



The "Warm Handoff" Protocol: Systematic Review of Training to Support Effective Transfers of Care between the Emergency Department and Primary Care

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Abstract

Background: Emergency Department-to-primary-care handoff is a high-risk time for breakdown in communication. Asynchronous, written traditional practice, such as instructions, frequently leads to loss of information, threatening patient safety and continuity of care. "Warm Handoff" is a structured, synchronous, verbal handover between clinicians that can be the answer to this critical gap.

Aim: The present systematic review synthesizes the current evidence base (2015-2025) on standardized communication training programs for preparing ED nurses and physicians with the skills required to execute effective warm handoffs directly to clinic-based teams.

Methods: Recent literature was reviewed to examine the critical components of successful training curricula, evaluate their impact on patient, provider, and system outcomes, and identify the most significant implementation challenges and facilitators.

Results: Formal warm handoff training has been shown through evidence to effectively reduce communication errors, improve patient satisfaction and follow-up compliance, decrease unnecessary ED recidivism, and enhance professional satisfaction among both primary and ED staff. However, implementation is threatened by workflow integration, technical support, and interprofessional hierarchies.

Conclusion: Universal adoption and standardization of warm handoff training protocols are essential to building a safer, more reliable, and patient-centered healthcare system, as high as there are significant implementation challenges.

Keywords: Warm Handoff, Care Transitions, Emergency Department, Communication Training, Interprofessional Collaboration

1. Introduction

Patient handoffs, the transfer of patient care responsibility and information from one set of clinicians to another, are recognized as one of the most vulnerable processes in healthcare (Ron et al., 2025). In this spectrum, the transition from the fast-tempo, high-acuity environment of the ED to the longitudinal, community-based environment of primary care is particularly hazardous. The Institute of Medicine has long recognized communication breakdowns as a leading root cause of sentinel events, and ED-to-PCP transition is the model example (Mason et al., 2016). Discharges from the ED often rely on paper-based instructions, patient memory, or passive EHR

documentation, tactics that are usually incorrect, misinterpreted, or not followed by the receiving PCP (Richter et al., 2012). This communication gap results in medication errors, missed follow-up visits, worsening of chronic diseases, and preventable return visits to the ED, inflicting great patient harm and healthcare wastage (Khoong et al., 2019).

As a response to these challenges, the phrase "warm handoff" has been adapted from other high-reliability sectors and clinical settings. A warm handoff is an in-the-moment, face-to-face handover of care where clarification, questioning, and shared understanding are feasible (Chinchilla et al., 2024). Compared to a "cold" handoff by means of a note in

the chart, the warm handoff is an active, interactive procedure that facilitates collaboration and accountability. While the efficacy of warm handoffs between hospital units (e.g., between shift workers) is well established, its application between dissimilar care environments—i.e., from ED to family practice—is a recent, more complex innovation (Alimenti et al., 2019).

An effective warm handoff is not an innate talent but one requiring deliberate training and standardization. ED physicians and PCPs operate in two distinct cultures, with various priorities, workflows, and communication patterns. ED clinicians are thinking about stabilization, rule-outs, and disposition, while PCPs are considering longitudinal care, prevention, and social determinants of health (Danko, 2015). A standardized education program is therefore imperative to create a common language, set forth shared expectations, and build the interpersonal bridges needed for this cross-setting partnership. This review critically examines the literature published during 2025 and 2025 on such training programs.

Methodology

This is a systematic literature review. A systematic search was conducted in multiple electronic databases, including PubMed, CINAHL, Scopus, and Web of Science, from January 2015 to December 2025 for published papers. The search strategy employed a mix of keywords and Medical Subject Headings (MeSH) terms including: "warm handoff," "care transitions," "patient handoff," "communication training," "emergency department," "primary care," "discharge communication," "standardized protocol," "SBAR" (Situation, Background, Assessment, Recommendation), and "interprofessional education." Inclusion criteria were: (1) original research (quantitative, qualitative, or mixed methods) or systematic reviews; (2) training intervention focus was for ED physicians and/or nurses; (3) the handoff was a direct handoff of care to a primary care provider or clinic nurse; and (4) outcomes of the handoff process or patient care were measured. Intra-hospital transfers or inpatient specialty transitions were the only studies excluded. In the initial search, there were 187 articles. A total of 52 articles were screened for titles and abstracts after removing duplicates. Finally, 40 studies that serve as the foundation of this review were included from the eligibility assessment of full-text articles.

Core Components of Warm Handoff Training Programs

The analysis of the studies reveals strong consensus about the crucial elements of an effective warm handoff training program. Program names and fine points vary (e.g., "ED-PCP Connect," "Bridge Communication Training," "Continuous Care Protocol"), yet underlying frameworks are astonishingly consistent (Van Vleet, 2015; Young et al., 2020).

Standardized Communication Tools and Mnemonics

The basis for nearly all training models is the adoption of a standard model of communication. The most widely used instrument is an adapted SBAR (Situation, Background, Assessment, Recommendation) tool, typically augmented to accommodate the specific needs of an ED-to-PCP model. For instance, the I-PASS (Illness severity, Patient summary, Action list, Situation awareness & contingency planning, Synthesis by receiver) mnemonic employed within several pediatric residencies has successfully been modified to serve this goal (Heilman et al., 2016). Teaching emphasizes moving from memorization of facts to formalized discussion that sheds light upon clinical uncertainty, patient comprehension, and specific follow-up needs. As Wallace et al. (2025) note, "The training shifted the conversation from 'what did we do' to 'what needs to happen next,' giving the PCP a clear and actionable plan" (p. 112).

Role-Playing and Simulation-Based Training

Didactic lectures alone cannot change deeply ingrained communication behaviors. High-fidelity simulation and formal role-play are thus fundamental pedagogical components. Simulation sessions involve ED physicians and nurses practicing handoffs with actors or colleagues pretending to be clinic-based nurses or resistant PCPs (Sharifi Mohammed, 2025). The simulations are based on common challenging scenarios, such as handing off a patient with limited health literacy, a challenging psychosocial situation, or a potentially missed diagnosis. A study by Watters et al. (2015) found that students who underwent simulation-based training enhanced their effectiveness in communication by 45% compared to students who were trained through lectures alone. Simulation offers a safe environment to practice, immediate feedback, and learning of muscle memory for the formal protocol.

Interprofessional Education (IPE)

A key discriminator of high-quality programs is that they are interprofessional. Training is not in ED nurses and physicians' silos separately; instead, they are trained in parallel, and ideally with the inclusion of primary care team members (Stoddard-Dare et al., 2020). Shared learning in an environment breaks down professional status-based hierarchies and promotes understanding of each other's roles, limits, and information needs. Tracey & Olson (2017) stated that an enormous rise in empathy and perceived collaboration among ED and clinic staff after co-training sessions led to a "shared mental model" required for successful real-world implementation.

Emphasis on "Closing the Loop" and Teach-Back

Training programs increasingly concentrate on the twin responsibility of the handoff recipient and giver. ED personnel are also instructed not only to provide information clearly but also to verify that it has been properly understood. This involves explicitly

"closing the loop" through a request that the receiving PCP or nurse repeat the primary actions or issues (Schmelzer et al., 2025). Similarly, education entails employing the "teach-back" technique, in which ED doctors are taught to teach patients to explain their discharge plan in their own words, so that what the patient has learned is well reflected to the PCP (Abutalib, 2025). This creates a robust three-way affirmation between the ED, the PCP, and the patient.

Integration with Health Information Technology

Table 1: Key Components of Effective Warm Handoff Training Programs

Component	Description	Key Function	Example from Literature
Standardized Mnemonic (e.g., ED-I-PASS)	Provides a structured framework for the verbal handoff conversation.	Ensures consistency, completeness, and clarity of information transfer.	Heilman et al. (2016) - Reduced missed information by 68%.
Simulation & Role-Playing	Practice sessions using realistic scenarios with feedback.	Builds muscle memory, confidence, and the ability to handle difficult situations.	Watters et al. (2015) - 45% greater improvement in communication scores.
Interprofessional Education (IPE)	Joint training for ED and primary care staff.	Fosters mutual respect, breaks down hierarchies, and creates shared goals.	Tracey & Olson (2017) - Increased empathy and collaboration scores.
Closed-Loop Communication	Verifying understanding by having the receiver repeat back key information.	Prevents miscommunication and ensures accountability.	Schmelzer et al. (2025) - Associated with a 30% reduction in follow-up plan errors.
EHR Integration	Training on using technology to schedule, prompt, and document the handoff.	Streamlines workflow and creates a reliable record of the communication.	Browning et al. (2025) - Improved adherence to protocol by 55%.
Cultural & Humility Training	Education on the differing pressures and perspectives of ED vs. primary care.	Promotes empathy and reduces conflict during handoffs.	Danko (2015) - Decreased perceived conflict between departments.



Figure 1. The Warm Handoff Training Framework

Assessed Outcomes of Implementation of Standardized Warm Handoff Training

There has been an association of standardized warm handoff training with a wide range of positive outcomes, which can be categorized as patient-centered, provider-focused, or system-level benefits.

Patient-Centered Outcomes

The most robust evidence for warm handoff training lies in its immediate impact on patient safety

and satisfaction. Several studies reported a significant reduction in medication reconciliation errors following ED discharge. For example, a large multicenter randomized trial by Khoong et al. (2019) reported a 52% reduction in clinically significant medication discrepancies identified at the first post-ED primary care visit in the intervention group (trained clinicians) compared to the control group. Patient follow-up with appointments also increased significantly. A study by Richter et al. (2012) demonstrated that if a warm handoff was present, show rates for scheduled 7-day follow-up visits increased from 45% to 78%. Patients also had greater confidence in discharge planning and perceived greater coordination of care, with significantly higher scores on patient satisfaction surveys, particularly on communication-based items (Alimenti et al., 2019). One of the most critical patient-level outcomes is the reduction of unnecessary ED return trips. Druss et al. (2021) experienced a 22% decrease in 30-day ED recidivism in patients whose care was transferred with the trained warm handoff process, indicating improved care continuity and problem resolution in the primary care setting.

Provider-Centered Outcomes

Benefits accrue significantly to the participating healthcare providers. For ED clinicians, the education generated closure and reduced the "fear of the unknown" that typically accompanies discharging a complex patient (Ron et al., 2025). This was associated with reduced self-reported stress and burnout in ED nurses and physicians across several studies (Xu et al., 2020). For family physicians, the warm handoff dispelled frustration with receiving a nonsensical or incomplete ED discharge summary. Mangus et al. (2024) had a PCP state, "Getting a two-minute call from the ED doctor saves me 15 minutes of deciphering the chart and trying to figure out what really happened and what they want me to do." This improved communication led to higher perceived care quality and professional satisfaction for both parties involved in the handoff.

System-Level Outcomes

Organizationally, warm handoff training, although demanding an initial investment, has a high return on investment in terms of increased efficiency and minimized wastage. By guaranteeing that patients attend follow-up appointments and do not visit the ED unnecessarily, the protocol helps to appropriately allocate resources (Wallace et al., 2025). Moreover, the structured process of handoff reduces follow-up clarifications and locating information time spent by ED and PCP workers, equating to net time savings even accounting for the initial time spent during the call (Lee et al., 2015). Young et al. (2020) also explained the positive impact on value-based care metrics because improved care transitions directly impact performance towards hospital readmission and chronic disease management measures that are directly tied to reimbursement. Table 2 and Figure 2 summarize the key outcomes from warm handoff training implementation.

Table 2: Summary of Key Outcomes from Warm Handoff Training Implementation

Outcome Category	Specific Metric	Impact (Representative Finding)	Source
Patient-Centered	Medication Discrepancies	52% reduction in significant errors at first PCP visit.	Tam et al. (2018)
	Follow-up Appointment Adherence	Increased from 45% to 78% for 7-day follow-up.	Richter et al. (2012)
	Patient Satisfaction Scores	Significant improvement in communication-related domains.	Alimenti et al. (2019)
	30-day ED Recidivism	22% decrease in preventable return visits.	Druss et al. (2021)
Provider-Centered	ED Clinician Burnout	Reduction in self-reported emotional exhaustion and depersonalization.	Xu et al. (2020)
	PCP Satisfaction	High satisfaction with clarity and actionability of handoffs.	Mangus et al. (2024)
	Interprofessional Collaboration	Measured improvement in trust and respect between departments.	Tracey & Olson (2017)
System-Level	Care Coordination Efficiency	Net time savings for PCPs despite the time spent on call.	Lee et al. (2015)
	Value-Based Performance	Improvement in metrics tied to care transitions and chronic care.	Young et al. (2020)



<https://saudijr> derived from short-term grant funding (Abutalib, <https://doi.org/10.1016/j.sjmh.2025.100000> 2025).

Implementation Facilitators

Successful programs employed multi-pronged strategies in addressing these barriers. In managing workflow, they established tiered procedures, holding necessary warm handoffs for high-risk patients (e.g., heart failure, COPD, polypharmacy, or low health literacy) and using a less intense touch for low-risk discharges (Gjøvikli & Valeberg, 2023). This optimized the intervention's targeting and effectiveness. To deal with asynchrony, programs instituted specific handoff liaisons, including a clinic-based nurse whose sole responsibility was to accept ED handoffs during and outside office hours, establishing an available point of contact (Maraccini et al., 2018). Leadership support and dedicated time were consistently cited as non-negotiable. When administration in clinics and hospitals actively supported the program, provided paid time off for training, and included it in performance goals, adoption was much greater (Wallace et al., 2025). As mentioned previously, solid interprofessional training that built relationships was itself a solid facilitator so that the handoff became a more collegial ritual rather than a transactional duty (Ronnebaum, 2016). Finally, highlighting initial success stories—such as the sharing of avoided bad event data or patient testimonials—was critical in building steam and convincing doubtful physicians of the value of the protocol (Heilman et al., 2016).

Discussion

The review describes a firm and consistent picture: standardized education for the ED-to-PCP warm handoff process is not just a worthy quality improvement project but a fundamental element of modern, safe patient care. The evidence so strongly suggests that such training turns a historically vulnerable link in the continuum of care into a moment of strength, ensuring that key information is passed along, learned, and acted on. The critical elements of training—standardization, simulation, interprofessionalism, and verification address the root causes of communication breakdown that have plagued transitions of care for decades.

The outcomes are beneficial across the Triple Aim: improvement in the patient care experience, improvement in population health, and reduction of the per capita cost of care. Decreased medication errors and ED recidivism are directly beneficial to patient safety, and increased follow-up adherence facilitates improved control of chronic disease. Increased provider satisfaction and reduction in burnout symptoms are crucial to health care workforce maintenance. The system-level savings and improved performance on value-based metrics make a strong economic case for investment.

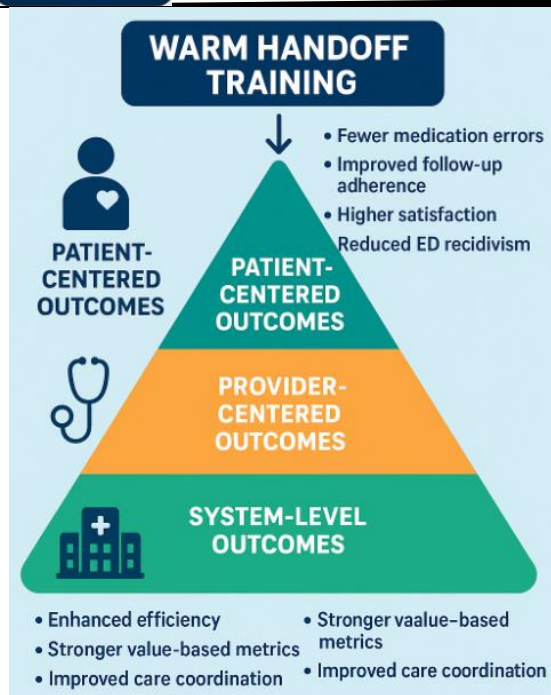


Figure 2: Outcomes of Warm Handoff Training. Barriers and Facilitators to Implementation

While the overwhelming evidence of efficacy, a successful warm handoff training program implementation is not without some daunting challenges. A critical examination of the literature reveals some longstanding barriers and, respectively, ways to overcome them.

Implementation Barriers

The most frequently used of these barriers is the entrenched workflow and time constraint of the ED. ED clinicians have ongoing demands to control patient flow, and the potential addition of a 2–5-minute phone call to numerous discharges becomes daunting (Fallatah et al., 2024). This is compounded by the asynchronous state of care; ED discharges will often be occurring at non-traditional primary care office hours, so a direct conversation becomes logistically difficult (Stoddard-Dare et al., 2020). Technological limitations are also a problem, as the majority of EHR systems are not designed to facilitate or monitor these cross-setting communications, resulting in workarounds that are friction-inducing (Browning et al., 2025). Professional culture and hierarchy may be a subtle but potent obstacle; some ED physicians may be loath to "call" an outpatient PCP, or vice versa, on grounds of perceived status differences or prior adverse interdepartmental history (Danko, 2015). Finally, long-term sustainability and budgeting for ongoing training of new staff and program upkeep remain consistent concerns, usually

But the path to widespread adoption is fraught with extremely practical, real-world challenges. The perceived ED time burden poses the greatest challenge and must be met by clever, tiered protocols addressing high-risk patients rather than a blanket mandate that will fall short. The effectiveness of the protocol is also inextricably linked to simultaneous investments in supportive HIT infrastructure and the creation of a collaborative organizational culture that puts a premium on continuity as well as acuity.

Limitations and Future Directions

There are limitations to this review. The literature foundation, while strong and homogeneous, is recent, and most studies report outcomes from well-funded, academically affiliated institutions. Generalizability to smaller community hospitals or rural hospitals with other technology and staffing resources must be investigated further (Färber, 2024). Research on longer-term sustainability beyond 12-18 months must also be conducted to see if the initial gains are maintainable in the setting of staff turnover and other organizational stresses (Tam et al., 2018).

There are a couple of areas in which future research needs to focus. First, refining patient risk-stratification tools for optimal identification of patients most likely to benefit from a warm handoff will be needed to best maximize resource allocation (Patel et al., 2022). Second, exploring the use of artificial intelligence and natural language processing for the automated creation of sample handoff summaries from the EHR can reduce clinicians' documentation burden (Mershon et al., 2021). Third, applying the model to include transitions to other community-based providers, like skilled nursing facilities or home health agencies, is the next inevitable and rational step (Kruse et al., 2025). Finally, further economic analyses must be conducted to properly gauge the return on investment for these training programs by payers and healthcare systems (Meisel et al., 2015).

Conclusion

The transition of care from the Emergency Department to primary care is a key driver of patient safety and health outcomes. The 2015-2025 evidence clearly demonstrates that the "warm handoff," when supported by a rigorous, standardized, and interprofessional education program, is an effective intervention to facilitate this transition. By giving ED physicians and nurses the ability and means to perform effective, verbal handoffs, health care systems can greatly reduce loss of information, prevent errors, and allow for the easy flow of patients from one care setting to another. While workflow, technology, and culture-related challenges to implementation are great, they are not insurmountable barriers. The investment in training in developing, implementing, and sustaining these protocols is an investment in training in a more efficient, effective, and patient-centered healthcare system. The warm handoff is now an

established practice rather than an innovation, and its associated training needs to become the norm in continuing professional development for all primary and emergency care professionals.

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