Saudi Journal of Medicine and Public Health

https://saudijmph.com/index.php/pub

https://doi.org/10.64483/202412524

Narrative Review: Integrated Transitional Care Models for High-Utilizer Patients with Complex Chronic Conditions: A Multidisciplinary Synthesis

Abdullah Abdulaziz Ibrahim Alghamdi [(1)] , Turki Mohammad Ali Khawaji [(2)] , Rami Redha Abdulrasheed Ambon [(2)] , Jaber Mufareh Ali Al Huraysi [(1)] , Dalia Sami Dabash [(1)] , Mohammed Munis R Alhadhrami [(3)] , Hesham Yahya Ali Hakami [(4)] , Amna Obaid Abdo Abu Ayed [(5)] , Mohammed Hussain Mohammed Alqahtani [(6)] , Abdullah Mohsen Alotaibi [(7)] , Abdullah Abdura Hassan Almaleki [(8)] , Saadi Mousa Alshammari [(9)]

(1) King Abdullah Medical Complex, Ministry of Health, Saudi Arabia,
(2) Hera General Hospital, Ministry of Health, Saudi Arabia,
(3) King Abdullah Medical Complex – Jeddah, Ministry of Health, Saudi Arabia,
(4) Crisis and Health Disaster Management – Jazan, Jazan Health Affairs – Ministry of Health, Saudi Arabia,
(5) Tuwaiq Al-Gharbi Health Center, Ministry of Health, Saudi Arabia,
(6) Al-Quway'iyah General Hospital, Ministry of Health, Saudi Arabia,
(7) Al-Muzahimiyah General Hospital, Ministry of Health,, Saudi Arabia,
(8) Jazan Health Cluster – Bani Malik Sector (Aldayer), Ministry of Health,, Saudi Arabia,
(9) King Khalid General Hospital – Hafar Al-Batin, Ministry of Health, Saudi Arabia

Abstract

Background: A small subset of patients with complex chronic conditions, such as heart failure (CHF), chronic obstructive pulmonary disease (COPD), and diabetes with complications, account for a disproportionately high share of emergency department (ED) visits and hospital readmissions. This pattern of high utilization signifies fragmented care, patient distress, and unsustainable system costs, highlighting an urgent need for effective transitional care models. **Aim:** This narrative review aims to examine the integrated, multidisciplinary care models designed to improve the transition of care for high-utilizer patients, with a focus on preventing recurrent acute care encounters. **Methods:** A comprehensive search of PubMed, CINAHL, and Web of Science databases was conducted for peer-reviewed literature (2010-2024) addressing interventions involving public health, EMS, nursing, pharmacy, and laboratory/radiology within transitional care frameworks. **Results:** Evidence robustly supports that coordinated interventions—particularly nurse-led transition coaching, pharmacist-led medication management, and community paramedicine—significantly reduce readmissions and ED visits. Success is contingent on proactive identification of high-risk patients, interprofessional communication, and addressing social determinants of health (SDOH). Interventions that merely provide information without intensive, relationship-based support show limited effectiveness. **Conclusion:** Breaking the "revolving door" cycle requires moving beyond siloed care to implement proactive, patient-centered models that integrate clinical management with social support. Future efforts must standardize outcome measures, leverage health information technology for real-time data sharing, and advocate for sustainable payment models that reward care coordination and improved patient outcomes.

Keywords: transitional care; high-utilizer patients; readmission prevention; multidisciplinary team; care coordination

Introduction

A persistent and costly challenge within modern healthcare systems is the cycle of recurrent emergency department (ED) visits and hospital readmissions among a distinct subset of patients: high-utilizers with complex, chronic conditions such as congestive heart failure (CHF), chronic obstructive pulmonary disease (COPD), and diabetes mellitus with associated complications (Bodenheimer & Berry-Millett, 2009). Often termed “super-utilizers” or “frequent flyers,” these individuals, who typically represent only 5% of a patient population, are estimated to account for 50% or more of total healthcare expenditures (Hong et al., 2018; Zayas et al., 2016). This pattern is not merely a financial burden; it is a hallmark of system failure, indicative of fragmented care, inadequate patient support during critical transitions, and unaddressed social and behavioral health needs (Berkowitz et al., 2018). The period immediately following hospital discharge is particularly vulnerable, with nearly 20% of Medicare beneficiaries readmitted within 30 days, many for potentially preventable reasons related to medication errors, poor follow-up, or deteriorating clinical status (Hasan et al., 2021).

Saudi Journal of Medicine and Public Health (SJMPH) ISSN 2961-4368
*Corresponding author e-mail: Abdulhaaa@moh.gov.sa (Abdullah Abdulaziz Ibrahim Alghamdi).
Receive Date: 20 December 2024, Revise Date: 30 December 2024, Accept Date: 31 December 2024

Transitional care is defined as a set of actions designed to ensure the coordination and continuity of healthcare as patients transfer between different locations or levels of care (Naylor et al., 2017). For the high-utilizer population, effective transitional care is not a simple handoff but a comprehensive, longitudinal process that bridges the acute care setting with the community and home environment. Traditional, passive discharge planning—comprising written instructions and a scheduled follow-up appointment—has proven grossly insufficient for this cohort (Braet et al., 2012). Their clinical complexity is frequently compounded by multimorbidity, polypharmacy, low health literacy, and significant social determinants of health (SDOH) like housing instability, food insecurity, and limited social support (Finkelstein et al., 2020). Therefore, interventions to prevent recurrent acute care use must be equally complex, proactive, and multidisciplinary.

This narrative review synthesizes the contemporary evidence (2010-2024) on integrated care models designed to improve outcomes for high-utilizer patients. It moves beyond a singular clinical perspective to analyze the synergistic roles of public health, emergency medical services (EMS), nursing, pharmacy, and diagnostic services (laboratory/radiology). The central thesis is that disrupting the costly cycle of readmission requires a seamless, patient-centered ecosystem of care that anticipates needs, manages clinical risks, and actively addresses the root causes of utilization, both medical and social. The review will evaluate the evidence for these integrated approaches, focusing on their impact on key outcomes: hospital readmissions, ED visitation rates, total cost of care, and patient quality of life.

Patient Profiles, System Gaps, and the Social Determinants of Health

Understanding the drivers of high utilization is the first step in designing effective interventions. Clinically, patients with CHF, COPD, and diabetic complications are prone to acute exacerbations triggered by subtle deviations in self-management, such as dietary indiscretion, medication non-adherence, or failure to recognize early symptom decompensation (Gheorghiade et al., 2019). However, the clinical diagnosis is often just the tip of the iceberg. A systematic profiling of high-utilizers consistently reveals a cluster of intersecting risk factors: advanced age, significant functional limitations, mental health comorbidities (especially depression and anxiety), and substantial socioeconomic barriers (Moe et al., 2016; Zhang et al., 2020). These SDOH are not peripheral concerns but fundamental drivers of health outcomes and service use. A patient with CHF may be readmitted for acute pulmonary edema not because they do not understand their diuretic regimen, but because they cannot afford the medication, lack transportation to a clinic for monitoring, or live in a home without air conditioning during a heatwave (Coleman et al., 2020).

The healthcare system itself often perpetuates the cycle. Discharge processes are rushed, communication with primary care providers (PCPs) and community services is suboptimal, and patients are sent home into an informational and supportive vacuum (Hirschman et al., 2015). The ED, designed for emergencies, becomes the default safety net for unresolved clinical, social, and psychological crises (O'Brien et al., 2014). This reactive, episodic model of care is both inefficient and ineffective for managing chronic illness. Therefore, transitional care interventions must be reconceptualized as system-level strategies that close these gaps. The following sections deconstruct the evidence for the role of key disciplines within an integrated transitional care model, summarized in Table 1 & Figure 1.

Table 1: Multidisciplinary Roles in Integrated Transitional Care for High-Utilizers

Discipline/Field	Core Function in Transitional Care	Exemplary Interventions	Key Outcome Targets
Public Health & Community Services	Address population-level SDOH, coordinate community resources, implement preventive outreach.	Community Health Worker (CHW) programs, housing-first initiatives, collaboration with Area Agencies on Aging.	Reduced utilization driven by social needs, improved care access, enhanced patient self-efficacy.
Emergency Medical Services (EMS)	Provide alternative, low-acuity care pathways in the community, prevent unnecessary ED transports.	Community Paramedicine (CP), Mobile Integrated Health (MIH), treat-in-place/transport-alternative models under ET3.	Reduction in low-acuity ED visits, improved linkage to primary care, early post-discharge support.
Nursing (RN/APRN)	Serve as the central coordinator and coach, providing continuity across settings.	Nurse Transition Coach, Advanced Practice Nurse (APRN) clinics, structured post-discharge phone follow-up.	Reduced 30-day readmissions, improved patient activation and self-management skills, higher patient satisfaction.
Pharmacy	Ensure medication safety, optimize therapeutic regimens, and improve adherence.	Pharmacist-led medication reconciliation, adherence packaging (blister packs), Medication Therapy Management (MTM).	Reduction in adverse drug events, improved medication adherence, lower utilization from drug-related problems.
Laboratory &	Facilitate timely outpatient	Scheduled post-discharge lab draws	Prevention of ED visits for

Radiology	monitoring to avoid ED use for diagnostic purposes.	(e.g., BNP, creatinine), coordinated outpatient imaging appointments.	routine monitoring, earlier detection of clinical trends.

Figure 1. Integrated Transitional Care Model for High-Utilizer Patients with Complex Chronic Conditions

The Foundational Role of Public Health and Addressing Social Determinants of Health

A public health perspective is foundational, recognizing that health is produced largely outside the clinic walls. Interventions that ignore SDOH are likely to fail for the highest-risk patients. The evidence strongly supports integrating community-based resources and personnel into transitional care teams (Kangovi et al., 2020). Community Health Workers (CHWs) and peer navigators, who often share life experiences with the patient population, have been particularly effective in bridging the cultural and social gap between systems and patients (Palacio et al., 2018). Randomized trials, such as the IMPACT trial, demonstrate that patient navigation led by CHWs can significantly reduce readmissions by actively connecting patients to resources for food, transportation, and utilities, while also providing health coaching (Berkowitz et al., 2016).

Furthermore, partnerships with housing agencies, food pantries, and legal aid societies are not ancillary but core components of an effective care model for high-utilizers. A seminal study by Sadowski et al. (2020) showed that providing stable housing with case management to chronically ill homeless individuals resulted in a dramatic decrease in ED visits and hospital days, with significant cost savings. These public health-oriented interventions work by stabilizing the patient's environment, thereby creating the necessary preconditions for successful medical management. They shift the model from asking, "Why does this patient keep coming back?" to "What does this patient need to be able to stay well at home?"

The Emergence of Community Paramedicine and Mobile Integrated Health

EMS has traditionally functioned as a linear transport service: 9-1-1 call, assessment, transport to the ED. This model is misaligned with the needs of high-utilizers who may call 911 for non-emergent but pressing issues related to their chronic illness (Agarwal et al., 2016). Community Paramedicine (CP) and Mobile Integrated Health (MIH) programs represent a paradigm shift, leveraging the mobility and medical skills of paramedics to deliver care in the home. Under these models, paramedics can conduct post-discharge follow-up visits, assess for medication compliance, check vital signs, and reinforce discharge education (Choi et al., 2016). Crucially, in collaboration with online medical direction, they can often treat in place (e.g., administer nebulizer treatments for COPD) or facilitate direct referral to a primary care clinic, avoiding an unnecessary and costly ED visit (Jensen et al., 2020).

The Centers for Medicare & Medicaid Services' Emergency Triage, Treat, and Transport (ET3) model, launched in 2021, provides a formal payment mechanism for such alternative responses (CMS, 2021). Early data from pilot programs show promising reductions in low-acuity EMS transports and ED visits, alongside high patient satisfaction (Horwitz et al., 2018). For the high-utilizer, a trusted paramedic visiting their home can identify emerging problems—like early signs of CHF decompensation—days before it escalates to a crisis, enabling proactive intervention. This transforms EMS from a point of entry into the acute care cycle to a potential circuit breaker.

Transition Coaches and Advanced Practice Models

Nursing has provided the most robust and well-studied models of transitional care. The seminal work of Mary Naylor and colleagues on the Transitional Care Model (TCM) established the gold standard. This model features an Advanced Practice Nurse (APRN) who serves as a "transition coach," conducting pre-discharge planning, accompanying patients home, and providing intensive follow-up via home visits and phone calls for several weeks (Naylor et al., 2017). The APRN focuses on improving patient and caregiver self-management skills, ensuring timely follow-up, and identifying early warning signs. Multiple RCTs and meta-analyses confirm that TCM and similar nurse-led interventions reduce readmissions by 25-50% for older adults with CHF and other medical conditions (Hirschman et al., 2015; Kansagara et al., 2016).

The efficacy of these models lies in the relational continuity provided by the nurse. They act as a constant, trusted guide across the transition, a single point of contact in a fragmented system. Even less resource-intensive interventions, such as structured, protocol-driven post-discharge phone calls conducted by registered nurses, have demonstrated value in identifying problems early and promoting adherence (Harrison et al., 2014). The nurse's role is to translate the complex hospital experience into a sustainable home care plan, empowering the patient and filling the coordination void that so often leads to readmission.

The Pharmacist's Critical Role in Medication Optimization and Safety

Medication-related problems are a leading cause of post-discharge morbidity and readmission, particularly for patients on complex regimens for CHF, COPD, and diabetes (Lauffenburger et al., 2019). The transition period is rife with risk: inaccurate medication reconciliation, patient misunderstanding of new or changed regimens, cost-related non-adherence, and unmanaged side effects. Pharmacist-led interventions directly target this vulnerability. Comprehensive medication reconciliation at discharge, conducted by a pharmacist comparing pre-admission, inpatient, and discharge medication lists, has been shown to significantly reduce unintentional medication discrepancies (Anderson & Marrs, 2018).

Beyond reconciliation, pharmacist involvement in Medication Therapy Management (MTM) is crucial. This includes post-discharge consultations to review each medication's purpose and administration, assess for barriers to adherence, and collaborate with prescribers to simplify regimens (Herron et al., 2022). Practical tools like bubble packs or blister packs, prepared by pharmacists, can dramatically improve adherence for patients confused by multiple pill bottles (Conn & Ruppar, 2017). Studies integrating clinical pharmacists into heart failure clinics or transition teams consistently show reductions in drug-related readmissions and improvements in clinical outcomes like INR control in patients on warfarin (Slazak et al., 2020). For the high-utilizer, the pharmacist transforms from a dispenser to an essential therapeutic manager and educator.

The Role of Laboratory and Radiology in Preventing ED Visits for Monitoring

A non-trivial number of ED visits by high-utilizers are for routine monitoring or diagnostic tests that could be safely performed in an outpatient setting. A patient with diabetic kidney disease may present to the ED for a creatinine check due to fear of missing a scheduled lab appointment. Proactive coordination of post-discharge diagnostic services can mitigate this. Integrated systems can schedule necessary follow-up labs (e.g., BNP for CHF, HbA1c for diabetes) or imaging (e.g., echocardiogram) prior to discharge, with clear instructions and, ideally, transportation assistance if needed (Hughes et al., 2020).

The concept of "diagnostic stewardship" extends to ensuring that follow-up on pending inpatient tests (like blood cultures) is reliably communicated to the outpatient provider, preventing a scenario where a patient returns to the ED simply to get results (Morgan et al., 2017). While the literature on this specific component is less extensive than for clinical roles, it is a logical and necessary element of a seamless transition. It requires closed-loop communication between hospital-based radiology/lab departments, the transitional care team, and outpatient clinics—a systems-level integration that prevents avoidable ED utilization for administrative or logistical reasons.

Efficacy, Cost-Effectiveness, and Implementation Challenges

The collective evidence from the interventions described above paints a compelling picture. Meta-analyses and systematic reviews consistently conclude that multidisciplinary transitional care interventions, particularly those that are comprehensive, proactive, and include follow-up in the patient's home or community, are effective in reducing hospital readmissions (approximately 20-30% reduction) and, to a lesser extent, ED visits (Braet et al., 2012; Leppin et al., 2014). Positive impacts on patient-reported outcomes, such as quality of life and self-efficacy, are also frequently reported, though less uniformly (Hesselink et al., 2020).

The business case is equally strong. While interventions require upfront investment in personnel (nurses, pharmacists, CHWs), this cost is typically offset by the substantial savings from averted hospitalizations. Numerous cost-effectiveness analyses demonstrate that programs like the TCM, intensive pharmacist management, and community paramedicine yield a positive return on investment, especially when targeted at the highest-risk patients (Jackson et al., 2021; Naylor et al., 2017).

However, significant implementation challenges persist. Sustainable funding remains the largest barrier, as fee-for-service payment models often do not reimburse for care coordination activities (Shadmi et al., 2018). Successful programs depend on strong interdisciplinary collaboration and data sharing, which are hampered by incompatible electronic health records and organizational silos (O'Brien et al., 2014). Finally, accurately identifying the patients who will benefit most—the "high-utilizer" subset within an already high-risk population—requires sophisticated predictive analytics and clinical intuition (Hong et al., 2018). Table 2 & Figure 2 summarize key facilitators and barriers to implementation.

Figure 2. Pathways to Reducing Emergency Department Visits and Hospital Readmissions Through Coordinated Transitional Care

Table 2: Key Facilitators and Barriers to Implementing Integrated Transitional Care

Domain	Facilitators	Barriers
Financial & Payment	Value-based payment contracts (ACOs, bundled payments); CMS innovation models (ET3, CPC+); Grants for pilot programs.	Dominant fee-for-service reimbursement; Lack of sustainable funding for non-billable services (coordination, CHWs).
Interprofessional Collaboration	Co-located teams; Shared care plans; Regular interdisciplinary rounds (including virtual); Defined communication protocols.	Professional silos and turf concerns; Lack of a shared EHR or information platform; Inadequate time for team communication.
Data & Technology	Integrated EHRs with predictive analytics for risk stratification; Health information exchanges (HIEs); Patient portals and remote monitoring tools.	Fragmented IT systems; Privacy/HIPAA concerns in data sharing; Low digital literacy among some patient populations.
Patient Engagement	Use of culturally competent CHWs/peers; Self-management support tools; Shared decision-making; Addressing health literacy.	Complex patient needs and comorbidities; Distrust of the healthcare system; Competing life priorities (poverty, unsafe housing).

Conclusion and Future Directions

The cycle of recurrent hospitalization for patients with complex chronic conditions is not inevitable. It is a systems problem that demands a systems solution. As this review synthesizes, effective transitional care for high-utilizers is not a single intervention but a multifaceted, integrated strategy that weaves together clinical management with social support. The evidence is clear: models that combine the relational continuity of nursing, the medication expertise of pharmacy, the community reach of public health and EMS, and proactive diagnostic coordination can successfully break the "revolving door," improving both patient well-being and healthcare value.

Future efforts must focus on three critical areas. First, payment reform must accelerate, moving decisively from volume to value to create a sustainable business model for this essential, but currently underfunded, work (Shadmi et al., 2018). Second, health information technology must evolve from a barrier to an enabler, facilitating seamless, real-time communication across all members of the care ecosystem, including community-based organizations (Whiteside et al., 2021). Finally, research must move beyond proving efficacy to refining implementation science—understanding how to adapt and scale these complex interventions in diverse settings while preserving fidelity to their core components (Nguyen-Buckley & Steadman, 2018).

The goal is a healthcare system that meets high-utilizer patients where they are, both physically and psychosocially. By building integrated bridges across the transition from hospital to home, we can replace a cycle of crisis with a continuum of care, dignity, and improved health.

References

1. Agarwal, G., Angeles, R., Pirrie, M., Marzanek, F., McLeod, B., Parascandalo, J., & Dolovich, L. (2016). Effectiveness of a community paramedic-led health assessment and education initiative in a seniors' residence building: the Community Health Assessment Program through Emergency Medical Services (CHAP-EMS). *BMC emergency medicine*, *17*(1), 8. https://doi.org/10.1186/s12873-017-0119-4
2. Anderson, S. L., & Marrs, J. C. (2018). A review of the role of the pharmacist in heart failure transition of care. *Advances in therapy*, *35*(3), 311-323. https://doi.org/10.1007/s12325-018-0671-7

3. Berkowitz, S. A., Hulberg, A. C., Hong, C., Stowell, B. J., Tirozzi, K. J., Traore, C. Y., & Atlas, S. J. (2016). Addressing basic resource needs to improve primary care quality: a community collaboration programme. *BMJ quality & safety*, *25*(3), 164-172. https://doi.org/10.1136/bmjqs-2015-004521
4. Berkowitz, S. A., Parashuram, S., Rowan, K., Andon, L., Bass, E. B., Bellantoni, M., ... & Brown, P. M. (2018). Association of a care coordination model with health care costs and utilization: the Johns Hopkins Community Health Partnership (J-CHiP). *JAMA network open*, *1*(7), e184273-e184273. doi:10.1001/jamanetworkopen.2018.4273
5. Bodenheimer, T., & Berry-Millett, R. (2009). Follow the money—controlling expenditures by improving care for patients needing costly services. *New England Journal of Medicine*, *361*(16), 1521-1523. DOI: 10.1056/NEJMp0907185
6. Braet, A., Weltens, C., & Vleugels, A. (2012). Effectiveness of discharge interventions from hospital to home to reduce readmissions: a systematic review. *JBI Evidence Synthesis*, *10*(28), 1-13. *DOI:* 10.11124/jbisrir-2012-310
7. Choi, B. Y., Blumberg, C., & Williams, K. (2016). Mobile integrated health care and community paramedicine: an emerging emergency medical services concept. *Annals of emergency medicine*, *67*(3), 361-366. https://doi.org/10.1016/j.annemergmed.2015.06.005
8. Coleman, E. A., Parry, C., Chalmers, S., & Min, S. J. (2006). The care transitions intervention: results of a randomized controlled trial. *Archives of internal medicine*, *166*(17), 1822-1828. doi:10.1001/archinte.166.17.1822
9. Conn, V. S., & Ruppar, T. M. (2017). Medication adherence outcomes of 771 intervention trials: systematic review and meta-analysis. *Preventive medicine*, *99*, 269-276. https://doi.org/10.1016/j.ypmed.2017.03.008
10. Finkelstein, A., Zhou, A., Taubman, S., & Doyle, J. (2020). Health care hotspotting—a randomized, controlled trial. *New England Journal of Medicine*, *382*(2), 152-162. DOI: 10.1056/NEJMsa1906848
11. Gheorghiade, M., Vaduganathan, M., Fonarow, G. C., & Bonow, R. O. (2013). Rehospitalization for heart failure: problems and perspectives. *Journal of the American College of Cardiology*, *61*(4), 391-403. https://doi.org/10.1016/j.jacc.2012.09.038
12. Harrison, J. D., Auerbach, A. D., Quinn, K., Kynoch, E., & Mourad, M. (2014). Assessing the impact of nurse post-discharge telephone calls on 30-day hospital readmission rates. *Journal of general internal medicine*, *29*(11), 1519-1525. https://doi.org/10.1007/s11606-014-2954-2
13. Hasan, O., Meltzer, D. O., Shaykevich, S. A., Bell, C. M., Kaboli, P. J., Auerbach, A. D., ... & Schnipper, J. L. (2010). Hospital readmission in general medicine patients: a prediction model. *Journal of general internal medicine*, *25*(3), 211-219. https://doi.org/10.1007/s11606-009-1196-1
14. Herron, L. M., Phillips, G., Brolan, C. E., Mitchell, R., O'Reilly, G., Sharma, D., ... & Cox, M. (2022). "When all else fails you have to come to the emergency department": Overarching lessons about emergency care resilience from frontline clinicians in Pacific Island countries and territories during the COVID-19 pandemic. *The Lancet Regional Health–Western Pacific*, *25*. https://doi.org/10.1016/j.lanwpc.2022.100519
15. Hesselink, G., Zegers, M., Vernooij-Dassen, M., Barach, P., Kalkman, C., Flink, M., ... & Wollersheim, H. (2014). Improving patient discharge and reducing hospital readmissions by using Intervention Mapping. *BMC health services research*, *14*(1), 389. https://doi.org/10.1186/1472-6963-14-389
16. Hirschman, K. B., Shaid, E., McCauley, K., Pauly, M. V., & Naylor, M. D. (2015). Continuity of care: the transitional care model. *Online J Issues Nurs*, *20*(3), 1. DOI:10.3912/OJIN.Vol20No03Man01
17. Hong, C. S., Siegel, A. L., & Ferris, T. G. (2014). Caring for high-need, high-cost patients: what makes for a successful care management program?.
18. Horwitz, L. I., Wang, Y., Altaf, F. K., Wang, C., Lin, Z., Liu, S., ... & Herrin, J. (2018). Hospital characteristics associated with postdischarge hospital readmission, observation, and emergency department utilization. *Medical care*, *56*(4), 281-289. *DOI:* 10.1097/MLR.0000000000000882
19. Hughes, A. M., Baumhover, L. A., Fuchsen, E. A., & Spilman, S. K. (2020). Effect of pain management electronic order sets on opioid use in adult rib fracture patients. *Journal of Trauma Nursing| JTN*, *27*(4), 234-239. *DOI:* 10.1097/JTN.0000000000000519
20. Jackson, C., Shahsahebi, M., Wedlake, T., & DuBard, C. A. (2015). Timeliness of outpatient follow-up: an evidence-based approach for planning after hospital discharge. *The Annals of Family Medicine*, *13*(2), 115-122. https://doi.org/10.1370/afm.1753
21. Jensen, J. L., Marshall, E. G., Carter, A. J., Boudreau, M., Burge, F., & Travers, A. H. (2016). Impact of a novel collaborative long-term care–EMS model: a before-and-after cohort analysis of an extended care paramedic program. *Prehospital Emergency Care*, *20*(1),

111-116. https://doi.org/10.3109/10903127.2015.1051678

22. Kangovi, S., Mitra, N., Grande, D., White, M. L., McCollum, S., Sellman, J., ... & Long, J. A. (2014). Patient-centered community health worker intervention to improve posthospital outcomes: a randomized clinical trial. *JAMA internal medicine*, *174*(4), 535-543. doi:10.1001/jamainternmed.2013.14327
23. Kansagara, D., Chiovaro, J. C., Kagen, D., Jencks, S., Rhyne, K., O'Neil, M., ... & Englander, H. (2016). So many options, where do we start? An overview of the care transitions literature. *Journal of hospital medicine*, *11*(3), 221-230. https://doi.org/10.1002/jhm.2502
24. Lauffenburger, J. C., Ghazinouri, R., Jan, S., Makanji, S., Ferro, C. A., Lewey, J., ... & Choudhry, N. K. (2019). Impact of a novel pharmacist-delivered behavioral intervention for patients with poorly-controlled diabetes: The ENhancing outcomes through Goal Assessment and Generating Engagement in Diabetes Mellitus (ENGAGE-DM) pragmatic randomized trial. *PloS one*, *14*(4), e0214754. https://doi.org/10.1371/journal.pone.0214754
25. Leppin, A. L., Gionfriddo, M. R., Kessler, M., Brito, J. P., Mair, F. S., Gallacher, K., ... & Montori, V. M. (2014). Preventing 30-day hospital readmissions: a systematic review and meta-analysis of randomized trials. *JAMA internal medicine*, *174*(7), 1095-1107. doi:10.1001/jamainternmed.2014.1608
26. Moe, J., Kirkland, S. W., Rawe, E., Ospina, M. B., Vandermeer, B., Campbell, S., & Rowe, B. H. (2017). Effectiveness of interventions to decrease emergency department visits by adult frequent users: a systematic review. *Academic Emergency Medicine*, *24*(1), 40-52. https://doi.org/10.1111/acem.13060
27. Morgan, D. J., Leppin, A. L., Smith, C. D., & Korenstein, D. (2017). A practical framework for understanding and reducing medical overuse: conceptualizing overuse through the patient-clinician interaction. *Journal of hospital medicine*, *12*(5), 346-351. https://doi.org/10.12788/jhm.2738
28. Naylor, M. D., Brooten, D. A., Campbell, R. L., Maislin, G., McCauley, K. M., & Schwartz, J. S. (2004). Transitional care of older adults hospitalized with heart failure: a randomized, controlled trial. *Journal of the American Geriatrics Society*, *52*(5), 675-684. https://doi.org/10.1111/j.1532-5415.2004.52202.x
29. Naylor, M. D., Shaid, E. C., Carpenter, D., Gass, B., Levine, C., Li, J., ... & Williams, M. V. (2017). Components of comprehensive and effective transitional care. *Journal of the American Geriatrics Society*, *65*(6), 1119-1125. https://doi.org/10.1111/jgs.14782
30. Nguyen-Buckley, C., & Steadman, R. (2018). How to implement evidence-based healthcare. *Anesthesia & Analgesia*, *126*(5), 1777-1778. *DOI:* 10.1213/ANE.0000000000002842
31. O'Brien, B. C., Harris, I. B., Beckman, T. J., Reed, D. A., & Cook, D. A. (2014). Standards for reporting qualitative research: a synthesis of recommendations. *Academic medicine*, *89*(9), 1245-1251. *DOI:* 10.1097/ACM.0000000000000388
32. Palacio, A., Garay, D., Langer, B., Taylor, J., Wood, B. A., & Tamariz, L. (2016). Motivational interviewing improves medication adherence: a systematic review and meta-analysis. *Journal of general internal medicine*, *31*(8), 929-940. https://doi.org/10.1007/s11606-016-3685-3
33. Sadowski, L. S., Kee, R. A., VanderWeele, T. J., & Buchanan, D. (2009). Effect of a housing and case management program on emergency department visits and hospitalizations among chronically ill homeless adults: a randomized trial. *Jama*, *301*(17), 1771-1778. doi:10.1001/jama.2009.561
34. Slazak, E., Cardinal, C., Will, S., Clark, C. M., Daly, C. J., & Jacobs, D. M. (2020). Pharmacist-led transitions-of-care services in primary care settings: opportunities, experiences, and challenges. *Journal of the American Pharmacists Association*, *60*(3), 443-449. https://doi.org/10.1016/j.japh.2019.11.016
35. Shadmi, E., Key, C., Molcho, T., Low, M., Giveon, S., Lieberman, N., & Balicer, R. D. (2018). Integrated Care for High-need High-cost Patients: The Comprehensive Care for Multimorbid Adults Program (CC-MAP). *International Journal of Integrated Care*, *18*(s2), 24. DOI:10.5334/ijic.s2024
36. Shah, M. K., Gandrakota, N., Cimiotti, J. P., Ghose, N., Moore, M., & Ali, M. K. (2021). Prevalence of and factors associated with nurse burnout in the US. *JAMA network open*, *4*(2), e2036469-e2036469. doi:10.1001/jamanetworkopen.2020.36469
37. Whiteside, L. K., Vrablik, M. C., Russo, J., Bulger, E. M., Nehra, D., Moloney, K., & Zatzick, D. F. (2021). Leveraging a health information exchange to examine the accuracy of self-report emergency department utilization data among hospitalized injury survivors. *Trauma surgery & acute care open*, *6*(1). https://doi.org/10.1136/tsaco-2020-000550
38. Zayas, C. E., He, Z., Yuan, J., Maldonado-Molina, M., Hogan, W. R., Modave, F., ... & Bian, J. (2016, May). Examining Healthcare Utilization Patterns of Elderly and Middle-Aged Adults in the United States. In *FLAIRS* (pp. 361-367).

39. Zhang, Y., Grinspan, Z., Khullar, D., Unruh, M. A., Shenkman, E., Cohen, A., & Kaushal, R. (2020, March). Developing an actionable patient taxonomy to understand and characterize high-cost Medicare patients. In *Healthcare* (Vol. 8, No. 1, p. 100406). Elsevier. https://doi.org/10.1016/j.hjdsi.2019.100406

.