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Remote Patient Monitoring and Hospital Readmissions in Adults with Chronic Diseases: A Critical Narrative Review of Clinical Effectiveness, Implementation, and Evidence Gaps

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ABSTRACT: Hospital readmissions are a major problem in chronic-disease care. RPM can capture physiological data and symptoms between visits but effects depend on clinical response, patient selection and outcomes studied.

Objective: To critically evaluate whether RPM reduces readmission after index discharge, distinguish direct readmission evidence from broader hospitalization outcomes and prioritize implementation, safety, economic and research needs.

Methods: This focused narrative review identified relevant randomized comparisons, evidence syntheses and implementation studies from PubMed indexed records and publisher sources through 22 October 2026. Literature selection was purposive; informed by SANRA; not exhaustive nor independently duplicate screened. No new meta-analysis was performed; systematic risk-of-bias assessment or GRADE evaluation were not conducted.

Results: A 2025 meta-analysis of 40 trials across noncommunicable diseases found fewer patients hospitalized with RPM (RR 0.86, 95% CI 0.77–0.95; low certainty evidence). In a 2026 synthesis of 79 heart failure trials lower total heart-failure hospitalization (incidence rate ratio 0.81, 95% CI 0.72–0.91) and first heart-failure hospitalization (RR 0.82, 95% CI 0.76–0.88) were reported but major post discharge heart failure trials showed no reduction in all cause readmission and COPD findings are inconsistent. In diabetes glycemic outcomes have been improved more consistently than readmission outcomes. Comparisons are limited by monitoring modalities used, follow up and endpoint definitions.

Conclusions: Remote patient monitoring reduces hospitalizations for heart failure when combined with a timely accountable clinical response service but not 30-day all-cause readmission across chronic diseases (COPD mixed; diabetes glycemic outcomes more often than readmission). COPD results are inconclusive and diabetes evidence is usually about glycemic outcomes rather than readmission. Future research should specify index discharges and outcome windows, fidelity of intervention, adverse effects, resource requirements, burden on patients and equity.

1. INTRODUCTION

Chronic diseases (heart failure, COPD, diabetes mellitus, chronic kidney disease and combinations of these conditions) have large ongoing care needs and are prone to acute deterioration. After discharge from hospital patients frequently change medication, follow up is incomplete, symptoms fluctuate and access to timely clinical advice is difficult; unplanned readmission is therefore an important measure of care continuity although this is also influenced by severity of disease, social circumstances, local thresholds for admission and quality of available community services. RPM involves repeated collection of physiological or symptom data outside the clinic and transmission to clinicians or automated care management platform (blood pressure, body weight, heart rate, oxygen saturation, glucose, respiratory symptoms and device-derived hemodynamic data). RPM differs from video consultation in that its contribution is serial information which may trigger action; it differs from predictive monitoring which may identify deterioration but does not necessarily modify treatment [1, 2, 3, 4]. The rationale is clinically attractive. When weight gain, congestion, hypoxemia, symptom escalation or unstable glycemia is identified before severe decompensation occurs then a coordinated care team might arrange titration of medication, rapid outpatient review, self-management support or emergency assessment. But more data collection alone does not guarantee these actions will happen nor does it prove that every avoided disease specific admission will be translated into fewer all-cause hospitalizations. Evidence base includes positive trials and prominent null findings [5, 6, 7, 8, 9].

This review addresses three questions: (1) does RPM prevent readmission after index discharge? How does this differ from impact on subsequent hospitalization more broadly?

(2) which features of RPM services and their clinical context plausibly modify effectiveness? (3) what evidence, operational safeguards and equity measures are needed for responsible implementation?

The contribution of this narrative review is an outcome focused interpretation across conditions rather than another pooled estimate of heterogeneous digital interventions.

2. REVIEW APPROACH AND SCOPE

A focused narrative literature search was conducted in October 2026 on PubMed-indexed publications and publisher article pages using "remote patient monitoring", "telemonitoring", "telehealth", hospital readmission, rehospitalization, hospitalization, heart failure, COPD, diabetes, chronic kidney disease, multimorbidity, randomized trial and meta-analysis terms; evidence cutoff date was 22 October 2026. Studies were identified purposively (with selected citation trails and landmark trials) supplemented by other citation trails and landmark trials; date stamped complete search log, exact Boolean strings executed and number of screened records were not retained in the manuscript documentation. Thus, this section does not claim reproducible or exhaustive search. Adult chronic-disease populations were prioritized and studies reporting 30-day all-cause readmission outcomes, other defined readmission outcomes or clearly identifiable hospitalization outcomes were included. Randomized comparative studies were emphasized for causal effectiveness claims; systematic reviews were used to situate individual trials but overlapping syntheses were not treated as independent evidence. Studies of stable ambulatory monitoring, invasive hemodynamic monitoring and telephone-supported transitional care were retained only with population, intervention and endpoint distinctions made. Feasibility, economic and equity studies informed implementation discussion but not as direct proof of reduced readmission. The review does not purport to retrieve everything; omissions and selection bias are possible. It is a critical narrative review rather than a systematic review. No multi-database search was done; duplicate eligibility screening, formal risk-of-bias scoring, new pooled analysis or author-generated GRADE assessment was performed. Therefore, no PRISMA study-flow diagram or invented screening totals are shown. SANRA is informed by explicit review aims (transparent account of purposive literature identification), balanced interpretation of positive and null trials (10) and acknowledgement of methodological constraints [10]. Effect estimates are reproduced from cited sources and not recalculated independently. Certainty labels where shown are those assigned by cited systematic-review authors.

3. HOW RPM MIGHT INFLUENCE READMISSION

RPM might work in a five-stage pathway (data acquisition, transmission of meaningful change to clinician, interpretation by clinician, therapeutic/supportive response timely after intervention). Failure at any stage can nullify the clinical benefit of the preceding steps. Weight or symptom trends are useful only if thresholds are clinically relevant, readings reliable, alerts sent to accountable team and that team can arrange treatment before emergency admission is needed [4]. 30-day all-cause readmission requires clearly identifiable index hospital discharge and records subsequent inpatient admission within 30 days; it differs from disease specific readmission, first hospitalization in stable outpatient cohort, total/recurrent admissions count over long follow up, days lost to hospitalization or death, composites incorporating mortality; denominators differ, competing risks and clinical meanings vary so they should not be used interchangeably. A post discharge randomized study with prespecified 30-day all-cause readmission provides most direct evidence for title question; broader utilization endpoints remain relevant but indirect. Table 4 summarizes operational differences.

4. CLINICAL EVIDENCE ACROSS CHRONIC CONDITIONS

4.1 Heart failure: the best studied condition

Heart failure is the condition for which RPM has been most studied. Early large randomized trials were sobering. In Tele-HF, 1653 patients recently hospitalized with heart failure received either interactive telephone-based monitoring or usual care; readmission/death by 180 days occurred in 52.3% and 51.5% of intervention and usual care groups respectively (no significant difference) [5]. The multicenter BEAT-HF trial randomized 1437 recently hospitalized patients and found similarly no effect on 180-day all-cause readmission: 50.8% in intervention vs 49.2% with usual care (adjusted hazard ratio 1.03, 95% CI 0.88–1.20) [6]. These trials make it clear that a plausible monitoring pathway does not guarantee a detectable benefit on readmission in routine clinical populations. Structured clinical support has produced promising endpoint-specific signals but not yet robust

results. In TIM-HF2 telemedical management in selected heart-failure patients reduced the proportion of days lost to unplanned cardiovascular hospitalization or all-cause death (4.88% vs 6.64%; ratio 0.80, 95% CI 0.65–1.00; reported p=0.046) [7]. This borderline significant combined measure is not the proportion readmitted after 30 days with all cause nor evidence that monitoring technology drove benefit. MONITOR-HF studied invasive pulmonary-artery pressure guided treatment in a subset and cannot be extrapolated to routine non-invasive home monitoring [11]. Recent evidence syntheses show positive effect on heart-failure specific utilization but preserve important distinctions between outcomes: A 2024 synthesis of 16 trials after acute decompensated heart failure found lower all-cause and heart failure hospitalizations with home-based monitoring RR 0.82 and 0.75 respectively [12]. A 2025 synthesis of 41 non-invasive RPM trials (n = 16,312) estimated lower odds of first heart-failure hospitalization (OR 0.78 [95% CI 0.70–0.87]) with education, self-management and video contact identified as potentially useful components [13]. Scholte and colleagues pooled 79 randomized trials in 2026 and found fewer total hospitalizations for heart failure (incidence rate ratio [IRR] 0.81), fewer first heart failure hospitalizations (RR 0.82) and lower all-cause mortality (RR 0.90) although subgroup analyses could not reliably identify a particular demographic group to which the benefit was confined [3]. A further 2026 systematic review estimated lower heart-failure hospitalization (RR 0.781, 95% CI 0.710–0.859) but not all-cause hospitalization (RR 0.959, 95% CI 0.892–1.031) and reported important limits to certainty and transportability [14]. Reviews [3,12–14] have many underlying randomized trials; their positive pooled findings are not four independent replications. The substantive conclusion is therefore endpoint specific: structured RPM can reduce some heart failure hospital use but evidence is still lacking that it reduces 30 day all cause readmission after discharge.

4.2 Chronic obstructive pulmonary disease

Heterogeneous and context dependent effects. COPD has high recurrent exacerbation burden but a less consistent RPM literature. The multicenter PROMETE II trial randomized 229 people with severe stable COPD and found no significant reduction in COPD related emergency visits or hospital admissions over one year [15]. Chromed trial also did not improve time to first hospitalization or the principal health-status outcome (although exploratory analysis showed fewer repeat hospitalizations) [16]. Exploratory secondary results should not replace null primary results. In contrast, a Danish randomized trial of 222 patients recruited during hospitalization for COPD exacerbation found less total exacerbation-related hospitalizations over six months with telemonitoring (42 episodes monitored group vs 66 in usual care), but no statistically significant difference in proportion hospitalized or time to first admission [17]. A nursing led randomized study in 2025 showed fewer readmissions after 12 weeks package including home monitoring weekly tele counselling and breathing/exercise support; since components were delivered together the independent contribution of monitoring cannot be disentangled [18]. Wider evidence is mixed. Systematic review of 12 randomized digital-intervention trials for COPD in 2024 found positive effects in four studies but most others had no clear admission benefit [19]. Another review of telemonitoring in heart failure and/or COPD noted heterogeneity in population, technology and risk of bias [20]. So selective deployment of COPD after a high-risk exacerbation is reasonable but must be integrated with a clinically actionable exacerbation plan not replaced by guideline-based respiratory care.

4.3 Diabetes

Better monitoring doesn't necessarily mean fewer readmissions. Glucose telemonitoring and CGM can support post discharge glycemic surveillance, medication review/education and identification of hypoglycemia or hyperglycemia but evidence for better glucose related intermediate outcomes should not be translated into unsupported claims about hospital use. A 2026 scoping review of 20 studies of diabetes-related transitional telehealth care found significantly improved glycated hemoglobin in seven of 13 studies that assessed it (but only three of 14 studies reporting readmissions had a significant reduction) [21]. Many included interventions were telephone RPM rather than device RPM so direct generalization is limited even further.

A small feasibility study recently showed that continuous glucose monitoring (CGM) plus telehealth follow-up could be done after discharge but was single-arm and not designed to estimate a causal effect on readmission [22]. Diabetes-specific RPM is better supported at present as an adjunct to safe glycemic management and care transitions rather than as an independent readmission-prevention intervention. Studies should measure severe hypoglycemia, treatment-related adverse events and all-cause readmission in addition to glycemic control.

4.4 chronic kidney disease, hypertension and other long-term conditions

For chronic kidney disease and hypertension remote blood pressure, fluid-status and symptom monitoring may support longitudinal treatment adjustments but the evidence selected for this review does not show a robust randomized effect on 30-day all-cause readmission after an index hospitalization. Many studies focus on physiological control among stable outpatients not readmission avoidance. This gap in evidence is a limitation of this purposive narrative evidence set and should not be taken as proof of ineffectiveness. Future research should stratify by CKD stage, dialysis status, treatment change, multimorbidity and admission cause.

4.5 Multimorbidity and high-risk transitions of care

In eCOBAHLT 534 older adults with multiple chronic conditions received a 12-month sensor-enabled tele surveillance package plus geriatric and general practice support or usual care. Unplanned hospitalization for chronic-disease decompensation occurred in 40.4% versus 48.7% (adjusted RR 0.72, 95% CI 0.51–0.94) [8]. This is evidence on specified 12-month disease-decompensation hospitalization outcome in multicomponent program but not on 30 day all cause readmission attributable solely to sensors.

Dawson and colleagues studied high-risk patients after discharge and found a lower 30-day composite of readmission or death with telemonitoring (18.2% versus 23.7%; RR 0.77, 95% CI 0.61–0.98) using modified intention-to-treat analysis [9]. Since the analytic groups excluded some randomized participants, the reported effect needs interpretation carefully. These studies imply that baseline risk and a deliberate transition-of-care service are plausible effect modifiers but leave open scalability questions and relative contribution of individual program elements.

4.6 Cross-condition interpretation

Evidence for readmission vs hospitalization. Across diagnoses the pattern is outcome specificity not treatment success or failure; 79-trial synthesis of heart-failure shows lower heart-failure admission rates but Tele-HF and BEAT-HF directly contradict the claim that RPM reliably prevents all-cause readmission in recently discharged HF patients [3,5,6]. The cross-disease 2025 pooled estimate refers to proportion hospitalized not proportion readmitted within 30 days after qualifying discharge [2].

For COPD a signal for fewer recurrent exacerbation admissions in one trial exists alongside unchanged probability of first event and negative primary results elsewhere [15–19]. In diabetes telephone and device-enabled transitional care are often combined which weakens attribution of any readmission reduction specifically to devices [21,22]. Evidence is limited for readmission focused CKD or hypertension populations. Multimorbidity studies show integrated transitional care might be useful although monitoring effect cannot be disentangled from accompanying clinical support [8,9].

These results suggest RPM should be evaluated as an interconnected service not an isolated platform. A causal chain could start with an at-risk, willing patient; valid and transmitted data; meaningful alert; timely interpretation by accountable team; access to effective treatment; measurable downstream clinical outcome. Breakdowns at any stage could explain null findings even if technically successful monitoring is achieved. The implementation specifications in Table 3 are evaluation criteria (not validated clinical decision rules) and Table 4 separates the different endpoint definitions.

Table 1. Selected primary comparative studies and their implications for readmissions.

Study; population/design	Intervention and time horizon	Main reported utilization finding	Interpretive qualification
Chaudhry et al., 2010 [5]; 1,653 postdischarge HF patients; RCT	Automated telephone symptom/weight reporting; 180 days	Readmission/death 52.3% with telemonitoring vs 51.5% with usual care; no significant difference	Composite includes mortality; technology and care response matter
Ong et al., 2016 [6]; 1,437 postdischarge HF patients; RCT	Non-invasive devices plus nurse coaching; 180 days	All-cause readmission 50.8% vs 49.2%; adjusted HR 1.03 (0.88–1.20)	Direct negative evidence for all-cause readmission reduction

Study; population/design	Intervention and time horizon	Main reported utilization finding	Interpretive qualification
Koehler et al., 2018 [7]; HF; RCT	Structured telemedical care; 12 months	Days lost to unplanned CV admission/death 4.88% vs 6.64%	Composite outcome is not 30-day all-cause readmission
Tchalla et al., 2025 [8]; 534 older multimorbid adults; RCT	Sensor-enabled surveillance plus geriatric support; 12 months	12-month unplanned hospitalization for chronic-disease decompensation: 40.4% vs 48.7%; adjusted RR 0.72	Multicomponent care; selective high-risk population
Dawson et al., 2021 [9]; high-risk discharges; RCT	Nurse-reviewed vital signs; 30 days	Readmission/death 18.2% vs 23.7%; RR 0.77	Modified intention-to-treat; composite outcome
Soriano et al., 2018 [15]; 229 stable severe COPD; RCT	Home telehealth; 12 months	No significant reduction in COPD emergency visits/admissions	Stable ambulatory patients; not a postdischarge readmission trial
Walker et al., 2018 [16]; older COPD/comorbidities; RCT	Lung-function telemonitoring; 9 months	No difference in time to first hospitalization	Exploratory repeat-admission signal not confirmatory
Andersen et al., 2024 [17]; 222 AECOPD discharges; RCT	Daily symptoms/physiology and alerts; 6 months	42 vs 66 total AECOPD admissions; first-admission risk not significantly different	Recurrent episodes and proportion readmitted are different outcomes
Köksal and Durgun, 2025 [18]; COPD; RCT	Counselling, exercise and home monitoring; 12 weeks	Reported significant readmission reduction	Multicomponent intervention; cannot isolate device effect

Abbreviations: AECOPD, acute exacerbation of COPD; CV, cardiovascular; HF, heart failure; HR, hazard ratio; RCT, randomized controlled trial; RR, relative risk. Values and endpoint descriptions are reproduced from the cited studies; no new analysis was performed. The studies are illustrative rather than an exhaustive evidence inventory.

Table 2. Recent evidence syntheses: endpoints and certainty should not be conflated.

Source	Population/evidence	Reported effect	Interpretation
Smedslund et al., 2025 [2]	40 RCTs across noncommunicable diseases	Proportion hospitalized: RR 0.86 (95% CI 0.77–0.95)	Low-certainty evidence; hospitalization is broader than postdischarge readmission
Clemente et al., 2024 [12]	16 RCTs after acute decompensated HF	All-cause hospitalization RR 0.82; HF hospitalization RR 0.75	Relevant to postdischarge HF; pooled estimates may reflect varied monitoring models
De Lathauwer et al., 2025 [13]	41 non-invasive HF RCTs; 16,312 patients	First HF hospitalization OR 0.78 (95% CI 0.70–0.87)	Module-specific findings are exploratory comparisons across trials

Source	Population/evidence	Reported effect	Interpretation
Scholte et al., 2026 [3]	79 HF RCTs; 31,669 patients	Total HF hospitalization IRR 0.81; first HF hospitalization RR 0.82	Mixed modalities include invasive monitoring and telephone support
Muller Ferreira and Muller, 2026 [14]	65 HF RCTs reviewed; 59 poolable	HF hospitalization RR 0.781; all-cause hospitalization RR 0.959 (not significant)	Separates disease-specific benefit from uncertain all-cause utilization
Mishra et al., 2024 [19]	12 randomized COPD digital-intervention studies	Four reported a positive readmission effect	Qualitative summary; technologies and outcomes differ
Lee et al., 2026 [21]	20 diabetes transitional-care studies	Readmission reduction significant in 3/14 studies reporting outcome	Many were telehealth rather than device-based RPM

Abbreviations: IRR, incidence rate ratio; OR, odds ratio. The included systematic reviews overlap in primary studies; their pooled results should not be added, averaged, or treated as independent replications. Any certainty terminology refers to the source review, not a new GRADE assessment performed for this article.

Table 4. Definitions and evidentiary relevance of commonly reported hospital-utilization outcomes.

Endpoint	Operational definition	Relevance to 30-day all-cause readmission claim
30-day all-cause readmission	Any inpatient readmission within 30 days of a specified index hospital discharge, irrespective of cause.	Direct, provided capture is complete and endpoint prespecified.
Disease-specific readmission	Postdischarge admission within defined follow-up attributed to the index disease.	Partial; excludes other causes of admission.
First hospitalization	Occurrence of a first hospital admission during follow-up, sometimes without an index discharge.	Indirect if the population was not recruited at discharge.
Recurrent/total hospitalization	Number or rate of admissions over follow-up, potentially multiple per patient.	Different estimand; event rate cannot be equated with proportion readmitted.
Hospitalization/death composite	Composite combining inpatient admission, death, or days lost to either event.	Interpret components; not a pure readmission endpoint.
Physiologic or predictive outcome	Change in biomarkers, monitored values, or prediction accuracy.	Does not itself establish prevention of readmission.

5. WHY EFFECTIVENESS VARIES BETWEEN RPM PROGRAMS

First, intervention intensity matters: a data-only platform, an automated symptom questionnaire, daily nurse-reviewed measurements and invasive pressure-guided specialist management are all commonly called RPM but involve very different fidelity of diagnosis and response capacity. A clinically useful intervention must match the measured signal to action that can

change the direction of deterioration (e.g., patient weight alone may be nonspecific; serial symptoms, individualized trends, timely medication access may make an alert actionable). Too high thresholds produce false alarms and alarm fatigue. Second is comparator. "Usual care" varies across countries, institutions and publication eras. A system already providing rapid specialist review, home visits, telephone advice and early follow-up might get less incremental benefit from RPM than one with fragmented discharge care. Apparent intervention effectiveness may then reflect whether RPM supplies a missing clinical service rather than just information value of digital measurement. Third enrollment risk and timing affect absolute benefit available. Programs after acute exacerbation may see more avoidable deterioration than long-term programs in stable low-risk outpatients. But high baseline risk can also be frailty, severe comorbidity or social barriers that no monitoring service can readily reverse. Risk-stratified allocation should therefore take clinical instability, ability to respond, symptom recognition needs and personal preference into account rather than an administrative risk score alone. Fourth participation is variable. In BEAT-HF only about half of intervention patients transmitted readings on more than half of monitored days at six months [6]. Connectivity, burden of device, cognitive impairment, language barriers, caregiver involvement and competing illness all affect adherence. Analysis restricted to active users may introduce selection bias because those who engage often differ from those who don't. Intention-to-treat results should remain central. Fifth analytic choices change the apparent result. Disease specific recurrent-event counts may improve even if probability of any readmission doesn't; mortality can compete with hospitalization and an intervention that makes patients live longer may create time at risk for admission. Comparisons of 30-, 90-, 180- and 365-day endpoints need explicit definitions and baseline denominators. Composite outcomes should be disaggregated whenever possible [3, 5, 6, 14].

6. IMPLEMENTATION AS A CLINICAL SERVICE

Deployment success depends on service specification — before device procurement teams should define population, target adverse event, clinical owner, parameter collected, transmission frequency acceptable to team, alert threshold and time within which response required (threshold without escalation plan is not a care pathway). Nurses, pharmacists, primary-care clinicians, cardiologists and respiratory specialists can all be involved but responsibility for reviewing alerts and changing therapy must be defined [4]. Enrollment at or soon after discharge provides hands-on training, medication reconciliation and personalized action plan. First post discharge week is critical for troubleshooting device errors, checking understanding and access to prescriptions and scheduled follow-up. For patients with multiple conditions an integrated protocol avoids multiple incompatible applications and repetitive alerts. Devices should be chosen for clinical usefulness, accessibility, validated measurement performance and integration into existing records (not novelty alone). Two-level triage system (routine trend review for stable data and prioritized assessment of sustained or clinically important abnormalities) can balance safety and workload: Routine trend review for stable data; Priority assessment of sustained or clinically important abnormality. Alarm thresholds should be tailored and audited regularly for false positives, false negatives, missed transmissions, delayed clinician response and inappropriate escalation. Services must record completion of response not just number of alerts sent. Patient-reported symptoms have to be kept important because physiologic sensors can be normal during relevant deterioration and technical faults can give misleading readings. RPM is not a substitute for emergency services. Patients need to know that new severe breathlessness, chest pain, collapse, profound confusion or other red flag symptoms require immediate conventional assessment regardless of device readings. Protocols also need contingency procedures for loss of electricity, internet access, staffing or device availability (alternative telephone contact; clear route back to standard care). A practical evaluation sequence is (1) identify patients discharged recently with plausible preventable deterioration; (2) choose measurements for which response pathway exists; (3) assign clinician/team and deadline; (4) document whether alerts resulted in treatment or reassurance; and (5) compare prespecified readmission safety and resource outcomes with appropriate usual-care group. These are implementation proposals not trial thresholds. Care pathways should be locally approved before use in clinical practice.

Table 3. Proposed minimum specifications and evaluation indicators for clinically actionable RPM.

Domain	Minimum operational specification	Suggested evaluation indicator
Eligibility	Document index diagnosis/discharge, baseline risk, exclusion factors, capacity and preferences	Enrollment/decline rates by risk group and sociodemographic subgroup

Domain	Minimum operational specification	Suggested evaluation indicator
Measurement	Select validated parameters linked to a clinical decision, with calibrated devices and planned frequency	Valid data-days; missing-data rate; patient burden
Alert management	Define patient-specific thresholds, reviewer, backup coverage and escalation deadline	Median time from alert to review and to completed clinical action
Clinical response	Enable medication adjustment, urgent appointment, community visit or emergency referral	Proportion of actionable alerts with documented intervention
Safety and privacy	Obtain consent, use secure transmission, test emergency and downtime procedures	Adverse events; false reassurance; device failures; privacy incidents
Effectiveness	Predefine 30-/90-day all-cause readmissions and disease-specific events, plus death	Risk difference, RR/HR, recurrent admissions and days alive out of hospital
Value and equity	Cost staffing and equipment; offer accessible or non-digital alternatives	Cost per patient; cost per readmission prevented; subgroup effects and dropout

7. EQUITY, PATIENT EXPERIENCE, SAFETY AND ECONOMIC VALUE.

Unequal access can reduce effectiveness as well as fairness. A 2025 analysis of 119 RPM publications quantified 11 dimensions of digital equity and found inclusive practices reported inconsistently [23]. Patients without broadband coverage, poor digital literacy, sensory disability, language mismatch, cognitive impairment or housing insecurity may be excluded at enrollment or become non-users early on. Excluding these participants from effectiveness analyses can overestimate benefit in routine practice and widen existing disparities. Equitable RPM therefore requires accessible hardware (translated guidance if needed), direct technical assistance where possible, caregiver participation with patient consent and an alternative for those unable or unwilling to use a device. Reports should separate access, enrollment, adherence, alert response and hospitalization outcomes by relevant groups while preserving privacy. Digital inclusion is not achieved just by giving everyone a device. Economic evaluation must distinguish between disease specific admissions reduced versus net financial savings. Program costs include devices, software, training, connectivity, clinical alert review staff cover cybersecurity additional visits treatment changes. A 2025 systematic review showed favourable cost-effectiveness results in six of seven evaluations of mobile active monitoring [24], but conditions and service models were heterogeneous so cannot directly prove cost-effectiveness of postdischarge heart-failure or COPD RPM. Future evaluations should prespecify payer/society perspective, time horizon, complete costs, incremental cost-effectiveness, budget impact, patient outcomes and uncertainty. Harms include alert fatigue from frequent abnormal readings; anxiety from too many alarms; emergency referrals for unnecessary reasons; privacy breaches; false reassurance after missed alerts. In some patients access and reassurance may outweigh burdens but these are not always rigorously measured. Patient experience, self-efficacy, caregiver workload and treatment burden need to be collected along with hospitalization metrics. Monitoring intensity needs to be re-assessed when no longer clinically useful.

8. A RESEARCH AGENDA FOR READMISSION-FOCUSED RPM

The definitive readmission-focused trial will enroll adults at or just before index discharge; randomize to a monitoring plus-response pathway (or well specified usual care) or a priori prespecified endpoint; and prespecify 30-day unplanned all-cause readmission as primary endpoint. Follow up should include out-of-network inpatient admissions where possible, deaths competing outcomes, emergency visits and 90-day recurrent admissions. Prespecified secondary endpoints should be disease specific admissions, days alive and out of hospital, health-related quality of life adverse events treatment burden comprehensive health-service costs. Sample size must be based on plausible baseline risk of readmission and an explicitly clinically meaningful effect not pooled nonequivalent hospitalization endpoints. Individually randomized pragmatic trials might offer the clearest causal comparison; cluster randomized or stepped wedge approaches may be appropriate when contamination/rollout makes individual allocation impossible but secular time trends and clustering are addressed (provided). Studies should report intention-

to-treat effects, uptake, missed transmissions, escalation time, medication or service changes, adverse events, subgroup analyses defined upfront and composite vs component outcomes. Factorial/dismantling designs could separate device signals from coaching, pharmacist input and specialist response. Newer methods (adaptive thresholds, multimodal wearables, ML prioritization) need evidence that better prediction leads to safer action (fewer admissions). In a 2023 randomized device-assignment study activity patterns collected remotely after discharge improved prediction of 30-day readmission or death when incorporated into models but predictive accuracy is not proof that an alert-based intervention prevents an event [1]. Deployment studies must evaluate calibration drift, differential performance, clinician workload and consequences of false alerts in the real world. International research (e.g., health systems with limited specialist capacity or broadband coverage) is needed too. A 2026 heart-failure meta-analysis found only two of 59 pool able trials reported formal rural–urban comparisons so firm conclusions about geographic equity cannot be drawn [14]. Research should also take into account patient groups most likely to need human support rather than evaluating only technologically confident volunteers. Conceptual synthesis: RPM implementation should be measured through six linked stages (1) high-risk patient and index discharge identifiable; reliable measurement and transmission; clinically meaningful detection; named team with response deadlines; available and completed treatment and (6) outcome measured using a pre-defined definition. A program may succeed technically at stage 2–3 but fail clinically at stage 4–6. This is an interpretive model derived from the reviewed studies; it has not been prospectively validated.

9. STRENGTHS AND LIMITATIONS OF THIS NARRATIVE REVIEW

This narrative review combines landmark randomized comparisons, recent syntheses and implementation literature but explicitly separates readmission from first hospitalization, recurrent events and mortality composites; its central originality is an endpoint- and response pathway-based interpretation framework for RPM. Limitations are targeted identification rather than systematic identification (complete search strings or screening counts unavailable), no duplicate selection (no risk-of-bias or GRADE assessment original to this article), no independent recalculation of effect sizes (possible omitted or selectively emphasized evidence), overlapping participants between published meta-analyses. Disease-specific conclusions should not be assigned formal certainty ratings by this article. Editorial verification note (remove before submission): All newly revised text is highlighted yellow. The 24 references remain; this was not a source-by-source audit of every reference or reported numeric estimate. Authors must verify each primary-source endpoint and statistic, exact literature search documentation and remaining declaration placeholders before submission.

10. CONCLUSIONS

Remote patient monitoring should be considered as a coordinated clinical response service not just a stand-alone data-transmission device. Evidence shows some reductions in heart-failure-specific hospitalizations but no reduction in 30-day all-cause readmission across chronic diseases (COPD results are mixed; diabetes interventions more consistently improve glycemic outcomes; direct readmission evidence for CKD and hypertension is limited in this review). Responsible deployment needs an index discharge and outcome, accountable alert-to-action pathways, missed deterioration and other harms assessment, complete costs, burden and equity. Clinically relevant question is whether reliable monitoring enables timely care that changes patient outcomes.

Author and Ethics Declarations

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