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REVIEWS

COMMUNITY PARAMEDICINE AND MOBILE INTEGRATED HEALTH FOR CARDIOVASCULAR RISK AND HEART FAILURE: AN ANALYSIS AND SYNTHESIS OF EVIDENCE ON OUTCOMES

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ABSTRACT

The objective of this narrative review was to synthesize evidence on how community paramedicine and mobile integrated health programs have been implemented to assess and manage cardiovascular risk and heart failure in community and home-based settings, and to assess reported effects on health care utilization, adherence-related outcomes, and feasibility of care delivery. PubMed/MEDLINE was searched for English-language, human-subject literature published from January 2016 through January 2026, with the final search completed February 28, 2026. Eligible studies described community paramedicine or mobile integrated health interventions addressing cardiovascular risk assessment, heart failure-related monitoring, or cardiopulmonary post-discharge care in community or home-based settings and reported patient-level clinical, utilization, adherence, feasibility, or implementation outcomes. Studies focused exclusively on non-cardiovascular conditions, emergency response-only care, protocols, conference abstracts, non-peer-reviewed reports, or program descriptions without outcomes were excluded. The search identified 44 PubMed/MEDLINE records, and citation linking identified 12 additional records. Twenty-nine sources were included, including eight core empirical studies prioritized for model-based synthesis. No formal risk-of-bias tool was applied; study quality was considered narratively according to design, comparison group, sample size, follow-up duration, outcome definition, and potential confounding. Three intervention models predominated: post-discharge home-based follow-up, community-based screening and linkage, and high-utilizer home-visit programs. Post-discharge follow-up demonstrated heterogeneous effects on utilization, with more consistent reductions in targeted, higher-risk populations and programs with defined visit frequency and escalation pathways. Screening programs showed improvements in intermediate cardiovascular risk factors and modest reductions in emergency medical services use, although downstream utilization effects were variable. Feasibility of paramedic-led cardiovascular assessment and follow-up was consistently demonstrated. Results highlight the need for future research to clarify the effectiveness of community paramedicine and mobile integrated health programs in cardiovascular care. Key limitations include single-database searching, single-reviewer screening, and absence of formal risk-of-bias assessment.

INTRODUCTION

Burden of Cardiovascular Disease and Heart Failure

Cardiovascular disease (CVD) and heart failure (HF) remain leading contributors to morbidity, mortality, and health care utilization, with a substantial proportion of disease burden occurring outside traditional outpatient care settings (Palaniappan et al., 2026; Savarese et al., 2017). The American Heart Association (AHA) estimates that nearly 128 million U.S. adults (approximately 48%) live with CVD, which accounts for over one-third of all deaths nationally, while HF affects more than 6.7 million adults and continues to rise in prevalence as survival improves and the population ages (Palaniappan et al., 2026; Savarese et al., 2017). HF is characterized by recurrent exacerbations and high rates of acute care use. Approximately 20-25% of patients are readmitted within 30 days of hospitalization, most often within the first two weeks following discharge (Dharmarajan et al., 2013, 2017). Many drivers of recurrent utilization, such as medication nonadherence, food insecurity, housing instability, limited transportation, inadequate access to primary or specialty care, and limited health literacy, arise primarily in community and home environments rather than clinical settings (Havranek et al., 2015; Johnston et al., 2019; Van Spall et al., 2017). Recent literature highlights persistent socioeconomic, geographic, and racial disparities in cardiovascular outcomes, and rural residence and limited specialist access are independently associated with higher mortality and preventable hospitalizations (Johnston et al., 2019; Palaniappan et al., 2026). Frequent health care utilization coupled with significant inequities in outcomes suggest a misalignment between accumulation of cardiovascular risk and traditional care delivery, driving interest in care designed to promote the extension of assessment and coordination beyond clinic-centered systems and into community settings.

Community Paramedicine and Mobile Integrated Health as Models for Cardiovascular Care

Community paramedicine (CP) and mobile integrated health (MIH) programs extend emergency medical services (EMS) capabilities beyond traditional response roles into preventive, transitional, and chronic disease management contexts (Gregg et al., 2019; Harring et al., 2025; Lurie et al., 2023; Wilder et al., 2021). CP programs commonly deploy paramedics in expanded roles that include home visits, chronic disease screening, medication review, patient education, and referral support. MIH models further integrate EMS teams within broader clinical and social service networks through shared protocols and structured communication with primary care and specialty services (Bourdages et al., 2024; Gregg et al., 2019). Combining EMS personnel, traditionally used for acute care settings, with community-based programs implemented to improve chronic care outcomes has been increasingly applied to populations with high acute care utilization and persistent barriers to clinic-based follow-up.

Rationale for Focusing on Cardiovascular Risk and Heart Failure

Despite the growing number of CP and MIH programs targeting cardiovascular risk and heart failure, interventions vary substantially in design, intensity, target population, and outcome measurement, limiting direct comparability (Agarwal et al., 2016, 2019; Burnett et al., 2023; Gingold et al., 2021; Sokan et al., 2022). Prior CP and MIH-focused literature largely adopts broad analytic scopes without systematically characterizing cardiac-specific intervention models or examining how implementation features and care context

influence outcomes (Dharmarajan et al., 2013, 2017; Johnston et al., 2019). As a result, the existing evidence base remains fragmented across intervention models, populations, and settings, with limited synthesis clarifying when and for whom community paramedic-led cardiovascular interventions are most effective, or how program design elements such as visit structure, escalation pathways, and linkage to longitudinal care shape observed utilization and risk-related outcomes (Agarwal et al., 2016, 2019; Burnett et al., 2023; Gingold et al., 2021; Harring et al., 2025; Rasku et al., 2019; Sokan et al., 2022; Ulintz et al., 2025; Wilder et al., 2021). This gap is particularly salient for cardiovascular risk and heart failure, where time-sensitive clinical deterioration, post-discharge vulnerability, and recurrent EMS contact intersect with social and structural barriers to clinic-based follow-up (Dharmarajan et al., 2013; Dharmarajan et al., 2017; Johnston et al., 2019). Addressing this gap requires a focused, model-based synthesis of cardiovascular- and heart failure-specific community paramedicine and mobile integrated health interventions, rather than their aggregation within broader EMS or population health frameworks.

Objective and Research Question

This narrative review examines how CP and MIH programs have been implemented to assess and manage cardiovascular risk and HF in community settings and what effects have been observed on health care utilization, patient adherence, and feasibility of care delivery. The review focuses on empirical evaluations of defined CP and MIH interventions reporting patient- or system-level outcomes, while drawing on contextual literature to explain program rationale and implementation constraints. Across programs, this review suggests that the effects of community paramedicine and mobile integrated health interventions on cardiovascular risk and heart failure outcomes are conditional rather than uniform, with the most consistent benefits observed in targeted models that are closely integrated with outpatient care pathways.

METHODS

Literature Review

A narrative literature review was conducted using PubMed/MEDLINE-indexed sources published between January 2016 and January 2026. PubMed/MEDLINE was selected to support a focused synthesis of peer-reviewed clinical and health services literature relevant to community paramedicine, mobile integrated health, cardiovascular risk, and heart failure. No additional bibliographic databases, trial registries, or grey literature sources were searched. This approach was intended to support a reproducible narrative synthesis rather than an exhaustive systematic review.

The final PubMed/MEDLINE search was completed on February 28, 2026, using the complete search strategy reported in Appendix 1. The search was limited to English-language studies involving human subjects and returned 44 records. Records were stored in Zotero. Because the search was conducted in a single database, no duplicate PubMed records were identified. Citation linking was also performed as part of the original search workflow by manually reviewing reference lists of included studies and relevant reviews; this process identified 12 additional records. In total, 56 records were considered for relevance. Search terms and limits were developed for this review and were not adapted from a published search filter. The January 2016 through January 2026 date

range was selected to emphasize contemporary CP/MIH models and current implementation contexts.

Selection Approach and Classification

Records were screened manually by a single reviewer. All 44 PubMed/MEDLINE records were screened by title and abstract for relevance to community paramedicine, mobile integrated health, cardiovascular risk assessment, heart failure-related monitoring, cardiopulmonary post-discharge care, or community-based care delivery. Fifteen PubMed/MEDLINE records advanced to full-text review. The 12 records identified through citation linking were also reviewed for relevance and eligibility as part of the same selection process. No formal screening software beyond Zotero record storage was used, and no formal extraction table was created.

Eligible empirical studies described community paramedicine or mobile integrated health interventions delivered in community, home-based, post-discharge, or other nontraditional clinical settings and addressed cardiovascular risk assessment, heart failure-related monitoring, cardiopulmonary post-discharge management, or closely related cardiovascular outcomes. Included studies reported at least one patient-level, system-level, feasibility, adherence-related, clinical, utilization, or implementation outcome. Studies involving mixed cardiopulmonary populations were retained when cardiovascular or heart failure-related outcomes were explicitly reported.

Studies were excluded if they focused exclusively on non-cardiovascular conditions; described emergency response-only care without a preventive, post-discharge, screening, or longitudinal care component; lacked patient-level, utilization, feasibility, or implementation outcomes; were conference abstracts, protocols, commentaries, editorials, or non-peer-reviewed reports; were not conducted in community or home-based settings; or addressed cardiovascular conditions only tangentially within broader chronic disease interventions. Study authors were not contacted for clarification or additional data.

Following screening and full-text review, 29 sources were included in the review. Of these, eight were classified as core empirical studies and prioritized for analytic synthesis because they reported a clearly specified CP/MIH intervention model, explicit cardiovascular or heart failure-related outcomes, and sufficient methodological detail to permit comparison across intervention types. The remaining 21 sources were used as contextual or supporting literature to describe disease burden, prior CP/MIH evidence, implementation rationale, health system context, and interpretation of findings.

Given the narrative design and heterogeneity of included studies, no formal risk-of-bias tool or quantitative scoring framework was applied. Instead, methodological rigor was considered qualitatively during synthesis according to study design, presence or absence of a comparison group, sample size, follow-up duration, clarity of outcome measurement, and potential confounding. Findings from studies with stronger methodological designs were given greater interpretive weight when comparing intervention models, whereas smaller, uncontrolled, or feasibility-focused studies were used primarily to inform contextual and implementation considerations.

For the purposes of analytic synthesis, health care utilization outcomes, including emergency department visits, hospital admissions, readmissions, and EMS utilization, were

treated as primary outcomes. Intermediate clinical outcomes, including blood pressure, cardiovascular risk scores, and medication adherence, as well as cost or resource measures, were considered secondary outcomes. Feasibility, acceptability, and implementation process measures were used to contextualize intervention delivery rather than to determine effectiveness.

Study (year)	Design and setting	Population	Intervention	Outcome
Gingold et al., 2021	Retrospective observational cohort study with propensity-score matched controls	Adults 18 years discharged home from internal/family medicine services at an academic and affiliated community hospital in Baltimore, MD	30-day MIH/CP transitional care program including home visits by community paramedics, CHWs, medication reconciliation via telepharmacy, interdisciplinary coordination, and telemedicine support	No significant difference in 30-day inpatient readmissions or ED visits compared with matched controls; increased observation hospitalizations at 30 days (adjusted IRR 1.78, 95% CI 1.01–3.14) that did not persist at 60 days
Sokan et al., 2022	Pilot observational; matched controls	HF or COPD post-discharge patients (n = 83)	MIH/CP post-discharge follow-up	Medication adherence (PDC) showed higher adjusted values at 30 days (HF +8%, COPD +14%), though not statistically significant; differences attenuated after 30 days
Abrashkin et al., 2024	Prospective observational; home-based urgent response	Homebound older adults (1,159 patients; 2,378 responses)	Community paramedic evaluation and treatment of high-acuity conditions in the home	Low emergency department transport rates following community paramedic responses; descriptive outcomes only with no comparison group
Agarwal et al., 2018	Pragmatic cluster RCT; subsidized seniors' housing	Residents in 6 housing buildings	Paramedic-led cardiovascular risk assessment, education, and referrals; ongoing for 1 year	Ambulance calls decreased (0.88 calls/100 units/month); SBP decreased 5.0 mmHg; DBP decreased 4.8 mmHg
Agarwal et al., 2017	Prospective pre-post observational study; subsidized seniors' housing	Older adults (n = 79)	Weekly drop-in assessment, education, referrals, and primary care clinician reports	EMS calls decreased 25%; SBP decreased by 3rd visit; DBP decreased by 5th; CANRISK category decreased in 15%
Agarwal et al., 2020	Feasibility study; community and faith-based clinic sites	South Asian adults (n = 71)	Clinic-based paramedic-led cardiovascular screening with volunteer translation	Feasible with language support; elevated BP in 46.5%; moderate/high diabetes risk in 42.3%
Agarwal et al., 2024	Pragmatic RCT; home-visit model	Frequent EMS users (1,025 vs 994)	Up to 3 community paramedic home visits	No statistically significant difference in EMS call rate overall (IRR 0.88); significantly reduced lift-assist call rate in the lift-assist subgroup (IRR 0.73)
Burnett et al., 2023	Prospective cohort; matched historical control	Cardiopulmonary discharges (n = 78 vs 78)	1–2 home visits/week for 30 days post-discharge	Readmissions decreased at 120 days (34.6% vs 64.1%) and 210 days (43.6% vs 75.6%); ED visits decreased 40.7%; acute care bed-days saved: 218; estimated cost decreased $410,428 (USD)

Abbreviations: BP, blood pressure; CI, confidence interval; CP, community paramedicine; ED, emergency department; EMS, emergency medical services; HF, heart failure; IRR, incidence rate ratio; MIH, mobile integrated health; PDC, proportion of days covered; RCT, randomized controlled trial; SBP, systolic blood pressure; DBP, diastolic blood pressure; COPD, chronic obstructive pulmonary disease; CHW, community health worker; CANRISK, Canadian Diabetes Risk Questionnaire.

Table 1. Primary research of community paramedicine and mobile integrated health interventions addressing cardiovascular risk and heart failure.

Synthesis Approach

Given substantial heterogeneity in intervention design, patient populations, outcome measures, and follow-up periods, quantitative pooling and meta-analysis were not deemed appropriate. A narrative synthesis approach was therefore used to interpret patterns across studies and explain variability in reported effects. Outcomes from core

empirical evaluations were grouped by implementation model (post-discharge home-based follow-up, community-based screening and linkage programs, and high-utilizer home-visit interventions) and summarized with attention to outcome direction and key operational characteristics, including visit frequency, setting, and integration with outpatient care pathways. No generative AI tools were used in the preparation of this manuscript.

RESULTS

Post-Discharge Home-Based Follow-Up Models

Post-discharge home-based follow-up represents a common application of community paramedicine and mobile integrated health for patients recently hospitalized with heart failure or other cardiopulmonary conditions. Programs in this category enrolled patients shortly after hospital discharge and delivered time-limited, home-based follow-up by community paramedics, often supported by interdisciplinary teams. Core components across studies included in-home clinical assessment, medication reconciliation, symptom monitoring, and coordination of outpatient follow-up.

In an observational, propensity-matched study of a 30-day MIH/CP transitional care program, Gingold et al. found no difference in 30-day inpatient readmissions compared with matched controls (adjusted IRR 1.19, 95% CI 0.89–1.60) among 464 enrolled patients, while hospital observation stays were more frequent in the intervention group (adjusted IRR 1.78) (Gingold et al., 2021). Sokan et al. evaluated a post-discharge MIH/CP program for patients with heart failure and chronic obstructive pulmonary disease and reported higher medication adherence at 30 days, measured by proportion of days covered (heart failure +8%, COPD +14%), with differences attenuating over time (Sokan et al., 2022). In contrast, Burnett et al. reported reductions in longer-term utilization in a prospective observational cohort with matched historical controls. Among patients discharged with cardiopulmonary conditions (n = 78 per group), the intervention—consisting of 1–2 community paramedic home visits per week for 30 days—was associated with lower all-cause readmissions at 120 days (34.6% vs 64.1%) and 210 days (43.6% vs 75.6%), fewer emergency department visits (40.7%), reduced hospital bed-days (218), and estimated total system-level cost savings of $410,428 (Burnett et al., 2023).

Across post-discharge models, outcomes varied by study design and follow-up duration.

Community-Based Screening and Linkage Models

Community-based screening and linkage models embedded community paramedics in non-clinical settings, most commonly subsidized housing or senior living environments, to conduct cardiovascular risk assessment and facilitate referral to primary care. These programs emphasized repeated blood pressure measurement, cardiovascular risk screening, patient education, and linkage to outpatient services, with delivery occurring in fixed community sites rather than patient homes.

In a cluster randomized trial conducted in subsidized senior housing, Agarwal et al. reported reductions in ambulance calls (0.88 calls per 100 units per month) and decreases in systolic and diastolic blood pressure (5.0 mmHg and 4.8 mmHg, respectively) over one year of paramedic-led assessment and education (Agarwal et al., 2018). A pre-post

evaluation of the Community Health Assessment Program through Emergency Medical Services (CHAP-EMS) similarly reported a 25% reduction in EMS call volume during the intervention year, with early reductions in blood pressure and improvements in diabetes risk categorization among a subset of participants (Agarwal et al., 2016).

In a feasibility-focused implementation study adapting the CP@clinic model for a South Asian population, Agarwal et al. conducted 26 paramedic-led screening sessions over 14 months, enrolling 71 participants in community and religious settings (Agarwal et al., 2020). Among the 26 participants with complete or near-complete risk factor data, 46.5% had elevated blood pressure (140/90 mmHg) and 65.4% had at least one indicator of cardiometabolic disease. Utilization outcomes were not assessed in this evaluation. Across community-based screening models, reported outcomes were concentrated in utilization and intermediate clinical measures.

High-Utilizer Home-Visit Models

High-utilizer home-visit models targeted individuals with recurrent EMS contact, with interventions delivered through short-term, home-based visits by community paramedics. Programs focused on patients with frequent emergency service use driven by complex medical, functional, or social needs and provided a limited number of visits over defined follow-up periods.

In a randomized controlled trial of frequent EMS users, Agarwal et al. delivered up to three community paramedic home visits over approximately 6-8 weeks and evaluated EMS call rates over a 6-month post-intervention period. The intervention was not associated with a statistically significant reduction in overall EMS calls (IRR 0.88, 95% CI 0.76–1.01), but was associated with a reduction among patients requiring recurrent lift assists (IRR 0.73, 95% CI 0.58–0.92) (Agarwal and Angeles, et al., 2024).

Abrashkin et al. evaluated a community paramedicine program embedded within an advanced illness management practice, serving an elderly, medically complex population. Across 2,378 paramedic responses over four years, 17.9% resulted in emergency department transport, with low rates of delayed transport among patients initially managed in the community (Abrashkin et al., 2024).

Across high-utilizer models, utilization effects varied by population subgroup and follow-up period.

Cross-Model Comparative Synthesis

Patterns of outcomes differed across models in relation to recruitment pathway, target population, intervention intensity, and level of health system integration. A structured comparison of these features is presented in Table 2. Distinct contrasts emerged across post-discharge home-based follow-up, community-based screening and linkage, and high-utilizer home-visit models.

Hospital Readmissions

Hospital readmissions were primarily evaluated in post-discharge MIH/CP programs targeting recently hospitalized patients with heart failure or cardiopulmonary conditions. Across transitional care models, findings ranged from reductions in selected

Dimension	Post-Discharge Home-Based Follow-Up	Community-Based Screening and Linkage	High-Utilizer Home-Visit Model
Primary recruitment pathway	Hospital discharge referral	Place-based outreach (e.g., subsidized housing, community sites)	Identification through EMS utilization records
Target population	Recently hospitalized patients with cardiopulmonary conditions	Community-dwelling adults with cardiovascular risk factors	Individuals with recurrent EMS use and complex medical or social needs
Typical intervention structure	Home visits, typically 1-2 visits per week	Repeated screening sessions	Structured home visits (commonly up to 3 visits)
Level of health system integration	High; coordination with hospital discharge teams, outpatient clinicians, and pharmacies	Moderate; linkage to primary care through standardized reports and referral	Moderate; coordination with EMS systems and outpatient providers
Common study designs	Observational cohorts; matched comparisons; pilot studies	Cluster randomized trials; pre-post evaluations; implementation studies	Randomized controlled trials; prospective observational studies
Hospital readmissions assessed	Frequently assessed	Infrequently assessed	Infrequently assessed
Observed readmission effects	Mixed findings; short-term effects often not statistically significant, with reductions reported in selected cohorts	Not a primary outcome in most evaluations	Not a primary outcome in most evaluations
EMS or emergency department utilization effects	Variable; some programs reported shifts in utilization patterns	Reductions in EMS call volume reported in controlled and pre-post evaluations	Variable; reductions observed in prespecified high-frequency subgroups
Intermediate clinical outcomes	Medication adherence improvements reported in short-term evaluations	Reductions in blood pressure and improved cardiovascular risk identification reported across screening models	Intermediate clinical outcomes infrequently evaluated
Cost outcomes assessed	Evaluated in selected studies with variable findings	Cost analyses uncommon	Cost analyses uncommon

Table 2. Cross-model comparison of community paramedicine and mobile integrated health cardiovascular intervention models.

cohorts to no statistically significant differences in 30-day readmissions compared with matched controls (Gregg et al., 2019; Lurie et al., 2023; Sokan et al., 2022). HF-specific MIH programs frequently reported feasibility and patient engagement, whereas short-term reductions in readmissions were less consistently demonstrated. Post-discharge "heart failure house calls" and rural MIH programs similarly reported stable readmission rates and were not powered to detect significant changes (Bourdages et al., 2024; Sokan et al., 2022). In contrast, community-based screening and high-utilizer models did not routinely assess hospital readmissions.

Emergency Department and EMS Utilization

Reductions in EMS utilization were most consistently observed in community-based screening programs implemented in subsidized housing settings, where cluster randomized and pre-post evaluations demonstrated fewer ambulance calls compared with control or baseline periods (Agarwal et al., 2016, Agarwal et al., 2018). Among frequent EMS users, a randomized controlled trial of a high-utilizer home-visit intervention reported mixed overall effects but identified reductions within prespecified high-risk subgroups, including patients requiring recurrent lift assists (Agarwal and Angeles et al., 2024). In contrast, post-discharge MIH programs more commonly reported shifts in patterns of utilization, such as increased outpatient contact or short-term observation stays, rather than consistent reductions in emergency service use (Gingold et al., 2021; Gregg et al., 2019; Lurie et al., 2023).

Intermediate Clinical and Medication-Related Outcomes

Intermediate clinical outcomes were most frequently evaluated in community-based screening and linkage models, where repeated assessments were associated with reductions in systolic and diastolic blood pressure and improved identification of cardiometabolic risk factors (Agarwal et al., 2015, Agarwal et al., 2016, Agarwal et al., 2019, Agarwal et al., 2020; Agarwal and Pirrie, et al., 2024). In contrast, post-discharge MIH programs more commonly examined medication-related outcomes, with pilot studies reporting short-term improvements in adherence that attenuated over time (Sokan et al., 2022). High-utilizer home-visit models rarely assessed intermediate cardiovascular or medication-related outcomes.

Cost and Resource Outcomes

Economic outcomes were evaluated in a limited number of studies, most commonly within post-discharge MIH programs. Propensity-matched and controlled evaluations generally did not demonstrate consistent short-term differences in total charges or health care costs compared with usual care, although some programs reported shifts in utilization patterns, including short-term increases in observation stays (Gingold et al., 2021; Sokan et al., 2022). Community-based screening and high-utilizer models infrequently included formal economic analyses, limiting cross-model cost comparison.

DISCUSSION

Effectiveness Across Community Paramedicine and MIH Models

Across CP and MIH interventions targeting cardiovascular risk and heart failure, effectiveness varied by intervention model and outcome domain. Utilization outcomes, particularly hospital readmissions, differed across studies, whereas improvements in intermediate outcomes such as cardiovascular risk identification, adherence support, and linkage to follow-up care were more frequently reported. Where reductions in acute care use occurred, they were often confined to specific populations or delivery contexts. These patterns suggest that observed effects reflect differences in intervention design, target population, and care context rather than a uniform program effect.

Recruitment Context and Target Population as Mechanisms of Utilization Variability

Observed heterogeneity in utilization outcomes may reflect differences in how intervention models identify and engage patients, in addition to differences in intervention intensity. Post-discharge MIH programs and interventions focused on high EMS utilizes concentrated services among patients identified during periods of heightened clinical vulnerability, commonly through hospital-based referral workflows or utilization-based screening (Feldman et al., 2022; Sokan et al., 2022). While this approach targeted individuals at elevated risk for acute care use, enrollment constraints may have limited participation among patients with greater social or medical complexity, resulting in intensive follow-up for a narrower subset of eligible individuals.

In contrast, community-based screening initiatives engaged broader populations through place-based delivery in trusted settings, supporting higher participation and sustained engagement (Agarwal et al., 2016; Agarwal et al., 2019). These screening models primarily enrolled individuals with lower immediate acuity, which may have con-

strained their ability to influence short-term utilization while supporting improvements in upstream outcomes such as risk identification and linkage to care. Across models, barriers related to housing instability, communication access, and language were reported to restrict reach among individuals at elevated cardiovascular risk (Agarwal et al., 2020; Bourdages et al., 2024; Feldman et al., 2022). Collectively, these contrasts suggest that differences in utilization effects may be associated with model-specific recruitment contexts rather than intervention intensity alone.

Alignment Between Intervention Scope and Consistency of Intermediate Outcomes

Differences in workforce design and scope of practice further distinguish how outcomes emerged across intervention models. Preventive screening programs emphasized standardized assessment, education, and referral—activities that are routine in paramedic practice and less dependent on downstream system responsiveness (Agarwal et al., 2016, Agarwal et al., 2019; Choi et al., 2016). Across screening models, alignment between intervention scope and clearly defined targets is consistent with the more frequent reporting of improvements in intermediate outcomes.

By comparison, post-discharge and high-utilizer programs pursued more complex objectives, including medication optimization and early identification of clinical deterioration (Feldman et al., 2022; Sokan et al., 2022). These higher-acuity models required broader paramedic competencies and more intensive clinical governance, often supported by multidisciplinary teams addressing medical and social complexity (Feldman et al., 2022; Gregg et al., 2019). While such configurations enabled comprehensive follow-up, they also introduced additional dependencies on timely escalation and coordination, which may have contributed to variability in utilization outcomes. Collectively, these contrasts suggest that intermediate outcomes were reported more consistently in models where intervention goals aligned closely with paramedic scope and activities under immediate operational control.

Health System Integration as a Conditional Determinant of Utilization Impact

Differences in utilization outcomes suggest that variation in health system integration may influence the observed impact of CP and MIH interventions, rather than functioning as a uniform feature across models. Community-based screening programs relied primarily on informational integration with primary care, typically through standardized assessment reports intended to prompt follow-up (Agarwal et al., 2016; Choi et al., 2016). While this level of integration supported awareness of cardiovascular risk, its influence on utilization appeared limited by workflow burden and constraints in data interoperability (O'Meara et al., 2015).

In contrast, post-discharge MIH and high-utilizer programs required deeper functional integration with hospital systems and cross-sector care networks. HF-focused interventions depended on access to electronic health records, coordination with pharmacies, and linkage to outpatient clinicians to support medication reconciliation and continuity of care (Feldman et al., 2022; Gregg et al., 2019; Sokan et al., 2022). Differences in utilization outcomes appeared to correspond with variation in the degree of integration achieved, rather than the presence of home visits alone, suggesting that observed effectiveness may depend in part on integration capacity in addition to intervention structure.

Implications and Directions for Future Research

Viewed collectively, these cross-model contrasts suggest that CP and MIH programs may have the greatest impact when intervention scope, recruitment context, and integration capacity are aligned. Variability in utilization outcomes appears related to differences in model design and implementation context rather than inconsistent implementation or intervention intensity alone. Interpretation of these patterns is tempered by heterogeneity in study design, outcome definitions, and follow-up duration, which limits causal inference and cross-study comparability. In contrast to prior CP or MIH-focused literature that aggregates heterogeneous interventions, this model-based synthesis highlights that observed variability may correspond to structural differences in intervention design and care context rather than inconsistent intervention performance (Bigham et al., 2013; Choi et al., 2016; O'Meara et al., 2015).

Future evaluations would benefit from comparative designs that explicitly assess differences across intervention models, standardize outcome measurement, and more clearly characterize how integration mechanisms interact with patient complexity and care infrastructure. Such approaches may help clarify when improvements in intermediate outcomes are associated with sustained reductions in acute care use and inform the design of context-appropriate CP and MIH interventions.

LIMITATIONS

The available literature on CP and MIH programs for cardiovascular risk and heart failure remains limited in scope and consistency. Most core empirical studies were single-site program evaluations, feasibility studies, or observational analyses, with relatively few randomized or contemporaneously controlled designs. Sample sizes were often modest, and follow-up periods frequently emphasized short-term utilization outcomes, limiting assessment of sustained cardiovascular risk modification, longer-term heart failure trajectories, patient adherence, or downstream clinical outcomes.

Outcome measures were inconsistently defined across studies, with primary emphasis on emergency department visits, EMS utilization, and hospital readmissions rather than disease-specific clinical endpoints, patient-reported outcomes, functional status, or objective cardiovascular risk markers. Economic outcomes were variably assessed, with few studies employing standardized cost accounting approaches, limiting comparability across programs. Interpretation is further constrained by heterogeneity in program structure, visit frequency, scope-of-practice regulations, degree of health system integration, and availability of downstream referral resources. These differences limit direct comparison across models and precluded quantitative pooling.

In addition to limitations of the evidence base, this review is subject to methodological constraints. The literature search was limited to PubMed/MEDLINE and English-language, human-subject literature, and no additional bibliographic databases, trial registries, grey literature sources, or non-peer-reviewed reports were searched. Relevant literature indexed in databases such as CINAHL, Embase, Scopus, or Web of Science may therefore have been missed, particularly given the interdisciplinary nature of community paramedicine and mobile integrated health research. Citation linking was used to supplement the database search, but this approach may preferentially identify studies connected to already retrieved literature.

Screening and study selection were conducted manually by a single reviewer, and no formal extraction table was used. Study authors were not contacted for clarification or missing data. No formal study-quality or risk-of-bias tool was applied; instead, methodological rigor was considered narratively according to study design, presence of a comparison group, sample size, follow-up duration, outcome definition, and potential confounding. Accordingly, conclusions regarding conditional effectiveness should be interpreted as hypothesis-generating rather than definitive.

CONCLUSIONS

Community paramedicine and mobile integrated health programs extend cardiovascular risk assessment, monitoring, and care coordination beyond traditional clinical settings and are consistently feasible across diverse contexts. Evidence of benefit is most consistent in preventive screening initiatives, early post-discharge monitoring, and narrowly targeted high-utilizer populations, while effects on early hospital readmissions remain variable. Patterns suggested by the reviewed literature highlight the importance of intervention intensity, population selection, and integration with existing care systems. Future research should prioritize standardized outcome measures, longer follow-up, and implementation-focused evaluation to inform scalability and optimize the role of paramedic-led models in cardiovascular and heart failure care.

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APPENDIX

PubMed/MEDLINE Search Strategy

The following PubMed/MEDLINE search was completed on February 28, 2026, and returned 44 records:

("community paramedicine"[tiab] OR "community paramedic"[tiab] OR "community paramedics"[tiab] OR "mobile integrated health"[tiab] OR "mobile integrated healthcare"[tiab] OR "mobile integrated health care"[tiab] OR "MIH-CP"[tiab] OR "MIH CP"[tiab]) AND ("heart failure"[tiab] OR "congestive heart failure"[tiab] OR "Heart Failure"[Mesh] OR hypertension[tiab] OR hypertensive[tiab] OR "Hypertension"[Mesh] OR "blood pressure"[tiab] OR "cardiovascular risk"[tiab] OR "cardiometabolic risk"[tiab] OR "cardiovascular disease"[tiab] OR "cardiovascular diseases"[tiab] OR "Cardiovascular Diseases"[Mesh] OR cardiopulmonary[tiab] OR "post-discharge"[tiab] OR postdischarge[tiab] OR readmission*[tiab]) AND ("2016/01/01"[Date - Publication] : "2026/01/31"[Date - Publication]) AND english[Language] AND humans[Filter]