding Source*	Sample		Study design	Working Conditions Studied[b]	Patient/Provider Outcomes Studied[c]	Study Quality[d]
	Patients[a]	Providers/Clinics				
Castro 2009[37] US *Not Reported*	Convenience sample of 218 Latina patients **Sample** Male: 0% Race/Ethnicity: 86% Mexican Age: 43% 25-32 years	Convenience sample of 15 licensed NPs from 11 urban clinics	Cross-sectional	ii. Training	v. Patient Satisfaction with Provider	1/4
DesRoches 2008[55] US *Robert Wood Johnson Foundation*	N/A	2,758 MDs (62% response rate) from the 2007 AMA file	Cross-sectional	vi. Electronic Medical Records	i. Quality of Care iv. Medication Errors	3/4
Fairchild 2001[51] Boston area *Not Reported*	**Sample** NR	132 MDs with at least 100 months working in hospital affiliated practices in urban area	Cross-sectional	iv. Hours	i. Quality of Care v. Patient Satisfaction with Provider	2/4
Feldstein 2010[56] US – WA/OR *Kaiser Permanente*	Approximately 1,500 diabetes and CVD patients from 2005-2007 **Sample** Male: NR Race/Ethnicity: 7-12 % nonwhite Age (years): 61 (diabetes), 70 (CVD)	15 Kaiser Permanente clinics: 167 PCPs with at least 20 diabetes patients 143 PCPs with at least 20 CVD patients	Retrospective cohort	vi. Electronic Medical Records	i. Quality of Care	4/4
Haas 2006[40] Utah *Health Studies Fund of the Department of Family & Preventive Medicine*	623 patients **Sample** Male: ~30% Race/Ethnicity: NR Age: 52 % 18-50 years	54 MDs and PAs at 7 urban community clinics	Pre-post of repeated cross-sections	i. Training	v. Patient Satisfaction with Provider	3/5

Study Country *Funding Source*	Sample		Study design	Working Conditions Studied[b]	Patient/Provider Outcomes Studied[c]	Study Quality[d]
	Patients[a]	Providers/Clinics				
Linzer 2009[6] US *Agency for Healthcare Research and Quality*	1,795 patients **Sample** Male: 31% Race/Ethnicity: 62% White, 22% Black Age (years): 60	119 clinics in 5 regions (urban & rural): 218 general internists and 204 family practitioners	Cross-sectional	iii. Workload v. Autonomy	i. Quality of Care iii. Non-medication Treatment Errors	3/4
Mundinger 2000[35] US *Division of Nursing, Health Resources and Services Administration, US Department of Health and Human Services; The Fan Fox and Leslie R. Samuels Foundation; and the New York State Department of Health*	1,316 patients **Sample** Male: 25% Race/Ethnicity: 1% White, 9% Black, 85% Hispanic Age (years): 44	5 urban clinics	Randomized trial	i. Skills	v. Patient Satisfaction with Provider	Allocation concealment: No Blinding: Providers were blinded Intention to treat analysis: No Withdrawals adequately described: Yes
Nyweide 2009[49] US *The Commonwealth Fund, National Institute on Aging*	N/A	71,980 PCPs with at least 10 Medicare patients (using Medicare data)	Cross-sectional	iv. Workload	i. Quality of Care	2/4
Parkerton 2003[53] US *Private (BCBS Michigan); Public (Rackam Graduate School; Dept of Health Management and policy U of Michigan)*	N/A	194 family practitioners and general internists from 25 out-patient clinics of a single medical group in western Washington	Cross-sectional	iv. Hours	i. Quality of Care v. Patient Satisfaction with Provider	3/4
Roblin 2004[36] Georgia, USA *Garland Memorial Fund of Kaiser Permanente Medical Care Program*	26,237 Kaiser Permanente Georgia patients (60% response rate) **Sample** Male: 39% Race/Ethnicity: NR Age: 76% 18-54 years	139 MDs, 63 PA/NPs	Cross-sectional	i. Skills	v. Patient Satisfaction with Provider	4/4

Study Country *Funding Source*	Sample		Study design	Working Conditions Studied[b]	Patient/Provider Outcomes Studied[c]	Study Quality[d]
	Patients[a]	Providers/Clinics				
Weiner 2009[57] US *National Institute on Aging*	40,487 referrals **Sample** Male: 33% Race/Ethnicity: 54% non-white Age: 20% 21-39 years	10 PC clinics	Pre-post of repeated cross-sections	vi. Electronic Medical Records	i. Quality of Care	5/5
Zabar 2010[41] US *Public: NYU Student Health Center*	**Sample** NR	21 NYU Student Health Center clinicians (14 MDs, 6 NPs, 1 PA)	Pre-post	ii. Training	i. Quality of Care v. Patient Satisfaction with Provider	4/5

Notes: a. To the extent possible, we report the following descriptive statistics (means/percents) on the main patient sample analyzed: age, gender, race, and veteran status. "NR" means this information was not reported in the study and "N/A" means the statistics were not applicable to the sample studied.

b. We focus on the following human resources practices, noting that each construct may be measured differently across studies:

i. Skills
ii. Training
iii. Workload
iv. Hours/Scheduling
v. Autonomy
vi. Electronic Medical Records or Computerized Systems

c. We focus on the following patient and provider outcomes (vii-viii), noting that each construct may be measured differently across studies:

i. Quality of Care – Clinical Effectiveness or Access
ii. Patient Safety- Diagnostic Errors
iii. Patient Safety – Non-Medication Treatment Errors
iv. Patient Safety – Medication Treatment Errors
v. Patient Satisfaction with Provider
vi. Patient Satisfaction with Clinic/Care
vii. Provider Stress
viii. Provider Satisfaction

d. We assessed study quality in the following ways. For non-randomized studies, we assessed the risk of study bias on the following dimensions: population (e.g., representative, uniform inclusion/exclusion criteria), outcomes (important outcomes assessed and measured, appropriate follow-up), measurement (variables uniformly assessed, blinded, construct valid measures), confounding (design and methods minimize confounding) and whether the intervention can be replicated if applicable. Study quality for these studies is reported as the number of criteria met (where risk was assessed as low) out of the total possible dimensions evaluated for risk. For randomized studies, we assessed study quality based on the four criteria listed.

Abbreviations used: AMA = American Medical Association, CVD = cardiovascular disease, GP = general practitioner, MD = physician, N/A = not applicable, NP = Nurse practitioner, NR = not reported, PA = Physician Assistant, PC = primary care, PCP = primary care provider

Appendix D, Table 2. Description of Human Resources Practices Studies – Europe

Study Country *Funding Source*	Sample		Study design	Working Conditions Studied[b]	Patient/Provider Outcomes Studied[c]	Study Quality[d]
	Patients[a]	Providers/Clinics				
Caldow 2006[32] Scotland *Chief Scientist Office, Department of Health, Scottish Executive*	1,343 randomly selected patients (49% response rate) **Sample** Male: 41% Race: NR Age: 41% 16-44 years	22 practices (55% response rate) in mostly urban areas	Cross-sectional	i. Skills	v. Patient Satisfaction with Provider vi. Patient Satisfaction with Practice/Care	2/4
Campbell 2001[42] England *National Primary Care Research and Development Centre*	4,493 patients (38% response rate) **Sample** NR	60 randomly selected practices across 6 districts in England (80% response rate)	Retrospective cohort	iii. Workload	i. Quality of Care	1/4
Campbell 2005[43] London *North Thames Region of the NHS Executive*	7,247 patients (66% response rate) **Sample** NR	54 volunteer practices (27% response rate) in urban areas	Cross-sectional	iii. Workload	i. Quality of Care	2/4
Carlsen 2006[44] Norway *Research Council of Norway through the Programme for Health Economics*	829 patients **Sample** Male: 29% Race: NR Age (years): 49	41 GPs (23% response rate)	Cross-sectional	iii. Workload	v. Patient Satisfaction with Provider	3/4
Dierick-van Daele 2009[33] Netherlands *Dutch Ministry of Health, Welfare and Sport and the Health Insurances CZ and VGZ, Foundation ROS Robuust, The Province of North-Brabant, the Netherlands*	1,397 patients **Sample** Male: 39% Race: NR Age: 52 % 16 to 45 years	Convenience sample of 12 NPs and 50 GPs in 15 clinics	Randomized controlled trial	i. Skills	vi. Patient Satisfaction with Provider	Allocation concealment: Yes Blinding: No (reported to be impossible for this study) Intention to treat analysis: No Withdrawals adequately described: Yes

Study Country *Funding Source*	Sample		Study design	Working Conditions Studied[b]	Patient/Provider Outcomes Studied[c]	Study Quality[d]
	Patients[a]	Providers/Clinics				
Edwards 2004[38] South Wales *Department of Health, Health in Partnership Programme*	747 patients (44% response rate) **Sample** NR	20 GPs (41% response rate)	Cluster randomized crossover trial	ii. Training	v. Patient Satisfaction with Provider	Allocation concealment: Yes Blinding: Yes (assessors of clinic visits) Intention to treat analysis: No Withdrawals adequately described: No
French 2001[52] UK *Medical Research Council*	661 patients (66% response rate) **Sample** NR	26 GPs in England	Longitudinal (cohort of GPs, repeated cross-sections of patients)	iv. Hours	v. Patient Satisfaction with Provider vi. Patient Satisfaction with Practice/Care	1/4
Grytten 2009[46] Norway *Not reported*	1,920 patients **Sample** Male: 46% Race: NR Age: 51% 16 to 45 years	1,075 GPs	Cross-sectional	iii. Workload	vi. Patient Satisfaction with Practice/Care	4/4
Laurant 2007[34] Netherlands *Private*	117 patients (50% response rate) **Sample** Male: 40% Race: NR Age (years): 63.9	30 GPs, 5 NPs, in 20 clinics	Cross-sectional	i. Skills	v. Patient Satisfaction with Provider	2/4
Luras 2007[47] Norway *Research Council of Norway*	2,326 patients **Sample** Male: 42% Race: NR Age: 47% 16 to 45 years	NR	Cross-sectional	iii. Workload	v. Patient Satisfaction with Provider	4/4

Study Country *Funding Source*	Sample		Study design	Working Conditions Studied[b]	Patient/Provider Outcomes Studied[c]	Study Quality[d]
	Patients[a]	Providers/Clinics				
Magan 2011[48] Madrid, Spain *Spanish Ministry of Health*	102,346 hospitalizations of adults age 65+ **Sample** Male: NR Race: NR Age (years): 77 for men, 81 for women	34 health districts in Madrid	Cross-sectional ecological	iii. Workload	i. Quality of Care	4/4
McKinstry 2007[54] Scotland *Not Reported*	**Sample stats NR**	276 MDs (62% response rate) with at least 49 patient surveys each	Cross-sectional	v. Autonomy	vi. Patient Satisfaction with Practice/Care	1/4
Salisbury 2010[50] UK *NHS Research and Development Programme on Service and Delivery Organisation*	4,573 patients (84% response rate) **Sample** Male: 39% Race: 98% white Age (years): 52	150 GPs in 27 practices in England	Cross-sectional	iii. Workload	v. Patient Satisfaction with Provider vi. Patient Satisfaction with Practice/Care	4/4

Notes: See notes from Appendix D, Table 1

Appendix D, Table 3. Description of Human Resources Practices Studies – Outside of US or Europe

Study Country *Funding Source*	Sample		Study design	Working Conditions Studied[b]	Patient/Provider Outcomes Studied[c]	Study Quality[d]
	Patients[a]	Providers/Clinics				
Dong 2010[45] China *Public (Chinese Ministry of Health (MOH) the United Nations Children's Fund (Unicef)*	20,125 prescriptions **Sample** Male: 57% Race: NR; Age (years): 34	680 primary health clinics from 40 rural counties	Cross-sectional	iii. Workload	iv. Medication Errors	4/4
Goulet 2007[39] Canada *Not Reported*	N/A	51 MDs who participated in a remedial professional development program (RPDP)	Pre-post	ii. Training	i. Quality of Care	3/5

Notes: See notes from Appendix D, Table 1

Appendix D, Table 4. Quality of Care Outcomes - Human Resources Practices Studies

First Author, Year	*HR Practice & Measure*[a]	Access		Effectiveness	
		Measured as:	*Main Finding*	*Measured as:*	*Main Finding*
US STUDIES					
DesRoches 2008[55]	vi. EMR: a)"Full" System – gives warnings, reminders for guideline based care, ability to order tests vs. b)"Basic" System – no order entry capability or clinical decision support	NR	NR	Physician response to: has the EMR ever helped to: a) alert to critical lab value b) provide preventive care c) order a critical laboratory test d) order a genetic test	a) 90% in full system vs. 75% in basic system; (p=0.004) b) 69% in full system vs. 41% in basic system (p<0.001) c) 68% in full system vs. 36 in basic system. (p<0.001) d) 17% in full system vs. 8% in basic system (p=0.03)
Fairchild 2001[51]	iv. Hours- Part time (PT) vs. Full time (FT)	NR	NR	Compliant with quality measure: whether 70% of patients had appropriate screening for Pap smear, mammography, and cholesterol	80% of PT PCPs versus 75% of FT PCPs were compliant (p-value = 0.04)
Feldstein 2010[56]	vi. EMR-electronic tool that identifies care gaps for each patient	NR	NR	"Care score" based on % of care recommendations met by PCPs per member month (out of 100)	After implementation, diabetes care score increased by 7.64 (p<0.001) and CVD care score increased by 5.10 (p<0.001)
Linzer 2009[6]	iii. Workload – time needed per patient/per allotted; chaotic office (0/1) v. Autonomy – work control 14 item scale (0/1)	NR	NR	3 quality indices based on management of 3 chronic conditions: a) hypertension b) diabetes c) heart failure	Greater time pressure yielded slightly lower quality. A chaotic office had no effect on quality. Having greater work control resulted in greater quality.
Nyweide 2009[49]	iii. Workload – Medicare caseload	NR	NR	a) % of appropriate women who get mammograms b) % of diabetics who receive hemoglobin A1c test c) preventable hospitalization rate	Providers with at least a) 328 women, b) 438 diabetics, and c) 19,069 patients are needed to detect a 10% difference in quality of care of Medicare patients relative to the national mean
Parkerton 2003[53]	iv. Hours- continuous measure of MD appointment hours (3 to 35 hours)	NR	NR	a) % of patients receiving cancer (Pap smear and mammography) screening b) % of patients receiving recommended diabetes care	a) Cancer screening coefficient: -0.07 (p=0.01) b) Diabetes management coefficient= -0.11 (p=0.008)
Weiner 2009[57]	vi. EMR – electronic referrals	Getting a specialty appointment scheduled from a referral (0/1)	OR of getting a specialty appointment scheduled increased by 4.32 (p <0.001) after implementation	NR	NR

First Author, Year	*HR Practice & Measure*[a]	**Access**		**Effectiveness**	
		Measured as:	***Main Finding***	***Measured as:***	***Main Finding***
Zabar 2010[41]	ii. Training -communication skills workshops	NR	NR	Chart Audits for documented risk screenings of: a) smoking b) depressed mood c) anhedonia d) sexual activity e) drinking alcohol	Mantel-Haenszel RRs: a) 1.65 (p=0.03) b) 1.40 (p=0.04) c) 1.47 (p=0.01) d) 1.73 (p=0.002) e) 1.77 (p=0.04)
EUROPEAN STUDIES					
Cambell 2001[42]	iii. Workload -booking interval (amount of time between each appointment)			Score based on guideline concordant care for three conditions: a) adult asthma b) angina c) type 2 diabetes mellitus	Mean unadjusted differences between scores of practices with 10+ intervals between appointments and those with 5 minute intervals: a) adult asthma – 21.6 (p <0.001) b) angina – 10.2 (p=0.002) c) type 2 diabetes – 10 (p=0.028)
Campbell 2005[43]	iii. Workload -list size	Two measures created based on patient report of how quickly usually seen after appointment request: a) See doctor the same or next day (0/1) b) See doctor within 2-3 days (0/1)	Correlations: a) -0.37(p=0.007) b) -0.21 (p=0.133)		
Magan 2011[48]	iii. Workload -visits/day	NR	NR	Rate of Ambulatory Care Sensitive Hospitalizations (ACSH)	Each additional patient per workday was associated with 6% to 7% higher relative rate of ACSH (p<0.001)
STUDIES OUTSIDE THE US & EUROPE					
Goulet 2007[39]	ii. Training – participation in a remedial professional development program			Expert physician peer review of medical records on: a) clinical investigation b) diagnostic accuracy c) treatment and follow-up	a) 46% of providers improved in clinical investigation (p<0.001) b) 29% improved in diagnostic accuracy (p=0.01) and c) 36% improved in treatment and follow-up (p<0.001)

Notes: a. We focus on the following human resources practices:

i. Skills
ii. Training
iii. Workload
iv. Hours/Scheduling
v. Autonomy
vi. Electronic Medical Records or Computerized Systems

Abbreviations used: CVD= cardiovascular disease, EMR = electronic medical record, GP = general practitioner, MD = physician, NP = nurse practitioner, NR = not reported, NS = not statistically significant, OR = odds ratio, PA = physician assistant, PCP = primary care provider, RR = relative risk

Appendix D, Table 5. Patient Safety Outcomes – Human Resources Practices Studies

First Author, Year	*HR Practice & Measure*[a]	**Diagnostic Errors**		**Non-Medication Treatment Errors**		**Medication Errors**	
		Measured as:	***Main Finding***	***Measured as:***	***Main Finding***	***Measured as:***	***Main Finding***
US STUDIES							
DesRoches 2008[55]	vi. EMRs: a) Full System-–gives warnings, reminders for guideline based care, ability to order tests vs. b) Basic System – no order entry capability or clinical decision support	NR	NR	NR	NR	Physician report of whether EMR ever helped: 1) prevent drug allergy 2) prevent dangerous medication interaction	1) 80 vs. 66% of MDs in full vs. basic report system helped with drug allergies (p=0.01) 2) 71 vs. 54% of MDs in full vs. basic report system prevented dangerous interactions (p=0.002)
Linzer 2009[6]	iii. Workload: a) time needed/patient/per allotted b) chaotic office (0/1) v. Autonomy a) work control 14 item scale (0/1)	NR	NR	Score based on chart audits to gauge missed treatment opportunities, inattention to behavioral factors, and guideline nonadherence (0/100)	No significant effect of workload on prevention, hypertension or diabetes management errors. Having more autonomy resulted in a lower total error score (more errors) (coefficient = -2.80, (-5.72, 0.12).	NR	NR
STUDIES OUTSIDE THE US & EUROPE							
Dong 2010[45]	iii. Workload -patient visits/month	NR	NR	NR	NR	Polypharmacy (Rx's with 5 or more drugs) per 100 patient-visits/month (0/1)	OR of Polypharmacy w/ higher workload versus less workload = 1.70 [1.26, 2.29]

Notes: a. We focus on the following human resources practices:

vii. Skills
viii. Training
ix. Workload
x. Hours/Scheduling
xi. Autonomy
xii. Electronic Medical Records or Computerized Systems

Abbreviations used: CVD= cardiovascular disease, EMR = electronic medical record, GP = general practitioner, MD = physician, NP = nurse practitioner, NR = not reported, NS = not statistically significant, OR = odds ratio, PA = physician assistant, PCP = primary care provider, RR = relative risk

Appendix D, Table 6. Patient Satisfaction Outcomes – Human Resources Practices Studies

First Author, Year	*HR Practice & Measure*	**Patient Satisfaction with Provider**		**Patient Satisfaction with Practice or Care**	
		Measured as:	***Main Finding***	***Measured as:***	***Main Finding***
US STUDIES					
Castro 2009[37]	ii. Training -NP reported receipt of cultural competence training	Patient Satisfaction Questionnaire (PSQ-III)	Patient satisfaction positively correlated with NP's culture competence training (r=0.32, p-value=NR)	NR	NR
Fairchild 2001[51]	iv. Hours- Part time (PT) vs. Full time (FT)	% of patients surveyed rating PCP as "excellent" or "good"	FT = 92%, PT = 95% (p=0.13)	NR	NR
Haas 2006[40]	ii. Training -90 minute workshop on structuring visits effectively	Patient reported satisfaction scaled from 1 (better) to 5 (worse) based on 30 items	Overall satisfaction: Pre-test= 1.12 Post-test = 1.14 (p = NS)	NR	NR
Mundinger 2000[35]	i. Skills -visit with MD -visit with NP	Satisfaction mean score measured by a 15 item satisfaction survey (5-point scale)	Overall Satisfaction <u>Baseline:</u> MD =4.6; NP = 4.59 (p= 0.89) <u>6 month F/U:</u> MD = 4.46; NP = 4.45 (p=0.87)	NR	NR
Roblin 2004[36]	i. Skills - visit with GP vs. - visit with PA/NP	Practitioner interaction (5 items)	1.16 (p<0.05) times more likely to be satisfied with practitioner interaction when seeing a PA/NP vs. an MD	Care access (4 items)	No significant difference satisfaction with care access whether patient saw an MD vs. PA/NP
Parkerton 2003[53]	iv. Hours- continuous measure of MD appointment hours (3 to 35 hours)	Patient satisfaction = excellent	Coefficient: -0.05 (p=0.21)	NR	NR
Zabar 2010[41]	ii. Training -communication skills workshops	10 point item on satisfaction with patient-provider communication[1]	No change in patient satisfaction after training		
EUROPEAN STUDIES					
Caldow 2006[32]	i. Skills - visit with GP vs. - visit with NP	NR	NR	Survey question on satisfaction with last visit dichotomized to be equal to one if patient reports "excellent" or "very good" satisfaction and 0, otherwise	No significant difference in satisfaction except patients who saw a NP were more satisfied with the amount of time spent with provider than those who saw a GP (p<0.05)

First Author, Year	*HR Practice & Measure*	**Patient Satisfaction with Provider**		**Patient Satisfaction with Practice or Care**	
		Measured as:	***Main Finding***	***Measured as:***	***Main Finding***
Carlsen 2006[44]	iii. Workload -GP listsize/1000	6 point survey question on how satisfied with doctor you visited dichotomized to be equal to one if patient reports "very satisfied" and 0, otherwise	No significant effect of GP listsize on patient satisfaction	NR	NR
Dierick-van Daele 2009[33]	i. Skills - visit with GP vs. - visit with NP	10 point scale (details not reported) on overall patient satisfaction	No significant difference in patient satisfaction across GP vs. NP patients (p=0.83)	NR	NR
Edwards 2004[38]	ii. Training - Shared decision making (SDM) - Risk communication (RC)	Patient satisfaction with the decision made (single item)	No significant effect of either training on satisfaction: SDM coefficient = 0.1 (p=NS) RC coefficient = 0.5 (p=NS)	NR	NR
French 2001[52]	iv. Hours -GPs being "on call" or off duty	General Satisfaction subscale on Consultant Satisfaction Score (CSQ)	Visits surrounding "On call" = 75.6 Visits surrounding "Off duty" 77.1 (p=NS)	Professional Care subscale on CSQ	Visits surrounding "on call" =75.3 Visits surrounding "Off duty" =76.8 (p=NS)
Grytten 2009[46]	iii. Workload -# of consultations per person on the GP's list	NR	NR	Patient response to a) how satisfied with wait time to get an appointment (4 point scale) b) satisfaction with amount of time the GP spent (4 point scale)	Probit coefficients: a) 0.938 (p < 0.05) b) 0.055 (p=0.13)
Laurant 2007[34]	i. Skills - visit with GP vs. - visit with NP	Overall satisfaction using the "Chronically ill patients evaluate general practice" scale (6 point scale)	Satisfaction with: a) GP = 4.1 b) NP = 4.4 (p = 0.03)	NR	NR
Luras 2007[47]	iii. Workload -listsize longer than stated -listsize shorter than stated	Satisfaction (5 point scales) with a) doctor taking questions/ problems seriously b) getting a referral c) length of time with doctor	Longer listsize than stated adjusted ORs: a) 2.0 [0.84 , 4.75] b) 1.03 [0.68, 1.57] c) 0.84 [0.62, 1.16] Shorter listsize than stated adjusted ORs: a) 0.41 [0.23,0.72] b) 0.48 [0.33,0.72] c) 0.63 [0.44, 0.92]	Satisfaction (5 point scales) with a) confidence in treatment prescribed b) waiting time	Longer listsize than stated adjusted ORs: a) 2.17 [0.98,4.82] b) 0.66 [0.51, 0.84] Shorter listsize than stated adjusted ORs: a) 0.46 [0.27, 0.78] b) 1.67 [1.17, 2.39]
McKinstry 2007[54]	vi. Autonomy -control of work on the Morale Assessment in General Practice Index	NR	NR	Patient rating of a) how treated by receptionists b) length of time you have to wait (higher is better)	Correlations (r): a) -0.15 (p=0.02) b) -0.21 (p<0.01)

First Author, Year	*HR Practice & Measure*	Patient Satisfaction with Provider		Patient Satisfaction with Practice or Care	
		Measured as:	***Main Finding***	***Measured as:***	***Main Finding***
Salisbury 2010[50]	iv. Workload -listsize (per 1000 patients)	Overall satisfaction (7 point scale)	Coefficient = 0.01 (p=0.32)	Satisfaction with: a) ability to get an appointment (6 point scale) b) access (0 to 100 scale created from 6 questions about contacting practice, making an appointment)	Coefficients a) 0.13 (p=0.001) b) 0.68 (p=0.25)

Notes: a. We focus on the following human resources practices:

i. Skills
ii. Training
iii. Workload
iv. Hours/Scheduling
v. Autonomy
vi. Electronic Medical Records or Computerized Systems

Abbreviations used: CVD= cardiovascular disease, GP = general practitioner, MD = physician, NP = nurse practitioner, NR = not reported, NS = not statistically significant, OR = odds ratio, PA = physician assistant, PCP = primary care provider, RR = relative risk

Appendix D, Table 7. Description of Organizational Culture Studies

Study Country *Funding Source*	Sample		Study design	Working Conditions Studied	Patient/ Provider Outcomes Studied	Study Quality
	Patients	Providers/Clinics				
Adam 2010[65] US *Not Reported*	N=20 Intervention (n=12) Control (n=8) **Sample** Male: 35% Race: 70% white, 35% black Median age (years): Team care = 49, Usual care = 50	NR	Case-control	vii. Team-based care	ii. Quality of Care -Effectiveness vii. Patient Satisfaction with Care	0/5

Study Country *Funding Source*	Sample		Study design	Working Conditions Studied	Patient/ Provider Outcomes Studied	Study Quality
	Patients	**Providers/Clinics**				
Bean-Mayberry 2003[62] US *Department of Veterans Affairs*	n=971 female veterans (62% of respondents were from women's clinics, 38% from traditional primary care) **Sample** Male: 0% Race: 87% white, 10% black, 3% other Veteran (%): 100 Age (years): 58.3	8 Veterans Affairs Medical Centers in 3 states	Cross-sectional (survey)	ix. Care environment (women's clinic vs. traditional primary care clinic)	vii. Patient Satisfaction with Care	1/5
Boyd 2009[66] US *John A. Hartford Foundation, Agency for Healthcare Research and Quality, National Institute for Aging, Jacob & Valeria Langeloth Foundation, Kaiser-Permanente Mid-Atlantic States, Johns Hopkins HealthCare, Roger C. Lipitz Center for Integrated Health Care*	N=904 **Sample** Male: 45.2% Race: 50% white. 46% African American, 4% other Age (years): 77.6	NR	Cluster-randomized controlled trial	vii. Team-based care	vii. Patient Satisfaction with Care	Allocation concealment: No Blinding: No Intention to treat analysis (ITT): Yes Withdrawals/ dropouts adequately described: Yes
Chomienne 2011[67] Canada Not Reported	N= 319 provided baseline data 376 received psych services **Sample** Male: 30% Age (years): 83.6% (over 25) Race: 94% White, 6% Other Insurance Coverage for psych services: 43.8% No, 32.3% Yes, 23.9% Don't Know Clinic Location: 43% Rural, 57% urban	N/A	Prospective cohort	vii. Team-based care	Patient: ii. Quality of Care - Effectiveness Provider: Physician satisfaction	1/5

Study Country *Funding Source*	Sample		Study design	Working Conditions Studied	Patient/ Provider Outcomes Studied	Study Quality
	Patients	**Providers/Clinics**				
Gilfillan 2010[63] US *Not Reported*	N= 15,310 **Sample** Male: 49.7% Age (years): 73.8 Admissions/1000 members/ year: 283.6 Readmissions/ 1000/year: 46	NR	Pre-post	viii. PCMH	ii. Quality of Care - Effectiveness	2/5
Hogg 2009[68] Canada *Ontario Ministry of Health and LongTerm Care Transition Fund*	N=241 **Sample** Male: 35.3% Age (years): 71.2	NR	Randomized controlled trial	vii. Team-based care	ii. Quality of Care - Effectiveness	Allocation concealment: No Blinding: Yes Intention to treat analysis (ITT): Yes Withdrawals/ dropouts adequately described: Yes
Linzer 2009[6] US *Agency for Healthcare Research and Quality*	N= 1,795 **Sample** Male: 31% Race/Ethnicity: 62% White, 22% Black Age (years): 60	119 clinics in 5 regions (urban & rural) 218 general internists and 204 family practitioners	Cross-sectional	x. Clinic values	ii. Quality of Care - Effectiveness	3/4
Reid 2009[64] US *Group Health Cooperative*	N= 236,604 PCMH clinic (n=8,094) 19 Control clinics (n=228,510) **Sample** Group visit attendance (%): 0.02 Attended self-management support workshops (%): 0.02 Health risk assessment completion (%): 1.8 Pre-visit outreach (%): 1.1 Emergency/urgent care follow-up (%): 6.5	N= 82 83% Response rate **Sample** Male: 16.3%	Prospective pre-post	viii. PCMH	Patient: ii. Quality of Care - Effectiveness vi. Patient Satisfaction with Provider vii. Patient Satisfaction with Care Provider: Staff Burnout	2/5

Study Country *Funding Source*	Sample		Study design	Working Conditions Studied	Patient/ Provider Outcomes Studied	Study Quality
	Patients	**Providers/Clinics**				
Sellors 2003[69] Canada *Health Transition Fund, Health Canada, the Department of Family Medicine, McMaster University, and the Centre for Evaluation of Medicines, St. Joseph's Healthcare, Hamilton, Ont*	N=889 **Sample** Male: 37.2% Race: NR Age (years): 74 Mean length of time with physician: 10.9 years Intervention (Pharmacist consult): n=431 Usual Care: n=458	N=48 agreed to participate Age: NR Male: 67% Race: NR Years since graduation: 21.7 Intervention (Pharmacist consult): n=24 Usual Care: n=24	Randomized controlled trial	vii. Team-based care	v. Medication Errors	Allocation concealment: No Blinding: No Intention to treat analysis (ITT): No Withdrawals/ dropouts adequately described: Yes

Notes: a. To the extent possible, we report the following descriptive statistics (means/percents) on the main patient sample analyzed: age, gender, race, and veteran status. "NR" means this information was not reported in the study and "N/A" means the statistics were not applicable to the sample studied.

b. We focus on the following organizational culture components:

vii. Team-based Care
viii. Patient Centered Medical Home (PCMH)
ix. Care Environment
x. Clinic Values

c. We focus on the following patient and provider outcomes (vii-viii), noting that each construct may be measured differently across studies:

i. Quality of Care – Clinical Effectiveness or Access
ii. Patient Safety- Diagnostic Errors
iii. Patient Safety – Non-Medication Treatment Errors
iv. Patient Safety – Medication Treatment Errors
v. Patient Satisfaction with Provider
vi. Patient Satisfaction with Clinic/Care
vii. Provider Stress
viii. Provider Satisfaction

d. We assessed study quality in the following ways. For non-randomized studies, we assessed the risk of study bias on the following dimensions: population (e.g., representative, uniform inclusion/exclusion criteria), outcomes (important outcomes assessed and measured, appropriate follow-up), measurement (variables uniformly assessed, blinded, construct valid measures), confounding (design and methods minimize confounding) and whether the intervention can be replicated if applicable. Study quality for these studies is reported as the number of criteria met (where risk was assessed as low) out of the total possible dimensions evaluated for risk. For randomized studies, we assessed study quality based on the four criteria listed.

Abbreviations used: GP = general practitioner, MD = physician, N/A = not applicable, NP = Nurse practitioner, NR = not reported, PA = Physician Assistant, PC = primary care, PCMH = patient centered medical home, PCP = primary care provider

Appendix D, Table 8. Quality of Care Outcomes – Organizational Culture Studies

Study	Organizational Culture Practice & Measure	Access		Effectiveness	
		Measured as:	Main Finding	Measured as:	Main Finding
Adam 2010[65]	vii. Team-based Care – care team consisting of weekly team (physician, nurses, and front desk staff)	NR	NR	Median # of Hospitalizations and ER visits	Hospitalizations: Team Care (n=12): Baseline = 0 6 month = 0 Usual Care (n=8): Baseline = 0 6 month = 0 ER visits – Team Care (n=12): 6 months before = 0 6 month = 0.5 Usual Care (n=8): 6 months before = 0.5 6 month = 0.5
Chomienne 2011[67]	vii. Team-based Care – addition of a psychologist to family practice clinic	NR	NR	- Outcome Questionnaire 45 (OQ-45) – standardized symptom distress inventory -EuroQoL(EQ-5D) - and index of health-related quality of life	OQ-45 improved in 60% of patients EQ-5D (quality of life) improved for 83% of patients who completed first and last assessment (n=178; p<0.001)
Gilfillan 2010[63]	viii. PCMH- multi-component intervention	NR	NR	Admissions (members/year) Readmissions (members/year)	Admissions: PCMH = 257 admissions/ 1000 members/ year; -18% [95% CI -30% to -5%; P<0.01] Control= 313 admissions/ 1000 members/ year[§] Readmission: PCMH= 38/1000 members/year; -36% [95% CI, -55 to -3%; p=0.02] Control= 59/1000 members/year[§]
Hogg 2009[68]	vii. Team-based care – Anticipatory and Preventive Team Care (APTCare) consisting of physicians, 1-3 nurse practitioners, and a pharmacist			A Chronic Disease Management (CDM) Quality of Care (QOC) composite score based on 12 indicator processes for 4 chronic diseases (CAD, diabetes, CHF, and COPD)	CDM QOC +9.29%; [p<0.001] Preventive Care +16.5%; [P<0.001]

Study	Organizational Culture Practice & Measure	Access		Effectiveness	
		Measured as:	Main Finding	Measured as:	Main Finding
Linzer 2009[6]	x. Clinic values	NR	NR	Association of clinic values and total quality based on management of: a) hypertension b) diabetes, and c) Preventive care from medical record audits.	Quality emphasis 0.94 (4.07 to 5.95) Information and communication emphasis 4.65 (0.07 to 9.23) Trust in organization 1.88 (2.97 to 6.73) Workplace cohesiveness 0.85 (3.37 to 5.07) Values alignment 1.15 (3.47 to 5.78)
Reid 2009[64]	viii. PCMH multi-component intervention	NR	NR	Contacts/ 1000 members/ year	Admissions (ACSC): PCMH= 12/1000; RR=0.89; P<0.001 Usual Care= 13/1000 members/year Admissions: PCMH=100/1000 members/year RR=1.03 (NS) Usual Care= 100/1000 members/year

Notes: We focus on the following organizational culture components:

i. Team-based Care
ii. Patient Centered Medical Home (PCMH)
iii. Care Environment
iv. Clinic Values

Abbreviations used: ACSC = Ambulatory Care Sensitive Conditions, BP = blood pressure, CAD = coronary artery disease, CHF = congestive heart failure, COPD = chronic obstructive pulmonary disease, ER = emergency room, LDL = low density lipoprotein, LEAP = lower extremity amputation prevention, NS = not statistically significant, PCMH = patient centered medical home, QOC = quality of care

§ Controls are for simulated non-PCMH participants representing the expected outcomes from the active group if the PCMH had never been implemented

Appendix D, Table 9. Patient Safety Outcomes – Organizational Culture Studies

Author, Year	Organizational Culture Practice & Measure	Diagnostic Errors		Non-Medication Treatment Errors		Medication Errors	
		Measured as:	Main Finding	Measured as:	Main Finding	Measured as:	Main Finding
Sellors 2003[69]	vii. Team-based care -Pharmacist consultation with family physician	NR	NR	NR	NR	At least 1 drug related problem identified by the pharmacist	344/431 (79.8%) 2.5 drug related problems/ senior *No comparison data from non pharmacist control

Abbreviations used: NR = not reported

Appendix D, Table 10. Patient Satisfaction Outcomes – Organizational Culture Studies

Author, Year	Organizational Culture Practice & Measure	Patient Satisfaction with Provider		Patient Satisfaction with Practice or Care	
		Measured as:	Main Finding	Measured as:	Main Finding
Adam 2010[65]	vii. Team-based Care – care team consisting of weekly team physician, nurses, and front desk staff)	NR	NR	Patient Self-rated well-being Patient Satisfaction	Patient self-rated well-being: Team based = +8% Usual care = no change Patient Satisfaction: Team based = satisfied or very satisfied increased from 75% at baseline to 92% at 6 months Usual care = "All control patients were very satisfied or satisfied at baseline and follow-up
Bean-Mayberry 2003[62]	ix. Care environment (women's clinic vs. traditional primary care clinic)	NR	NR	Primary Care Satisfaction Survey for Women (PCSSW) a) Overall Satisfaction b) Getting Care c) Privacy/Comfort d) Communication e) Complete Care f) Follow-up Care	Odds Ratios a) OR=1.42(1.00-2.02) b) OR=1.69(1.14-2.49) c) OR=1.63(1.11-2.39) d) OR=1.66(1.16-2.37) e) OR=1.69(1.17-2.43) f) OR=1.70(1.16-2.47)
Boyd 2009[66]	vii. Team Based Care- "Guided Care" RN trained in chronic care integrated into primary care to work with 2-5 physicians	NR	NR	Patient Assessment of Chronic Illness Care (PACIC)	Compared to usual care, patients who received guided were twice as likely to rate chronic care highly (AOR=2.13 [95% CI=1.30 to 3.5 p=0.003)]
Reid 2009[64]	viii. PCMH	Ambulatory Care Experiences Survey (ACES)* *Survey results from n=1,024 at PCMH clinic and n=1,662 at 2 control clinics	ACES (Adjusted mean difference in scores): Quality of GP-patient interactions= 2.12; p<0.01 Shared Decision Making= 2.76; p<0.01 Coordination of Care= 3.38; p<0.001 Access = 3.48; p<0.001	Patient Assessment of Chronic Illness Care (PACIC) survey* -Patient involvement in care -Degree teams helped set and refine goals	PACIC (Adjusted mean difference in scores): Patient Activation/Involvement= 3.30; p<0.01 Goal Setting/Tailoring= 3.10; p<0.05

Notes: We focus on the following organizational culture components:

vii. Team-based Care
viii. Patient Centered Medical Home (PCMH)
ix. Care Environment
x. Clinic Values

Abbreviations used: AOR = adjusted odds ratio, CI = confidence interval, GP = general practitioner, NR = not reported, OR = odds ratio, RN = registered nurse

Appendix D, Table 11. Provider Outcomes – Organizational Culture Studies

Study	Job Stress		Job Satisfaction		Burnout	
	Measured as:	Main Finding	Measured as:	Main Finding	Measured as:	Main Finding
Chomienne 2011[67]	NR	NR	Physician questionnaire on 5 point scale	8/10 doctors reported improved office atmosphere and quality of life at work 7/10 reported improved workload	NR	NR
Linzer 2009[6]	Association with physician rated clinic values: a) Quality emphasis: b) Information and comm. Emphasis: c) Trust in organization: d) Workplace cohesiveness: e) Values alignment:	a) -0.34 (-0.48 to -0.20) b) -0.25 (-0.37 to -0.13) c) -0.31 (-0.43 to -0.19) d) -0.25 (-0.39 to -0.11) e) -0.34 (-0.46 to -0.22)	Association with physician rated clinic values: a) Quality emphasis: b) Information and comm. Emphasis: c) Trust in organization: d) Workplace cohesiveness: e) Values alignment:	a) 0.51 (0.41 to 0.61) b) 0.32 (0.21 to 0.42) c) 0.55 (0.45 to 0.65) d) 0.43 (0.30 to 0.59) e) 0.48 (0.37 to 0.59)	Association with physician rated clinic values: a) Quality emphasis: b) Information and comm. Emphasis: c) Trust in organization: d) Workplace cohesiveness: e) Values alignment:	a) -0.57 (-0.76 to -0.37) b) -0.33 (-0.51 to -0.14) c) -0.51 (-0.69 to -0.34) d) -0.33 (-0.50 to -0.15) e) -0.49 (-0.66 to -0.33)
Reid 2009[64]	NR	NR	NR	NR	Maslach Burnout Inventory	10% of PCMH staff reported emotional exhaustion vs. 30% of control clinics p<0.01

Notes: We focus on the following organizational culture components:

vii. Team-based Care
viii. Patient Centered Medical Home (PCMH)
ix. Care Environment
x. Clinic Values

Abbreviations used: NR = not reported

Appendix D, Table 12. Description of Physical Environment Studies

Study Country *Funding Source*	Sample		Study Design	Working Conditions Studied	Patient/Provider Outcomes Studied	Study Quality
	Patients	Providers/Clinics				
Arneill 2002[71] United States *None Reported*	n=147 college students Male: 27% Race: "majority Caucasian" Age: NR (range 18-24 years) Veteran (%): NR n=48 senior citizens Male: 34% Race: "primarily Caucasian" Age: NR (range 59-90 years) Veteran (%): NR	Slides of 35 waiting rooms (analyzed data from 34 slides)	Case series	Environment (waiting areas)	Perceived quality of care Comfort in environment	0/3 relevant criteria
Rice 2008[70] United Kingdom *Government*	Phase 1, n=1118 Male: 35.1 Race: NR Age (years): 48.8 Phase 2, n=954 Male: 34.8% Race: NR Age (years): 47.8 NOTE: unmatched patients (Phase 1 vs. Phase 2)	n=19 with data from Phase 1 and twice in Phase 2 (4 and 11 months after move); 13 administrative/ reception staff, 6 health professionals Male: 21% Race: NR Age (years): NR	Before and after Patient questionnaire completion rate 80% in both phases	Environment (lighting, sound, space, privacy, furnishings, art)	Patient anxiety, satisfaction Staff well-being, job satisfaction Patient-doctor communication	1/5 relevant criteria

Abbreviations used: NR = not reported