Sharma AE, Rivadeneira NA, Barr-Walker J, Stern RJ, Johnson AK, Sarkar U. Patient engagement in health care safety: an overview of mixed-quality evidence. Health Aff (Millwood). 2018;37(11).

Appendix

Appendix Exhibit A1. Search strategies for all databases.

Database	Search strategy	Number of results
PubMed	(("Patient Participation"[Mesh] OR "patient involvement"[tiab] OR "patient involved"[tiab] OR "patient engagement"[tiab] OR "patient engaged"[tiab] OR "patient participant"[tiab] OR "patient participation"[tiab] OR "patient contribution"[tiab] OR "patient complaint"[tiab] OR "patient report"[tiab] OR "patient reporting"[tiab] OR "patient-empowering"[tiab] OR "patient empowerment"[tiab] OR "patient partnership"[tiab] OR "patient activation"[tiab] OR "patient led"[tiab] OR "patient initiated"[tiab] OR "patient and public involvement"[tiab] OR co-creation[tiab] OR cocreation[tiab] OR co-created[tiab] OR co-create[tiab] OR co-design[tiab] OR codesign[tiab] OR co-designed[tiab] OR "family participation"[tiab] OR "family involvement"[tiab] OR "family engagement"[tiab] OR "family empowerment"[tiab] OR "family partnership"[tiab] OR "family activation"[tiab] OR "caregiver participation"[tiab] OR "caregiver involvement"[tiab] OR "caregiver engagement"[tiab] OR "caregiver empowerment"[tiab] OR "caregiver partnership"[tiab] OR "caregiver activation"[tiab] OR "patient role"[tiab] OR "patient roles"[tiab] OR "patient decision making"[tiab] OR "shared decision making"[tiab] OR "self management"[tiab]) AND ("Adverse Drug Reaction Reporting Systems"[Mesh] OR "Safety Management"[Mesh] OR "Medical Errors"[Mesh] OR "Diagnostic Errors"[Mesh] OR "Medication Errors"[Mesh] OR "Patient Safety"[Mesh] OR "Patient Harm"[Mesh] OR "Iatrogenic Disease/prevention and control"[Mesh] OR "Cross Infection/prevention and control"[Mesh] OR "Risk Assessment"[Mesh] OR "Root Cause Analysis"[Mesh] OR adverse[tiab] OR safe[tiab] OR safety[tiab] OR harm[tiab] OR harms[tiab] OR harmed[tiab] OR harmful[tiab] OR unsafe[tiab] OR "safety management"[tiab] OR "safety monitoring"[tiab] OR "safety monitor"[tiab] OR "adverse reporting"[tiab] OR negligence[tiab] OR negligent[tiab] OR "near miss"[tiab] OR "near misses"[tiab] OR "risk assessment"[tiab] OR "event review"[tiab] OR iatrogenic[tiab] OR iatrogenesis[tiab] OR misdiagnosis[tiab] OR "missed diagnosis"[tiab] OR "drug interactions"[tiab] OR "inappropriate prescribing"[tiab] OR falling[tiab] OR "home safety"[tiab] OR "outdated medication"[tiab] OR "medication reconciliation"[tiab] OR overdos*[tiab] OR underdos*[tiab] OR ((error*[tiab] OR mistake*[tiab]) AND (medical[tiab] OR medication*[tiab] OR diagnos*[tiab] OR prevent*[tiab] OR detect*[tiab] OR disclos*[tiab]))) AND (review[pt] OR review[tw] OR meta-analysis[tw] OR systematic[sb]))	1727

Embase	('patient participation'/exp OR "patient involvement":ab,ti OR "patient involved":ab,ti OR "patient engagement":ab,ti OR "patient engaged":ab,ti OR "patient participant":ab,ti OR "patient participation":ab,ti OR "patient contribution":ab,ti OR "patient complaint":ab,ti OR "patient report":ab,ti OR "patient reporting":ab,ti OR "patient-empowering":ab,ti OR "patient empowerment":ab,ti OR "patient partnership":ab,ti OR "patient activation":ab,ti OR "patient led":ab,ti OR "patient initiated":ab,ti OR "patient and public involvement":ab,ti OR co-creation:ab,ti OR cocreation:ab,ti OR co-created:ab,ti OR co-create:ab,ti OR co-design:ab,ti OR codesign:ab,ti OR co-designed:ab,ti OR "family participation":ab,ti OR "family involvement":ab,ti OR "family engagement":ab,ti OR "family empowerment":ab,ti OR "family partnership":ab,ti OR "family activation":ab,ti OR "caregiver participation":ab,ti OR "caregiver involvement":ab,ti OR "caregiver engagement":ab,ti OR "caregiver empowerment":ab,ti OR "caregiver partnership":ab,ti OR "caregiver activation":ab,ti OR "patient role":ab,ti OR "patient roles":ab,ti OR "patient decision making":ab,ti OR "shared decision making":ab,ti OR "self management":ab,ti) AND ('adverse drug reaction'/exp OR 'cross infection'/exp OR 'medical error'/exp OR 'patient safety'/exp OR 'patient harm'/exp OR 'root cause analysis'/exp OR "adverse event":ab,ti OR "adverse events":ab,ti OR safe:ab,ti OR safety:ab,ti OR harm:ab,ti OR harms:ab,ti OR harmed:ab,ti OR harmful:ab,ti OR unsafe:ab,ti OR "safety management":ab,ti OR "safety monitoring":ab,ti OR "safety monitor":ab,ti OR "adverse reporting":ab,ti OR negligence:ab,ti OR negligent:ab,ti OR "near miss":ab,ti OR "near misses":ab,ti OR "risk assessment":ab,ti OR "event review":ab,ti OR iatrogenic:ab,ti OR iatrogenesis:ab,ti OR misdiagnosis:ab,ti OR "missed diagnosis":ab,ti OR "drug interactions":ab,ti OR "inappropriate prescribing":ab,ti OR ((error*:ab,ti OR mistake*:ab,ti) AND (medical:ab,ti OR medication*:ab,ti OR diagnos*:ab,ti OR prevent*:ab,ti OR detect*:ab,ti OR disclos*:ab,ti))) AND ('review'/it OR review:ab,ti OR meta-analysis:ab,ti)	1647
CINAHL	((MH "Consumer Participation") OR (AB "patient involvement" OR "patient involved" OR "patient engagement" OR "patient engaged" OR "patient participant" OR "patient participation" OR "patient contribution" OR "patient complaint" OR "patient report" OR "patient reporting" OR "patient-empowering" OR "patient empowerment" OR "patient partnership" OR "patient activation" OR "patient led" OR "patient initiated" OR "patient and public involvement" OR co-creation OR cocreation OR co-created OR co-create OR co-design OR codesign OR co-designed OR "family participation" OR "family involvement" OR "family engagement" OR "family empowerment" OR "family partnership" OR "family activation" OR "caregiver participation" OR "caregiver involvement" OR "caregiver engagement" OR "caregiver empowerment" OR "caregiver partnership" OR "caregiver activation" OR "patient role" OR "patient roles" OR "patient decision making" OR "shared decision making" OR "self management")) AND (((MH "Patient Safety") OR (MH "Iatrogenic Disease/PC") OR (MH "Cross Infection/PC") OR (MH "Risk Assessment") OR (MH "Root Cause Analysis")) OR	475

	(AB "adverse event" OR "adverse events" OR safe OR safety OR harm OR harms OR harmed OR harmful OR unsafe OR "safety management" OR "safety monitoring" OR "safety monitor" OR "adverse reporting" OR negligence OR negligent OR "near miss" OR "near misses" OR "risk assessment" OR "event review" OR iatrogenic OR iatrogenesis OR misdiagnosis OR "missed diagnosis" OR "drug interactions" OR "inappropriate prescribing" OR ((AB error* OR mistake*) AND (AB medical OR medication* OR diagnos* OR prevent* OR detect* OR disclos*)))) AND ((AB review OR meta-analysis) OR (TI review OR meta-analysis))	
PsycINFO	((MAINSUBJECT.EXACT("Client Participation")) OR (ALL "patient involvement" OR "patient involved" OR "patient engagement" OR "patient engaged" OR "patient participant" OR "patient participation" OR "patient contribution" OR "patient complaint" OR "patient report" OR "patient reporting" OR "patient-empowering" OR "patient empowerment" OR "patient partnership" OR "patient activation" OR "patient led" OR "patient initiated" OR "patient and public involvement" OR co-creation OR cocreation OR co-created OR co-create OR co-design OR codesign OR co-designed OR "family participation" OR "family involvement" OR "family engagement" OR "family empowerment" OR "family partnership" OR "family activation" OR "caregiver participation" OR "caregiver involvement" OR "caregiver engagement" OR "caregiver empowerment" OR "caregiver partnership" OR "caregiver activation" OR "patient role" OR "patient roles" OR "patient decision making" OR "shared decision making" OR "self management")) AND ((MAINSUBJECT.EXACT("Side Effects (Drug)") OR MAINSUBJECT.EXACT("Side Effects (Treatment)") OR MAINSUBJECT.EXACT("Patient Safety") OR MAINSUBJECT.EXACT("Risk Assessment")) OR (ALL adverse OR safe OR safety OR harm OR harms OR harmed OR harmful OR unsafe OR "safety management" OR "safety monitoring" OR "safety monitor" OR "adverse reporting" OR negligence OR negligent OR "near miss" OR "near misses" OR "risk assessment" OR "event review" OR iatrogenic OR iatrogenesis OR misdiagnosis OR "missed diagnosis" OR "drug interactions" OR "inappropriate prescribing" OR ((ALL error* OR mistake*) AND (ALL medical OR medication* OR diagnos* OR prevent* OR detect* OR disclos*)))) AND (ALL review OR meta-analysis)	390
Cochrane Library	("patient involvement" OR "patient involved" OR "patient engagement" OR "patient engaged" OR "patient participant" OR "patient participation" OR "patient contribution" OR "patient complaint" OR "patient report" OR "patient reporting" OR "patient-empowering" OR "patient empowerment" OR "patient partnership" OR "patient activation" OR "patient led" OR "patient initiated" OR "patient and public involvement" OR co-creation OR cocreation OR co-created OR co-create OR co-design OR codesign OR co-designed OR "family participation" OR "family involvement" OR "family engagement" OR "family empowerment" OR "family partnership" OR "family activation" OR "caregiver participation" OR "caregiver involvement" OR "caregiver engagement" OR "caregiver empowerment" OR "caregiver partnership" OR "caregiver activation" OR "patient role" OR "patient roles" OR "patient decision making" OR "shared decision making" OR "self management")	191

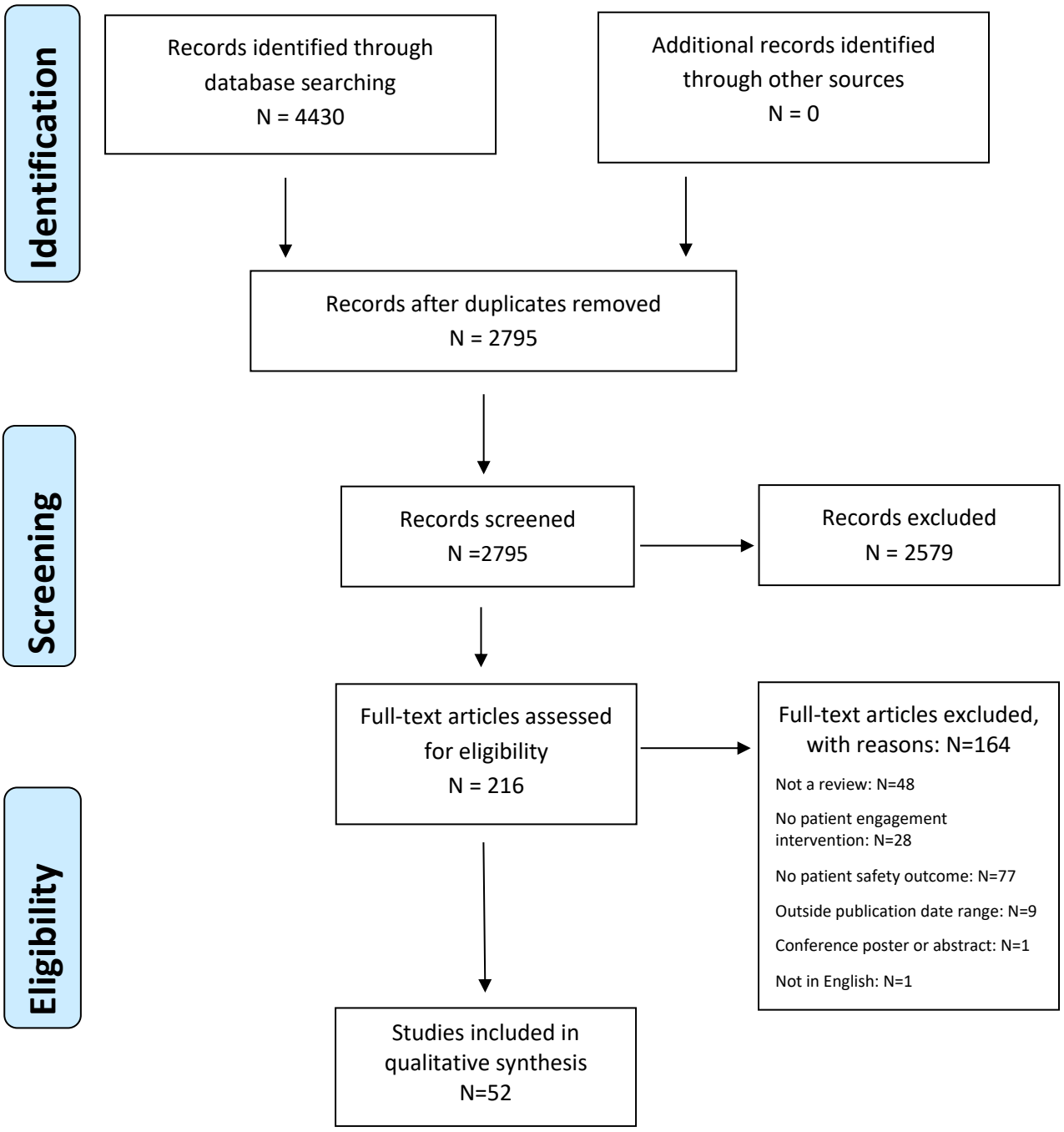
	AND (adverse OR safe OR safety OR harm OR harms OR harmed OR harmful OR unsafe OR "safety management" OR "safety monitoring" OR "safety monitor" OR "adverse reporting" OR negligence OR negligent OR "near miss" OR "near misses" OR "risk assessment" OR "event review" OR iatrogenic OR iatrogenesis OR misdiagnosis OR "missed diagnosis" OR "drug interactions" OR "inappropriate prescribing" OR ((error* OR mistake*) AND (medical OR medication* OR diagnos* OR prevent* OR detect* OR disclos*)))	
Total number of results		4430
Total number of duplicates		1339
Total number of results after de-duplication		3091

NOTES: All searches were conducted on February 13, 2018. No language or date limits were used.

Appendix Exhibit A2. Inclusion and exclusion criteria

Include
1. Self-identified review
2. Intervention includes the involvement of patients/families/caregivers in their own care in the individual level or the system level
3. Comparison group is usual care or non-engaged patients
4. Outcome measures patient safety event, either quantitatively or qualitatively
5. Article published in English language
6. Study setting in any country
Exclude
1. Not a review
2. Intervention does not involve patient engagement
3. Outcome does not track patient safety outcomes
4. Published before 2007 or after 2017
5. Conference poster or abstract
6. Not related to health care
7. The original review that this review is updating
8. No summary estimates provided

Appendix Exhibit A3. PRISMA flowchart



SOURCE: Adapted from Moher et al[17]

Appendix Exhibit A4. Exhibit 1, expanded. Summary of included studies, evidence, and review quality

SAFETY TARGET/CONDITION		PATIENT ENGAGEMENT INTERVENTION	REVIEW STUDY QUALITY WITH APPLICABLE STUDIES (AMSTAR 8-11 = HIGH quality; 4-7 = MEDIUM; 0-3 = LOW quality)	APPLICABLE STUDIES (with reference)	READINESS FOR BROAD SCALE ADOPTION	RESEARCH GAPS
Anticoagulation management/Prevention of bleeding, thromboembolism, mortality related to anticoagulant use		Patient self-monitoring of INR (patient self-testing with clinic-directed dose adjustment). Patient self-management (patient self-testing and patient-directed dose adjustment)	High:(11: Garcia; 10: Ryan; 9: Wells, Bloomfield 2011a; 8: Heneghan 2016, Christensen); Medium: (7: Sharma 2015a and 2015b, Heneghan 2012; 6: Heneghan 2006; 5: Medical Advisory Secretariat, Bloomfield 2011b); Low: (3: Cumberworth; 2: Pozzi; 0: Swedish Council, Cayley, Koerfer)	1) Self-monitoring and self-management: Reduced clot (Heneghan 2016; Cumberworth, Bloomfield 2011[a,b], Cayley, Garcia, Heneghan 2006); Reduced mortality (Cumberworth, Garcia, Cayley, Heneghan 2006); Mixed effect on bleed (Cumberworth mixed, Cayley (reduction in minor bleed), Heneghan 2006 null). 2) Self-management alone: Reduced clot (Sharma[a,b], Ryan Secretariat, Swedish); Reduced mortality (Ryan, Christensen), null on bleeding (Swedish), improved time in therapeutic range (Pozzi), fewer "major complications" (Christensen). 3) Self-monitoring alone: Reduced clot (Heneghan 2012, Wells), reduced mortality (Heneghan 2012, Wells) and Null on bleed (Heneghan 2012). 4) Self testing/self-management is non-inferior (Bloomfield VA); self-efficacy associated with fewer bleeds and clots (Koerfer)	High readiness for adoption; however, most studies had some parameters for patient and provider eligibility. Up-front distribution costs of self-management devices and clinic communication infrastructure must be considered.	Barriers to implementation for patients and providers are unexplored; research needed to assess if anticoagulation can be extrapolated to other high-risk medications such as insulin or antiarrhythmics.
Diabetes/Prevention of hypoglycemia		Digital apps/tools; self-management education; patient activation interventions	High: (8: Wu, Bolen). Low: (1: Iqbal)	Wu: Apps have mixed effect for reducing hypoglycemia in type 1 and type 2 (3/4 trials null; 1/4 trials showed reduction); Bolen: Patient activation interventions had a null impact on hypoglycemia for type 2; Iqbal: Self-management education prevents hypoglycemia and DKA in type 1 DM.	Limited and may only be impactful for type 1 DM; lack of insurance reimbursement may impede implementation of patient self-management interventions	Robust meta-analyses are needed to explore safety outcomes for of digital tools or apps; only 1 review addressed digital self-management.
Medication safety	Medication adherence	Medication self-monitoring and self-management programs, pharmacist education, simplified dosing regimens	High (10: Ryan); Medium (6: Williams; 5: Vermeir); Low (0: Bourbeau)	Ryan: Various education and self-management programs may benefit med adherence; Williams: Patient education improves adherence; Vermeir 2017: Patient access to online notes improves adherence; Bourbeau: Patient education improves COPD treatment adherence.	High readiness for adoption; easy tools to support patient education for med adherence are not currently disseminated	Research on education to support caregiver medication administration is needed
	Pharmacovigilance and other adverse events	Patient reporting of adverse events/post-marketing medication adverse events	Medium: (6: Harrison, Gilbert; 5: Lang; 4: Ward, Blenkinsopp, Inacio), to Low (2: Avery; 1: Kinnunen; 0:Berrewaerts)	Patients report more expansive adverse events than healthcare providers (Harrison, Gilbert, Lang, Blenkinsopp, Inacio, Kinnunen, Berrewaerts); Patient reporting is feasible (Ward, Avery)	Is already implemented in many European countries. US-based systems will require adaptations in EMR or links between FDA and providers to improve direct patient reporting.	Prospective trials needed for how actual patient reporting translates into long-term reduction or prevention of future adverse events
	Medication admin-istration errors	Patient education, patient monitoring	Medium (5: Mira; 4: CADTH; 4: Kim; Low (1: Schwappach, Woodward)	Mira: Patients commit med errors 19-59% of the time; CADTH: Family discharge education reduced home med preparation errors; Kim: Patient education and patient-led medication reconciliation improved medication administration safety and medication accuracy; Schwappach: Patients/families can participate in reducing chemotherapy administration errors; Woodward: Patient engagement reduces medication errors	Need for integration between prescriber and pharmacist medication education; current lack of accountability for who provides home medication education	Home and community-based studies needed, such as integrated trials between pharmacy and medication prescribers
Administrative errors/Errors in patient chart		Patients access EMR-portal to review and correct medication lists; schedule appointments; community engagement	High (9: Mold); Medium (5: Vermeir); Low (3: Zhao, 0: Leonhardt)	Mold: Patient portal was associated with twice as many corrections to the medication list; Vermeir: Patient portal access to notes can reduce administration errors; Zhao: Portal access reduces no-shows and wrong appointment	High readiness for adoption as most EMRs have built-in patient portals; must account for HIPAA and online security as well as	Prospective trials lacking that correlate patient portal access with medication safety

			type; Leonhardt: Community engagement/education can reduce patient med list discrepancies	limited English proficiency or lower digital literacy	outcomes or correlation with diagnostic errors
Diagnostic error	Patients/families question a diagnosis or seek a second opinion from a new provider	High (8: Payne)	Payne: Patient pursuit in a second opinion can change diagnosis, treatment and prognosis (10-62%)	Low readiness; more research needed	Lack of gold standards for diagnosis; limited research in general on diagnostic error and the patient experience; research needed to explore how providers can be notified about a diagnostic error
Malpractice lawsuits	Shared decision-making tools	High (8: Durand)	Durand: There is insufficient evidence for shared decision-making tools to reduce malpractice suits	Low readiness; emerging area	Need for patient and caregiver involvement in review of malpractice lawsuits to identify upstream contributors
Hospital readmissions/High morbidity chronic conditions: CHF, COPD, Pneumonia	Community health worker support; post-discharge symptom self-monitoring and self-management; patient and family discharge education	Medium (7: Domingo, Mackie; 6: Ditewig; 5: Burke; 4: CADTH, Moriartes)	Domingo: Structured discharge (w patient engagement) had no effect on pneumonia readmissions; Mackie: Family engagement had modest reduction on readmissions; Ditewig: Impact of self-management is unknown for CHF readmissions; Burke 2014: Patient self-monitoring and self-managing symptoms after d/c reduced readmissions (disease-agnostic); CADTH: Community health workers had null impact on hospital readmission, but reduction in subgroup of those who were already re-admits; Moriates: Patient education and patient activation reduce readmissions	While results are mixed, there are net positive moderate quality results for positive impact of patient self-monitoring and self-management post-discharge.	Role of family education/support and health coaches/navigators/health workers merits more research with discrete safety outcomes
Healthcare associated infection	Patients educated and supported to monitor health workers and to request them to wash hands	Medium (7: Butenko); Low (2: McGuckin; 1: Woodward; 0: Landers).	Butenko and Berger: Patients can participate in hand hygiene; McGuckin: Patient education for hand hygiene engagement resulted in lower healthcare-acquired infections; Woodward: Patient participation improves hand hygiene; Landers: Patient engagement increases hand hygiene	Currently limited as there has been little assessment of absolute reduction in infections	Prospective trials to evaluate healthcare-acquired infections is needed; work needed to explore how to overcome identified barriers and facilitators to patient capacity to "speak up"
Pressure Ulcers	Self-management; patient notification of providers for warning signals for ulcers	Low (3: Tung)	Tung: There is low-to-moderate effectiveness in self-management technologies for reducing risk factors for pressure ulcer development	Limited, but enhancing mechanisms for patients to report pressure ulcer warning signs is low-risk and may be appropriate for long-term care settings	Research needed to address patient education, implementation facilitators and barriers

Notes: INR: International Normalized Ratio, DKA: Diabetic ketoacidosis, DM: Diabetes mellitus, COPD: Chronic obstructive pulmonary disease, US: United States, EMR: Electronic medical record, FDA: Food and Drug Administration, HIPAA: Health Insurance Portability and Accountability Act, CHF: Congestive heart failure.

Appendix Exhibit A5. Reviews on anticoagulation management

High Quality

1. Garcia-Alamino JM, Ward AM, Alonso-Coello P, Perera R, Bankhead C, Fitzmaurice D, et al. Self-monitoring and self-management of oral anticoagulation. Cochrane Database Syst Rev. 2010 Apr 14;(4):CD003839.

2. Ryan R, Santesso N, Lowe D, Hill S, Grimshaw J, Prictor M, et al. Interventions to improve safe and effective medicines use by consumers: an overview of systematic reviews. Cochrane Database Syst Rev. 2014 Apr 29;(4):CD007768.

3. Wells, P. S., Brown, A., Jaffey, J., et al. Safety and effectiveness of point-of-care monitoring devices in patients on oral anticoagulant therapy: a meta-analysis. Open medicine : a peer-reviewed, independent, open-access journal. 2007;1(3):e131-46.

4. Bloomfield HE, Krause A, Greer N, Taylor BC, MacDonald R, Rutks I, et al. Meta-analysis: effect of patient self-testing and self-management of long-term anticoagulation on major clinical outcomes. Ann Intern Med. 2011 Apr 5;154(7):472–82.

5. Heneghan, C J, Garcia A, J M, Spencer, E A, et al. Self-monitoring and self-management of oral anticoagulation. The Cochrane database of systematic reviews. 2016 Jul 5;7:Cd003839.

6. Christensen, T D, Johnsen, S P, Hjortdal, V E, et al. Self-management of oral anticoagulant therapy: a systematic review and meta-analysis. International journal of cardiology. 2007 May 16;118:54–61.

Medium Quality

7. Sharma, P, Scotland, G, Cruickshank, M, et al. Is self-monitoring an effective option for people receiving long-term vitamin K antagonist therapy? A systematic review and economic evaluation. BMJ Open. 2015 Jun 25;5:e007758.

8. Sharma, P, Scotland, G, Cruickshank, M, et al. The clinical effectiveness and cost-effectiveness of point-of-care tests (CoaguChek system, INRatio2 PT/INR monitor and ProTime Microcoagulation system) for the self-monitoring of the coagulation status of people receiving long-term vitamin K antagonist therapy, compared with standard UK practice: systematic review and economic evaluation. Health technology assessment (Winchester, England). 2015 Jun;19:1–172.

9. Heneghan, C J, Ward, A, Perera, R, et al. Self-monitoring of oral anticoagulation: systematic review and meta-analysis of individual patient data. Lancet (London, England). 2012 Jan 28;379:322–34.

10. Heneghan, C J, Alonso C, P, Garcia A, J M, et al. Self-monitoring of oral anticoagulation: A systematic review and meta-analysis. Lancet. 2006;367:404–11.

11. Medical Advisory Secretariat. Point-of-Care International Normalized Ratio (INR) Monitoring Devices for Patients on Long-term Oral Anticoagulation Therapy: An Evidence-Based Analysis. Ont Health Technol Assess Ser. 2009;9(12):1–114.

12. Bloomfield, H E, Taylor, B C, Krause, A, et al. VA Evidence-based Synthesis Program Reports. Safe and Effective Anticoagulation in the Outpatient Setting: A Systematic Review of the Evidence. 2011;

Low Quality

13. Cumberworth A, Mabvuure NT, Hallam M-J, Hindocha S. Is home monitoring of international normalised ratio safer than clinic-based monitoring? Interact Cardiovasc Thorac Surg. 2013 Feb;16(2):198–201.

14. Pozzi, M., Mitchell, J., Henaine, A. M., et al. International normalized ratio self-testing and self-management: improving patient outcomes. Vascular health and risk management. 2016;12:387–92.

15. Swedish Council on Health T, Assessment. SBU Systematic Review Summaries. Self-Testing and Self-Management of Oral Anticoagulation. 2007;

16. Cayley Jr, W. E. Self-monitoring and self-management of anticoagulation therapy. American Family Physician. 2011;84(3):266–8.

17. Koerfer R, Reiss N, Koertke H. International normalized ratio patient self-management for mechanical valves: is it safe enough? Curr Opin Cardiol. 2009 Mar;24(2):130–5.

Appendix Exhibit A6. Reviews on diabetes management/prevention of hypoglycemia

High Quality

1. Bolen SD, Chandar A, Falck-Ytter C, Tyler C, Perzynski AT, Gertz AM, et al. Effectiveness and safety of patient activation interventions for adults with type 2 diabetes: systematic review, meta-analysis, and meta-regression. J Gen Intern Med. 2014 Aug;29(8):1166–76.

2. Wu, Y, Yao, X, Vespasiani, G, et al. Mobile App-Based Interventions to Support Diabetes Self-Management: A Systematic Review of Randomized Controlled Trials to Identify Functions Associated with Glycemic Efficacy. JMIR mHealth and uHealth. 2017 Mar 14;5:e35.

Low Quality

3. Iqbal A, Heller SR. The role of structured education in the management of hypoglycaemia. Diabetologia. 2018 Apr;61(4):751–60.

Appendix Exhibit A7. Reviews on medication safety

Medication adherence

High Quality

1. Ryan R, Santesso N, Lowe D, Hill S, Grimshaw J, Prictor M, et al. Interventions to improve safe and effective medicines use by consumers: an overview of systematic reviews. Cochrane Database Syst Rev. 2014 Apr 29;(4):CD007768.

Medium Quality

2. Williams A, Manias E, Walker R. Interventions to improve medication adherence in people with multiple chronic conditions: a systematic review. J Adv Nurs. 2008 Jul;63(2):132–43.

3. Vermeir P, Degroote S, Vandijck D, Van Tiggelen H, Peleman R, Verhaeghe R, et al. The patient perspective on the effects of medical record accessibility: a systematic review. Acta Clin Belg. 2017 Jun;72(3):186–94.

Low Quality

4. Bourbeau J, Bartlett SJ. Patient adherence in COPD. Thorax. 2008 Sep;63(9):831–8.

Pharmacovigilance and adverse events reporting

Medium Quality

5. Harrison, R, Walton, M, Manias, E, et al. The missing evidence: a systematic review of patients' experiences of adverse events in health care. International journal for quality in health care : journal of the International Society for Quality in Health Care. 2015 Dec;27:424–42.

6. Gilbert, A, Ziegler, L, Martland, M, et al. Systematic Review of Radiation Therapy Toxicity Reporting in Randomized Controlled Trials of Rectal Cancer: A Comparison of Patient-Reported Outcomes and Clinician Toxicity Reporting. International journal of radiation oncology, biology, physics. 2015 Jul 1;92:555–67.

7. Lang, S, Velasco G, M, Heintze, C. Patients' views of adverse events in primary and ambulatory care: a systematic review to assess methods and the content of what patients consider to be adverse events. BMC family practice. 2016 Jan 27;17:6.

8. Ward, J K, Armitage, G. Can patients report patient safety incidents in a hospital setting? A systematic review. BMJ quality & safety. 2012 Aug;21:685–99.

9. Blenkinsopp, A, Wilkie, P, Wang, M, et al. Patient reporting of suspected adverse drug reactions: a review of published literature and international experience. British journal of clinical pharmacology. 2007 Feb;63:148–56.

10. Inacio, P, Cavaco, A, Airaksinen, M. The value of patient reporting to the pharmacovigilance system: a systematic review. British journal of clinical pharmacology. 2017 Feb;83:227–46.

Low Quality

11. Avery, A J, Anderson, C, Bond, C M, et al. Evaluation of patient reporting of adverse drug reactions to the UK "Yellow Card Scheme": literature review, descriptive and qualitative analyses, and questionnaire surveys. Health technology assessment (Winchester, England). 2011 May;15:1–234, iii–iv.

12. Kinnunen U-M, Sarantob K. It is time for self-incident-reporting for patients and their families in every health care organization: a literature review. Stud Health Technol Inform. 2013;192:92–6.

13. Berrewaerts J, Delbecque L, Orban P, Desseilles M. Patient Participation and the Use of Ehealth Tools for Pharmacoviligance. Front Pharmacol. 2016;7:90.

Medication administration errors

Medium Quality

14. Mira JJ, Lorenzo S, Guilabert M, Navarro I, Pérez-Jover V. A systematic review of patient medication error on self-administering medication at home. Expert Opin Drug Saf. 2015 Jun;14(6):815–38.

15. CADTH Rapid Response Reports. Patient- and Family-Centered Care Initiatives in Acute Care Settings: A Review of the Clinical Evidence, Safety and Guidelines. 2015.

16. Kim, J M, Suarez C, C, Berger, Z, et al. Evaluation of Patient and Family Engagement Strategies to Improve Medication Safety. The patient. 2017 Aug 9.

Low Quality

17. Schwappach DLB, Wernli M. Medication errors in chemotherapy: incidence, types and involvement of patients in prevention. A review of the literature. Eur J Cancer Care (Engl). 2010 May;19(3):285–92.

18. Woodward HI, Mytton OT, Lemer C, Yardley IE, Ellis BM, Rutter PD, et al. What Have We Learned About Interventions to Reduce Medical Errors? Annual Review of Public Health. 2010 Mar;31(1):479–97.

Appendix Exhibit A8. Reviews on administrative errors

High Quality

1. Mold, F, de L, S, Sheikh, A, et al. Patients' online access to their electronic health records and linked online services: a systematic review in primary care. The British journal of general practice : the journal of the Royal College of General Practitioners. 2015 Mar;65:e141-51.

Medium Quality

2. Vermeir P, Degroote S, Vandijck D, Van Tiggelen H, Peleman R, Verhaeghe R, et al. The patient perspective on the effects of medical record accessibility: a systematic review. Acta Clin Belg. 2017 Jun;72(3):186–94.

Low Quality

3. Zhao P, Yoo I, Lavoie J, Lavoie BJ, Simoes E. Web-Based Medical Appointment Systems: A Systematic Review. Journal of Medical Internet Research. 2017;19(4):e134.

4. Leonhardt, K K. HRET patient safety leadership fellowship: the role of "community" in patient safety. American journal of medical quality : the official journal of the American College of Medical Quality. 2010 Jun;25:192–6.

Appendix Exhibit A9. Reviews on diagnostic errors

High Quality

1. Payne VL, Singh H, Meyer AND, Levy L, Harrison D, Graber ML. Patient-initiated second opinions: systematic review of characteristics and impact on diagnosis, treatment, and satisfaction. Mayo Clin Proc. 2014 May;89(5):687–96.

Appendix Exhibit A10. Reviews on malpractice lawsuits

High Quality

1. Durand, M A, Moulton, B, Cockle, E, et al. Can shared decision-making reduce medical malpractice litigation? A systematic review. BMC health services research. 2015 Apr 18;15:167.

Appendix Exhibit A11. Reviews on hospital readmissions

Medium Quality

1. Domingo, G. R., Reyes, F. C., Thompson, F. V., et al. Effectiveness of structured discharge process in reducing hospital readmission of adult patients with community acquired pneumonia: A systematic review. JBI library of systematic reviews. 2012;10(18):1086–121

2. Mackie, Benjamin R., Mitchell, Marion, Marshall, Prof Andrea. The impact of interventions that promote family involvement in care on adult acute-care wards: An integrative review. Collegian. 2018;25(1):131–40.

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Appendix Exhibit A12. Reviews on hospital acquired infections

Medium Quality

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Low Quality

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Appendix Exhibit A13. Reviews on pressure ulcers

Low Quality

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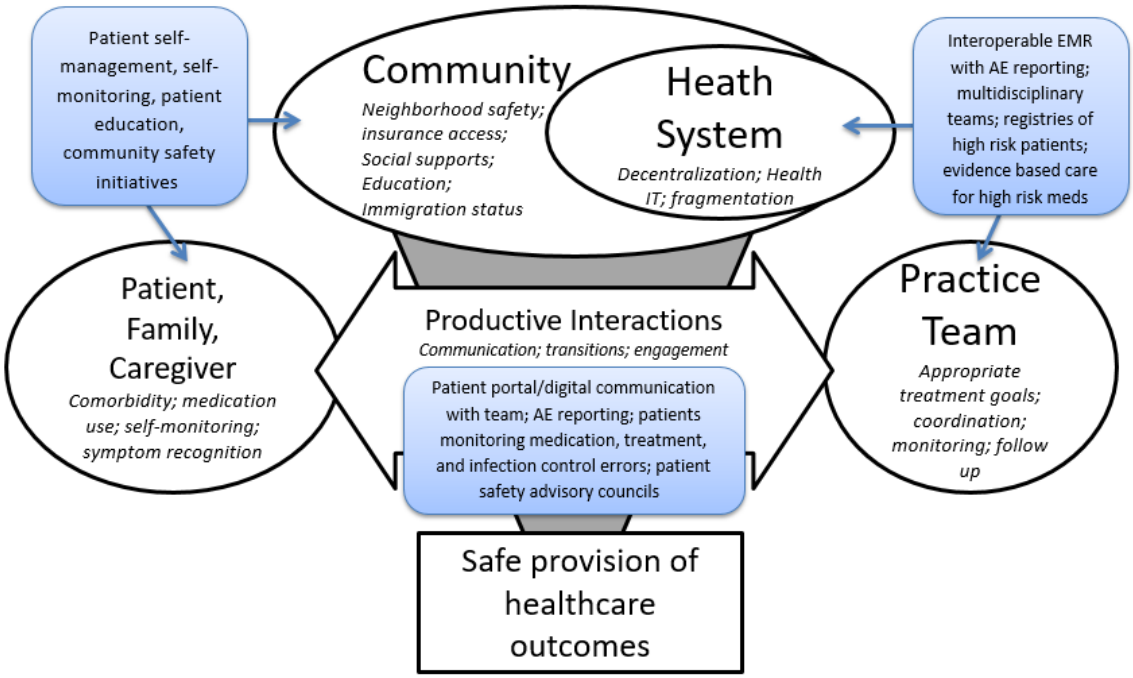
Appendix Exhibit A14. Conceptual map of ecological model of patient engagement within care safety applying the Wagner chronic care model.



SOURCE: Adapted from Sarkar et al. (note 2 in the text)