Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 58 Issue: 10:2025
DOI: 10.5281/zenodo.17321741

EFFECTIVENESS OF INTEGRATED MULTIDISCIPLINARY HOSPITAL CARE MODELS ON PATIENT OUTCOMES AND LENGTH OF STAY: A SYSTEMATIC REVIEW

SANYTAN GHAZY AL OTAIBI
Emergency Medical, National Guard Hospital.

MOHAMMED DAWOOD ALMANSOUR
Physical Therapy, National Guard Hospital.

FAHAD RASHEED SALEM ALHARBI
Respiratory Therapist, National Guard Hospital.

AMJAAD ALI MOHAMMED
Dentist, National Guard Hospital.

SAUD ALJARBAA
Radiology, National Guard Hospital.

MOHAMMED ALSHEHRI
Radiology, National Guard Hospital.

ABDULLAH OBAID ALGHUWAINEM
Radiology, National Guard Hospital.

Abstract

Background: Hospitals increasingly deploy integrated, multidisciplinary models, such as clinical pathways, orthogeriatric co-management, hospitalist services, interdisciplinary rounds, and early supported discharge, to improve outcomes and reduce length of stay (LOS). **Objective:** To synthesize evidence on the effectiveness of integrated, team-based hospital care models on LOS, mortality, readmissions, functional outcomes, complications, and costs. **Methods:** Following PRISMA guidance, we included randomized and observational studies of adult inpatients receiving integrated multidisciplinary models versus usual care. Outcomes were extracted in duplicate and summarized narratively due to heterogeneity of designs, populations, and interventions; results tables provide study-level details. **Results:** Eighteen studies were included: nine primary studies in the results set (acute medical, surgical/orthopedic, and stroke care) and nine contextual/systematic reviews for background. Integrated models frequently reduced LOS (hip fracture, heart failure, community-acquired pneumonia, COPD) and, in several settings, lowered mortality or readmissions. Orthogeriatric and hospitalist co-management consistently shortened LOS and accelerated time to surgery in hip fracture cohorts, while clinical pathways and early supported discharge improved efficiency in pneumonia and stroke. Not all models decreased LOS (one stroke rehabilitation trial showed no LOS benefit and faster functional gains with conventional multidisciplinary care). **Conclusions:** Integrated multidisciplinary hospital care models generally reduce LOS and can improve survival and process outcomes, though effects vary by condition, model design, and implementation fidelity. Standardized reporting and higher-quality comparative trials are needed to define which model features drive benefit.

Keywords: Multidisciplinary Care; Clinical Pathways; Hospitalist; Orthogeriatrics; Early Supported Discharge; Interdisciplinary Rounds; Length of Stay; Readmissions; Mortality.

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 58 Issue: 10:2025
DOI: 10.5281/zenodo.17321741

INTRODUCTION

Integrated, multidisciplinary hospital care models aim to coordinate decision-making across professions, align care plans, and standardize best practices to improve outcomes and efficiency. Over the past two decades, hospitalist programs have proliferated and have been associated, in multiple comparative evaluations, with shorter LOS and lower costs relative to non-hospitalist care, with specific gains reported in orthopedic co-management, pneumonia processes, and heart failure bundles [1]. Contemporary reviews emphasize that LOS is a critical metric linked to safety, capacity, and cost; however, indiscriminate reduction risks premature discharge and downstream adverse events, underscoring the need for structured models that embed discharge planning and post-acute coordination [2].

Beyond staffing models, comprehensive geriatric assessment (CGA) and orthogeriatric services bring geriatric expertise and team-based assessment to medically complex older adults. CGA improves quality of life and reduces caregiver burden, though its effect on LOS is inconsistent across settings [3]. A broader evidence synthesis of internal-medicine physician involvement in surgical care suggests that comanagement with a multidisciplinary team, rather than consultation alone, is associated with reductions in LOS and inpatient mortality [4]. Learning-health-system overviews identify multiple hospital-led levers, clinical pathways, case management, interdisciplinary teams, medication management, and telehealth, but also highlight inconsistent effects across high-risk populations and important evidence gaps (social risk) [5].

Clinical pathways, in particular, aggregate best evidence into time-sequenced, role-explicit care plans. A meta-analysis of randomized and controlled trials reported frequent LOS reductions and cost savings without increased complications or readmissions, with larger effects for invasive procedures [6]. Building on this framework, this review focuses on integrated models (clinical pathways, orthogeriatric or hospitalist comanagement, interdisciplinary bedside rounds, early supported discharge) applied to adult inpatients, evaluating their impacts on LOS and other patient-centered outcomes. We synthesize primary comparative studies across medical and surgical conditions and contextualize findings with recent systematic reviews to identify model features associated with benefit and areas requiring further study.

METHODS

Eligibility criteria. We included randomized controlled trials and comparative observational studies of adult inpatients (≥18 years) evaluating an integrated, multidisciplinary hospital care model versus usual care. Eligible models included: clinical pathways/managed care pathways; hospitalist or internal-medicine comanagement; orthogeriatric comanagement; interdisciplinary bedside rounds/integrated care conferences; and early supported discharge services embedded within stroke models. We excluded pediatric populations, single-discipline interventions without integrated team processes, non-hospital settings, and non-comparative designs.

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 58 Issue: 10:2025
DOI: 10.5281/zenodo.17321741

Outcomes. Primary outcome was length of stay (LOS). Secondary outcomes included mortality (in-hospital, 30- or 90-day, 1-year), readmissions, time to surgery (where relevant), functional outcomes (modified Rankin Scale, Barthel Index), complications (delirium, pressure injury), and costs.

Information sources and study selection. We prioritized peer-reviewed studies available in full text. Two reviewers screened titles/abstracts and full texts against criteria. Given heterogeneity of clinical conditions and intervention content, we planned a narrative synthesis with structured evidence tables rather than a pooled meta-analysis.

Data extraction. Using a standardized template, two reviewers extracted: setting, design, population, intervention components, comparator, outcome definitions, and adjusted/unadjusted results. Disagreements were resolved by consensus.

Risk of bias and certainty. Randomized trials were appraised for sequence generation, allocation, blinding (where feasible), and completeness of outcome data; observational studies were assessed for selection, confounding, and outcome measurement bias. Certainty was judged qualitatively across consistency, directness, and precision.

Synthesis approach. We grouped studies by clinical area (orthopedic/hip fracture; stroke; cardiopulmonary/medical). We present study-level effects for LOS and key secondary outcomes in two summary tables and provide a narrative comparative synthesis emphasizing direction and magnitude of effects, noting when findings diverged across designs or conditions. No protocol was registered; this review follows PRISMA reporting elements (eligibility, selection flow, and outcome synthesis).

RESULTS

Study characteristics Nine primary comparative studies met inclusion criteria across diverse conditions and models:

Orthopedics, hip fracture: orthogeriatric services and orthopedic–hospitalist comanagement reduced LOS, time to surgery, and certain complications without increasing readmissions or mortality [10–12,14]. Stroke: an extended stroke unit service (with early supported discharge) improved functional independence and reduced institutional days; a randomized stroke rehabilitation pathway showed no LOS advantage and, in some measures, faster functional gains with conventional multidisciplinary care [9,13]. Medical/cardiopulmonary: clinical pathways for community-acquired pneumonia (CAP) improved survival, reduced LOS and costs; interdisciplinary/team-based rounds or conferences in heart failure and COPD reduced LOS and (in heart failure) 30-day readmissions [7,8,15].

Effects by condition/model

Orthopedics, hip fracture

In a monocentric, decade-long repeated cross-sectional study of 2798 patients discharged alive after hip-fracture surgery, full implementation of an orthogeriatric service shortened median LOS from 17.5 to 10.4 days across discharge destinations, lowered

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 58 Issue: 10:2025
DOI: 10.5281/zenodo.17321741

the risk of staying >3 weeks six-fold, reduced pressure ulcers, and yielded substantial bed-day and cost savings [10]. In a hospitalist-led comanagement before-after study (n=466), time to surgery decreased (38 to 25 hours), postoperative LOS decreased (9 to 7 days), and total LOS decreased (10.6 to 8.4 days) without differences in inpatient deaths or 30-day readmissions [11]. A prospective pre–post cohort of acute hip fractures using an integrated care pathway halved LOS (26.3 to 12.2 days) and improved time to first ambulation and complication profiles; 30-day readmissions were nil in both groups [12]. An orthopedic–hospitalist comanaged service reduced LOS by 1.6 days (27.4 to 21.9 hours trend toward faster surgery; surgery within 48 hours rose from 86% to 96%) with no increase in 30-day readmissions or mortality [14].

Synthesis: Across hip-fracture studies, integrated models (orthogeriatric or hospitalist co-management; care pathways) consistently shortened LOS, often accelerated access to theatre, and reduced complications such as pressure injuries, while maintaining readmission and mortality rates.

Stroke, acute and rehabilitation

A randomized trial of an extended stroke unit service with early supported discharge (n=320) demonstrated greater global independence at 26 weeks and reduced institutional LOS (mean 31.1 to 18.6 days) versus ordinary stroke unit care [9]. In contrast, a randomized stroke rehabilitation clinical pathway (n=152) showed no LOS reduction (50±19 vs 45±23 days) and faster functional improvement (4–12 weeks) and higher quality-of-life scores in the conventional multidisciplinary care group [13]. These findings underscore that pathway benefits depend on context and content: early, integration-oriented models focusing on discharge transitions may yield efficiency gains, whereas rigid pathway templates during post-acute rehabilitation can underperform relative to flexible team-based care.

Medical cardiopulmonary

In six U.S. hospitals, a CAP clinical pathway (levofloxacin 750 mg monotherapy or ceftriaxone+azithromycin) was associated with lower 90-day mortality, shorter LOS (adjusted =3.9 vs 5.0 days; unadjusted 4.9 vs 6.0), and lower total hospital costs than non-pathway antibiotic regimens [7]. A community-hospital heart-failure multidisciplinary rounding program reduced 30-day readmissions (27.6% to 17.22%) with a modest LOS decrease (5.7 to 5.0 days) [8]. In a two-hospital comparison, daily integrated care conferences for COPD exacerbation achieved shorter LOS (3.37 vs 5.55 days), with benefit across age strata [15].

Synthesis: For acute medical conditions, clinical pathways and structured interdisciplinary rounds/conferences consistently improved throughput (LOS) and, in some cases, survival (CAP) or readmissions (heart failure).

Safety, function, and costs

Where reported, integrated models did not increase readmissions and often reduced complications (fewer pressure wounds in hip fracture). Functional outcomes improved

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 58 Issue: 10:2025
DOI: 10.5281/zenodo.17321741

with early supported discharge in stroke (higher independence), while one stroke rehabilitation pathway underperformed conventional multidisciplinary care. Cost data, although sparse, indicated meaningful savings aligned with reduced LOS (bed-day reductions and estimated annual savings within orthogeriatric programs; lower total hospital costs in CAP pathway care).

Table 1: Characteristics of included primary studies and main outcomes

Study (Design)	Setting/Population	Integrated model (Comparator)	Primary outcomes	Key results
Frei 2011 (obs. cohort) [7]	CAP in 6 U.S. hospitals, n=792	Antibiotic clinical pathway (fluoroquinolone 750 mg or ceftriaxone+azithro) vs non-pathway	90-day mortality; LOS; costs	Lower mortality; LOS decrease (=3.9–5.0 vs 5.0–6.0 d); costs decrease
Olsson 2006 (prospective pre–post) [12]	Acute hip fracture, Sweden, n=112	Integrated care pathway vs conventional	LOS; time to ambulation; complications; 30-d readmissions	LOS 12.2 vs 26.3 d; earlier ambulation; fewer complications; no 30-d readmits
Lisk 2023 (repeat cross-sectional) [10]	Hip fracture, UK, n=2798	Orthogeriatric service (vs pre-implementation)	LOS; bed-days; pressure ulcers; costs	LOS 10.4 vs 17.5 d; fewer prolonged stays; fewer ulcers; cost savings
Indredavik 2000 (RCT) [9]	Stroke unit, Norway, n=320	Extended SU + early supported discharge vs ordinary SU	Independence; institutional LOS; mortality	Higher independence; institutional LOS 18.6 vs 31.1 d; similar mortality
Chava 2019 (before-after) [8]	HF admissions, U.S., n=332	Multidisciplinary rounds vs pre-intervention	30-d readmissions; LOS	Readmissions 27.6% to 17.22%; LOS 5.7 to 5.0 d
Phy 2005 (historical cohort) [11]	Hip fracture ≥65 y, U.S., n=466	Hospitalist comanagement vs standard	Time to surgery; LOS; mortality; readmissions	Time to surgery 38 to 25 h; LOS 10.6 to 8.4 d; no increase deaths/readmissions
Sulch 2000 (RCT) [13]	Stroke rehab unit, UK, n=152	Managed care pathway vs conventional MDT	LOS; function; QoL	No LOS benefit; faster recovery and better QoL with conventional care
Bracey 2016 (pre–post) [14]	Hip fracture, U.S., n=99	Orthopedic–hospitalist comanagement vs pre-implementation	LOS; time to surgery; 30-d outcomes	LOS −1.6 d; trend to faster surgery; no increase readmissions or deaths
Shilian 2020 (retrospective 2-site) [15]	COPD exacerbation, U.S., n=1683	Integrated care conferences vs none	LOS	LOS 3.37 vs 5.55 d (all ages)

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 58 Issue: 10:2025
DOI: 10.5281/zenodo.17321741

Table 2: Quantitative summary of length-of-stay (LOS) effects and selected secondary outcomes

Condition / Model	Representative LOS effect	Secondary outcomes
Hip fracture, orthogeriatric service	17.5 to 10.4 d (all destinations) [10]	decrease prolonged stays; decrease pressure ulcers; cost savings
Hip fracture, hospitalist/orthopedic comanagement	10.6 to 8.4 d [11]; −1.6 d [14]	decrease time to surgery; no increase mortality/readmissions
Hip fracture, care pathway	26.3 to 12.2 d [12]	Earlier ambulation; fewer complications; zero 30-d readmits
Stroke, extended SU + early supported discharge	Institutional LOS 31.1 to 18.6 d [9]	increase independence at 26 weeks; similar mortality
Stroke, rehab pathway	No LOS reduction (50 vs 45 d) [13]	Faster functional gains and QoL with conventional MDT
CAP, antibiotic pathway	=4.9–6.0 to 3.9–5.0 d [7]	decrease 90-d mortality; decrease costs
HF, multidisciplinary rounds	5.7 to 5.0 d [8]	30-d readmissions 27.6% to 17.22%
COPD, integrated care conferences	5.55 to 3.37 d [15]	Benefit across age groups

DISCUSSION

This review shows that integrated, multidisciplinary hospital care models generally reduce LOS across diverse conditions and often improve additional outcomes. In orthopedic hip-fracture care, orthogeriatric and hospitalist comanagement models consistently shortened LOS and time to surgery while maintaining or improving safety signals (fewer pressure injuries), aligning with meta-analytic evidence that orthogeriatrics reduces LOS, in-hospital and 1-year mortality, and delirium [16]. These findings also dovetail with the broader hospitalist literature associating hospitalist involvement with shorter LOS and lower costs, especially when tied to structured processes and comanagement of surgical patients [1].

In acute medical care, clinical pathways standardized early, evidence-based treatment and discharge milestones, leading to meaningful LOS and cost reductions in pneumonia alongside lower medium-term mortality [7]. Interdisciplinary rounding and integrated care conferences offer a low-cost organizational lever that improved LOS and, in heart failure, reduced 30-day readmissions, consistent with systems-level reviews that identify team-based coordination and discharge planning as key to throughput [5]. Importantly, not all integrated models conferred uniform benefit: a randomized stroke rehabilitation pathway underperformed conventional multidisciplinary care for functional recovery and did not reduce LOS [13], echoing meta-analytic caution that indiscriminate pathway adoption may yield variable effects across settings [6]. This heterogeneity emphasizes that model design matters, flexible, person-centered MDT care with clear roles and responsive adjustments may outperform rigid, template-driven pathways in rehabilitation contexts.

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 58 Issue: 10:2025
DOI: 10.5281/zenodo.17321741

Evidence quality varied. Randomized trials (stroke settings) demonstrated functional gains and reduced institutional days with early supported discharge [9], while most hip-fracture and cardiopulmonary data were before-after or cohort comparisons susceptible to confounding; nevertheless, the direction and magnitude of LOS benefit were consistent. Recent syntheses suggest that multidisciplinary comanagement (rather than IM consultation alone) is the feature most associated with reduced LOS and mortality in surgical populations [4], and that the largest LOS gains from clinical pathways occur in invasive/procedural care [6].

Implementation context influences effect sizes. In orthogeriatrics, stepwise service redesign, prioritized theatre access, geriatric assessment, MDT rehab, and structured discharge, produced system-level bed-day savings and reduced complications [10,16]. Regional commentaries highlight opportunities and challenges in scaling orthogeriatrics (across Asia), with early evidence of improved time-to-surgery and survival after co-management adoption [17]. Interdisciplinary bedside rounds likely improve patient-centeredness and team collaboration, but evidence quality is mixed and barriers (time, hierarchy, coordination) must be addressed [18].

Implications: Health systems aiming to improve LOS and outcomes should prioritize team-based comanagement models with clear accountability, condition-specific clinical pathways that embed discharge planning, and post-acute integration (early supported discharge). Future research should include pragmatic randomized or quasi-experimental designs, standardized reporting of core outcomes (LOS, readmissions, mortality, function, costs), and evaluation of contextual moderators (social risk, capacity constraints).

CONCLUSION

Integrated, multidisciplinary hospital care models, orthogeriatric and hospitalist comanagement, clinical pathways, interdisciplinary rounds, and early supported discharge, generally reduce length of stay and frequently improve clinical outcomes without compromising safety. Benefits are most consistent in hip fracture and acute medical conditions when models combine clear team roles, standardized care processes, and robust discharge coordination. Effects vary by context, with some rehabilitation pathways showing no LOS advantage. Health systems should adopt flexible, team-centered designs and evaluate implementation fidelity. High-quality comparative studies are needed to identify the model components that most reliably drive gains in throughput, outcomes, and value.

References

1) Peterson MC. A systematic review of outcomes and quality measures in adult patients cared for by hospitalists vs nonhospitalists. Mayo Clin Proc. 2009;84(3):248-254.

2) Hirani R, Podder D, Stala O, Mohebpour R, Tiwari RK, Etienne M. Strategies to reduce hospital length of stay: evidence and challenges. Medicina (Kaunas). 2025; 61:922.

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
E-Publication: Online Open Access
Vol: 58 Issue: 10:2025
DOI: 10.5281/zenodo.17321741

3) Chen Z, Ding Z, Chen C, Sun Y, Jiang Y, Liu F, et al. Effectiveness of comprehensive geriatric assessment intervention on quality of life, caregiver burden and length of hospital stay: a systematic review and meta-analysis of randomized controlled trials. BMC Geriatr. 2021; 21:377.

4) Shaw M, Pelecanos AM, Mudge AM. Evaluation of internal medicine physician or multidisciplinary team comanagement of surgical patients and clinical outcomes: a systematic review and meta-analysis. JAMA Netw Open. 2020;3(5): e204088.

5) Siddique SM, Tipton K, Leas B, Greysen SR, Mull NK, Lane-Fall M, et al. Interventions to reduce hospital length of stay in high-risk populations: a systematic review. JAMA Netw Open. 2021;4(9): e2125846.

6) Rotter T, Kugler J, Koch R, Gothe H, Twork S, van Oostrum JM, Steyerberg EW. A systematic review and meta-analysis of the effects of clinical pathways on length of stay, hospital costs and patient outcomes. BMC Health Serv Res. 2008; 8:265.

7) Frei CR, Bell AM, Traugott KA, Jaso TC, Daniels KR, Mortensen EM, et al. A clinical pathway for community-acquired pneumonia: an observational cohort study. BMC Infect Dis. 2011; 11:188.

8) Chava R, Karki N, Ketlogetswe K, Ayala T. Multidisciplinary rounds in prevention of 30-day readmissions and decreasing length of stay in heart failure patients: a community hospital–based retrospective study. Medicine (Baltimore). 2019;98(27): e16233.

9) Indredavik B, Fjærtoft H, Ekeberg G, Løge AD, Mørch B. Benefit of an extended stroke unit service with early supported discharge: a randomized, controlled trial. Stroke. 2000; 31:2989-2994.

10) Lisk R, Yeong K, Fluck D, Robin J, Fry CH, Han TS. An orthogeriatric service can reduce prolonged hospital length of stay for older adults admitted with hip fractures: a monocentric study. Aging Clin Exp Res. 2023; 35:3137-3146.

11) Phy MP, Vanness DJ, Melton LJ 3rd, Long KH, Schleck CD, Larson DR, et al. Effects of a hospitalist model on elderly patients with hip fracture. Arch Intern Med. 2005; 165:796-801.

12) Olsson LE, Karlsson J, Ekman I. The integrated care pathway reduced the number of hospital days by half: a prospective comparative study of patients with acute hip fracture. J Orthop Surg Res. 2006; 1:3.

13) Sulch D, Perez I, Melbourn A, Kalra L. Randomized controlled trial of integrated (managed) care pathway for stroke rehabilitation. Stroke. 2000; 31:1929-1934.

14) Bracey DN, Kiymaz TC, Holst DC, Hamid KS, Plate JF, Summers EC, et al. An orthopedic-hospitalist comanaged hip fracture service reduces inpatient length of stay. Geriatr Orthop Surg Rehabil. 2016;7(4):171-177.

15) Shilian R, Abraham T, Wynbrandt J, Jhaveri D, Hostoffer RW, Peppers BP. Daily integrated care conferences to reduce length of hospital stay for patients with COPD exacerbation. J Am Osteopath Assoc. 2020;120(3):144-152.

16) Van Heghe A, Mordant G, Dupont J, Dejaeger M, Laurent MR, Gielen E. Effects of orthogeriatric care models on outcomes of hip fracture patients: a systematic review and meta-analysis. Calcif Tissue Int. 2022; 110:162-184.

17) Ho SWL, Phua SKA, Tan BY. Bringing orthogeriatric care for elderly patients with hip fractures to Asia. Lancet Reg Health West Pac. 2022; 21:100418.

18) Heip T, Van Hecke A, Malfait S, Van Biesen W, Eeckloo K. The effects of interdisciplinary bedside rounds on patient centeredness, quality of care, and team collaboration: a systematic review. J Patient Saf. 2022;18: e40-e44.