THE EUROPEAN SOCIETY OF MEDICINE
Medical Research Archives, Volume 12 Issue 7

REVIEW ARTICLE

Health Disparities in Hospital Readmissions in Rural vs Urban Populations in the United States: A Comprehensive Review of Factors and Reduction Strategies

Jovita Echere[1], Okelue E. Okobi[2*], Oluwatosin B. Iyun[3], Gideon Kwame Siaw Gyampoh[4], Satkarjeet Kaur Gill[5]

[1]MD Anderson Cancer Center, Texas, USA.
[2]Larkin Community Hospital, Miami, Florida, USA.
[3]University of Cape Town, Cape Town, South Africa.
[4]Eastern Regional Hospital, Koforidua, Ghana.
[5]Jagare Ridge Medical Clinic, Edmonton, Alberta, Canada.

OPEN ACCESS

PUBLISHED
31 July 2024

CITATION
Echere, J., Okobi, O., E., et al., 2024. Health Disparities in Hospital Readmissions in Rural vs Urban Populations in the United States: A Comprehensive Review of Factors and Reduction Strategies. Medical Research Archives, [online] 12(7). https://doi.org/10.18103/mra.v12i7.XXXX

COPYRIGHT
© 2024 European Society of Medicine. This is an open- access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

DOI
https://doi.org/10.18103/mra.v12i7.XXXX

ISSN
2375-1924

ABSTRACT

Background: Health disparities between rural and urban populations in the United States significantly impact health outcomes, access to medical services, and overall care quality. These disparities are influenced by factors such as socioeconomic status, geographic isolation, availability of healthcare providers, and the prevalence of chronic health conditions. Hospital readmission rates serve as critical indicators of care quality and post-discharge management effectiveness. High readmission rates often highlight issues in patient care management, discharge planning, and follow-up care efficacy, necessitating targeted interventions to improve patient outcomes and reduce healthcare costs. Rural areas face unique challenges in addressing these issues due to limited resources and access barriers.

Method: A comprehensive approach was employed to investigate health disparities between rural and urban populations in the United States, focusing on strategies to mitigate hospital readmission rates in rural areas. The literature review involved searching electronic databases, including PubMed, Google Scholar, and Scopus, with keywords like "rural health disparities," "urban-rural differences," "hospital readmission," and "healthcare interventions." Articles were selected based on their relevance to hospital readmissions and interventions targeting rural populations. Data extraction encompassed study characteristics, participant demographics, outcomes related to hospital readmissions, and intervention details such as telehealth and care coordination programs. National data from guides and reports were also included to capture broader trends and efforts at reducing readmissions.

Results: The review revealed significant disparities in hospital readmission rates between rural and urban populations in the United States. Rural areas exhibited higher readmission rates due to limited healthcare access, higher prevalence of chronic conditions, and socioeconomic challenges. Strategies such as enhanced telehealth services, improved primary care access, and care coordination programs demonstrated potential in mitigating these disparities.

Conclusion: Addressing health disparities between rural and urban populations requires a multifaceted approach. Effective strategies include expanding telehealth services, improving care coordination, and strengthening community-based healthcare resources. Policymakers should focus on addressing socioeconomic disparities and ensuring equitable distribution of funding and resources. Continuous evaluation of healthcare policies can provide insights into improving outcomes for rural populations. Future research should standardize methodologies, foster interdisciplinary collaborations, and incorporate qualitative insights to inform effective, equitable healthcare interventions and policies.

Keywords: Hospital readmission, Rural health, Urban Health, Healthcare disparities, United States, Review.

Introduction

Health disparities between rural and urban populations in the United States pose a persistent challenge within the healthcare system, impacting various health outcomes, access to medical services, and overall care quality. These disparities are influenced by complex factors including socioeconomic status, geographic isolation, healthcare provider availability, and the prevalence of chronic health conditions. Particularly glaring are the differences in hospital readmission rates, which serve as critical indicators of care quality and post-discharge management effectiveness[1-3].

Hospital readmission rates are pivotal metrics used to assess healthcare quality. High rates often signal issues in patient care management, discharge planning, and follow-up care efficacy, thus necessitating interventions to improve patient outcomes and reduce healthcare costs. Initiatives by the Centers for Medicare & Medicaid Services (CMS) and other healthcare entities underscore the importance of reducing readmissions, yet rural areas face unique challenges due to limited resources and barriers to access[3-6].

Rural populations in the United States experience disproportionately higher hospital readmission rates for several reasons. Firstly, rural regions typically lack adequate healthcare facilities and providers, resulting in longer travel times and delayed access to care. This geographic isolation contributes to less timely and comprehensive post-discharge follow-up, exacerbating healthcare disparities. Additionally, rural residents often encounter socioeconomic disadvantages such as lower incomes and higher unemployment rates, which impede their ability to afford medications, transportation, and other healthcare expenses. Moreover, rural communities exhibit higher prevalence rates of chronic conditions like diabetes, heart disease, and respiratory illnesses, necessitating ongoing management that contributes to increased readmissions[7-9].

Addressing these disparities requires a multifaceted approach tailored to the specific challenges faced by rural communities. One effective strategy is expanding telehealth services, which mitigate geographic barriers by offering remote consultations, follow-up care, and health monitoring. Telehealth minimizes the need for extensive travel to healthcare facilities, thereby enhancing access and potentially reducing readmissions[10-11]. Furthermore, enhancing care coordination through integrated care models ensures patients receive comprehensive and continuous care. This involves improving communication among healthcare providers and utilizing electronic health records to facilitate seamless information sharing[12].

Another critical approach involves strengthening community-based healthcare resources. Community health workers and local health programs play crucial roles in supporting patients with chronic conditions, providing education, aiding medication management, and promoting lifestyle changes. Additionally, policy interventions should prioritize increased funding and resources for rural healthcare infrastructure, including hospitals, clinics, and transportation services. Such investments aim to mitigate systemic issues contributing to healthcare disparities in rural areas[13-14].

The objective of this review is to examine the health disparities between rural and urban populations in the United States, particularly focusing on hospital readmission rates. It aims to identify and analyze the key factors contributing to these disparities, such as limited healthcare access, higher prevalence of chronic conditions, and socioeconomic differences in rural areas. Additionally, the study seeks to evaluate the effectiveness of various strategies designed to reduce readmission rates, including enhanced telehealth services, improved access to primary care, and care coordination programs. The ultimate goal is to provide evidence-based recommendations for improving healthcare delivery and outcomes in rural communities.

The review revealed significant disparities in hospital readmission rates between rural and urban populations in the United States. Summary of

studies on hospital readmission strategies are presented in table 1. Rural areas exhibited higher readmission rates, primarily due to limited healthcare access, higher prevalence of chronic conditions, and socioeconomic challenges. Enhanced telehealth services, improved primary care access, and care coordination programs demonstrated potential in mitigating these disparities[1,3,5,15].

Disparities in hospital readmission rates

Non-Hispanic Black patients had the highest readmission rates in 2016 at 19.4% (Figure 1). In 2018, there were 2.3 million 30-day readmissions costing $35.7 billion, with 10% potentially preventable. COVID-19 increased readmission risks for older patients, those with chronic conditions, recent hospital stays, or discharges to skilled nursing facilities or home health. Telehealth, expanded by CMS during the pandemic, showed potential to reduce readmissions but faced barriers due to a lack of digital access. This digital divide led to higher 30-day readmissions and mortality rates among underserved populations, particularly affecting Hispanic, rural, and socially deprived Medicare enrollees[16].

Figure: 1 Rate of unplanned readmission across the racial groups

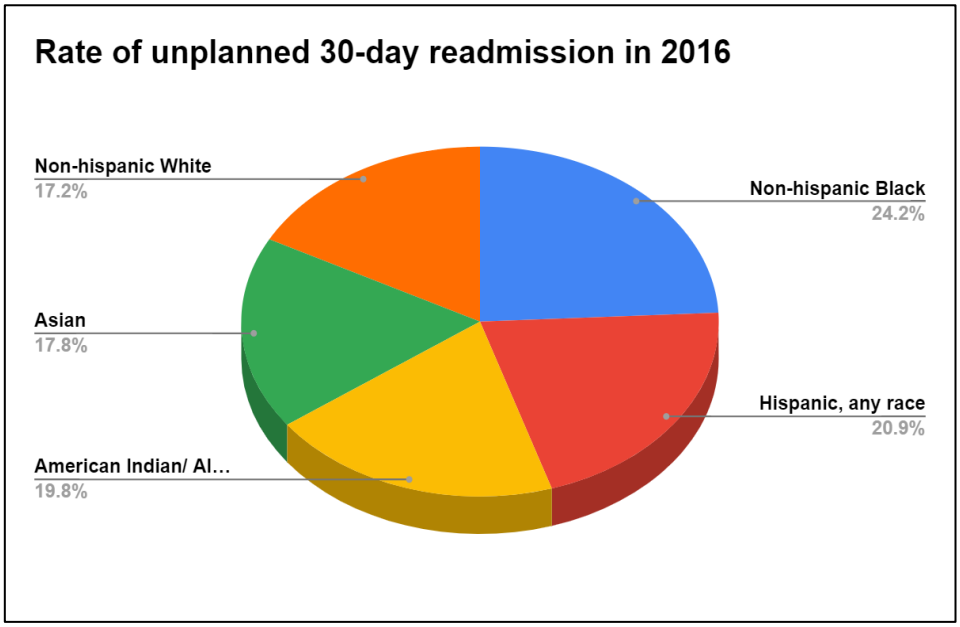

Table 1: Summary of studies on hospital readmission strategies and health disparities in rural vs. urban populations in the United States

Sr. No.	Author Name, Study Year	Study Design	Study Purpose	Study Main Finding	Conclusion
1	Nash, K.A. et al., 2024[19]	Cross-sectional study	To define equitable readmissions, identify hospitals with equitable readmissions by insurance and race, and compare them with hospitals without equitable readmissions	17% of hospitals had equitable readmissions by insurance and 30% by race. Hospitals with equitable readmissions served fewer Black patients and differed in multiple characteristics	A minority of hospitals achieved equitable readmissions, highlighting the role of structural racism and the need for measures considering patient distribution among hospitals
2	Lui, B. et al., 2024[20]	Retrospective cohort study	To examine disparities in 30-day postpartum readmission by patient- and hospital-level factors	Black mothers and mothers with public insurance had higher readmission rates. Income was inversely related to readmission rates	Significant disparities in postpartum readmissions exist, particularly among Black mothers, necessitating targeted actions to address these disparities
3	Jiang, H.J. et al., 2024[21]	Interrupted time-series analysis	To assess changes in in-hospital mortality for time-sensitive conditions during the COVID-19 pandemic compared to pre-pandemic periods by hospital location	In-hospital mortality increased for sepsis and pneumonia during the pandemic, with greater increases in rural hospitals. Mortality increases were linked to community COVID-19 levels	Patient outcomes for time-sensitive conditions worsened during the pandemic, with varied impacts by hospital location, suggesting tailored strategies are needed for future crises
4	Tung, E.L. et al., 2024[22]	Pooled cross-sectional analysis	To examine whether hospital closure is associated with socioeconomic disadvantage and racial/ethnic minority composition	Hospitals in areas with higher socioeconomic disadvantage and Black racial composition had higher odds of closure	Disproportionate hospital closures in socioeconomically disadvantaged and Black communities raise concerns about unequal healthcare resource distribution

© 2024 European Society of Medicine

Sr. No.	Author Name, Study Year	Study Design	Study Purpose	Study Main Finding	Conclusion
5	Pati, D. et al., 2024[23]	Symposium data analysis	To identify rural health challenges and opportunities in the context of the COVID-19 pandemic	Four main challenges: healthcare delivery, infrastructure, community health, and public administration. The pandemic highlighted the resilience of rural clinicians	Rural health challenges were exacerbated by the pandemic, but opportunities for improvement were identified, including the potential of telemedicine
6	Franz, B. et al., 2024[24]	Bivariate and regression analyses	To assess disparities in hospital-based transitional opioid programs across rural and urban hospitals	Rural hospitals had lower odds of offering addiction consult services and medications for opioid use disorder compared to urban hospitals	Rural-urban disparities in opioid-related health outcomes may be due to less availability of evidence-based interventions in rural hospitals. Strategies to support rural hospital adoption of transitional opioid programs are needed
7	Williams, C. et al., 2024[25]	Retrospective study	To examine patient- and community-level factors influencing health outcomes in Mayo Clinic's Advanced Care at Home program	Older age and male gender were significant predictors of 30-day mortality. Severity of illness predicted readmission, mortality, and escalation. Community Gini Index and internet access predicted mortality	The study highlights the promise of equitable treatment in hospital-at-home programs and emphasizes the importance of addressing health equity issues to achieve inclusive healthcare delivery
8	Gonzalez, A.A. et al., 2024[26]	Retrospective, cross-sectional analysis	To simulate the impact of including SES-sensitive models on HRRP penalties for hospitals performing lower extremity revascularization (LER)	Adjusting for SES would reduce penalty amounts for 38% of SNHs compared with only 17% of non-SNHs	Including SES in readmission risk-adjustment models would reduce penalties for SNHs, especially teaching institutions
9	Wang, H. et al., 2024[27]	Retrospective analysis	To evaluate algorithmic bias in common 30-day hospital readmission models and assess selected fairness metrics	Retrained CMS and modified HOSPITAL score had the lowest racial and income bias in Maryland. Modified HOSPITAL score showed the lowest racial bias in Florida	Fairness measures can detect disparate model performances but are insufficient alone to inform policy changes
10	Mentias, A. et al., 2024[28]	Retrospective cohort study	To evaluate rural-urban differences in GDMT use among Medicare beneficiaries following new-onset HFrEF	Optimal GDMT use at 12 months was significantly lower among rural patients. Suboptimal GDMT was associated with higher mortality and subsequent HF hospitalization	Suboptimal GDMT use following new-onset HFrEF is lower in rural areas, contributing to higher mortality and HF hospitalization rates
11	Choudhry, H.S. et al., 2024[30]	Cross-sectional analysis	To evaluate the association between social determinants of health (SDH) and outcomes in patients with ocular cancer	Differences in SDH-related characteristics were observed among cancer types. Rural patients had higher likelihood of 30-day readmission	SDH influences presentation and readmission rates in ocular cancer, highlighting the need for public health efforts to address disparities
12	Tajeu, G.S. et al., 2024[31]	Pooled cross-sectional analysis	To determine the association of the HRRP with 30-day readmissions	HRRP was associated with a 3.80 percentage point decrease in readmission rates. Teaching, rural hospitals, and hospitals in predominantly Black markets saw larger decreases	The HRRP is effective, but hospital characteristics must be considered in policy development to ensure equitable responses to penalties and incentives
13	Correa-Agudelo, E. et al., 2024[32]	Retrospective cohort study using Bayesian mixed-effects models	To examine racial disparities in asthma hospitalization outcomes (length of stay and readmission) across the United States	Black participants had 20% shorter length of stay but 12% higher odds of readmission compared to White participants. Public-insured patients had longer stays and higher readmission odds than commercially insured patients	A comprehensive understanding of factors influencing asthma hospitalization is essential for addressing racial disparities and improving equitable outcomes in asthma care
14	Silver, R.A. et al., 2024[33]	Data analysis using Partial Least Squares–Structural Equation Modeling	To explore macrolevel factors contributing to hospital readmissions, particularly environmental, behavioral, and socioeconomic factors	Significant associations found between negative economic factors, environmental factors, and opioid use, which in turn was associated with hospital readmissions. Hospital access positively moderated the relationship between opioid use and readmissions	Addressing hospital readmissions requires considering macrolevel environmental factors alongside individual factors for a holistic approach
15	Preventza, O. et al., 2024[34]	Retrospective cohort study using Kaplan-Meier survival curves	To evaluate community socioeconomic factors in patients with unplanned readmission after proximal aortic surgery	Black patients and those undergoing emergency surgery had less favorable socioeconomic factors and poorer long-term survival compared to White patients and those with elective surgery	More frequent follow-up and targeted post discharge measures for patients with less favorable socioeconomic factors can improve outcomes. Developing off-campus clinics is important
16	Puro, N. et al., 2024[35]	Hierarchical linear regression models	To identify hospital and county characteristics associated with hospital partnerships to improve population health	Nonprofit and public hospitals had greater breadth and depth of partnerships compared to for-profit hospitals. Community social capital was positively associated with partnership breadth	Collaboration between hospitals and organizations can impact community health by addressing social determinants. A culture of public value within hospitals is crucial for effective community building
17	Axon, R.N. et al., 2024[36]	Retrospective cohort study using segmented regression models	To examine changes in hospitalization trends and healthcare utilization among Veterans following MISSION Act implementation	Post-implementation, readmission risks were higher for Veterans with community care (CC) and Medicare-funded (CMS) admissions compared to VHA admissions, but ED utilization was lower for CC admissions	MISSION Act implementation shifted treatment sites and payors for Veteran hospitalizations, necessitating further investigation into the reasons behind the observed divergence

© 2024 European Society of Medicine

Sr. No.	Author Name, Study Year	Study Design	Study Purpose	Study Main Finding	Conclusion
18	Harlan, E.A. et al., 2024[37]	Multivariable logistic regression	To examine the relationships among rurality, location of care, and mortality for mechanically ventilated patients	30-day mortality was higher for patients in rural intermediate care compared to urban intermediate care, with no significant difference in intensive care units.	Hospitalization in rural intermediate care is associated with increased mortality, highlighting the need to better understand and evaluate intermediate care usage across hospitals.
19	Carroll, A.R. et al., 2024[38]	Data analysis using Healthcare Cost and Utilization Project and US Census data	To examine associations between social determinants of health and hospitalization rates among children	Hospitalization rates decreased significantly as Child Opportunity Index (COI) increased, showing higher hospitalization rates in low COI areas.	Social context and community-engaged solutions are crucial for health systems aiming to eliminate care inequities and improve children's health outcomes.
20	Mahmoudi, E. et al., 2024[39]	Case-Control Study using generalized linear models	To examine racial/ethnic disparities in 30-day readmission and frequent hospitalizations among Medicare beneficiaries with dementia in traditional Medicare (TM) vs. Medicare Advantage (MA)	TM was associated with higher odds of 30-day readmission and frequent hospitalizations compared to MA. Hispanic and Black enrollees in TM had higher odds of frequent hospitalizations than those in MA. MA reduced Hispanic-White and Black-White disparities in frequent hospitalizations.	Medicare Advantage (MA) is associated with lower risks of 30-day readmission and frequent hospitalizations, and substantially reduces racial/ethnic disparities compared to Traditional Medicare (TM).

Abbreviation: AMI: Acute Myocardial Infarction ARB: Angiotensin Receptor Blocker ACEI: Angiotensin-Converting Enzyme Inhibitor BP: Blood Pressure CMS: Centers for Medicare & Medicaid Services CKD: Chronic Kidney Disease DM: Diabetes Mellitus ED: Emergency Department GDMT: Guideline-Directed Medical Therapy HbA1c: Hemoglobin A1c HF: Heart Failure HFrEF: Heart Failure with Reduced Ejection Fraction HOSPITAL: A prediction model for hospital readmissions HRRP: Hospital Readmissions Reduction Program LER: Lower Extremity Revascularization LDL-C: Low-Density Lipoprotein Cholesterol NT-proBNP: N-terminal pro b-type Natriuretic Peptide RAAsi: Renin-Angiotensin-Aldosterone System Inhibitors SGLT2i: Sodium-Glucose Co-Transporter-2 Inhibitors SDH: Social Determinants of Health SES: Socioeconomic Status SNH: Safety-Net Hospital TM: Traditional Medicare MA: Medicare Advantage

Impacts of rural hospital closures:

ECONOMIC AND HEALTH CONSEQUENCES

Rural hospital closures not only impact local economies by reducing income levels and increasing poverty rates but also introduce significant health vulnerabilities, especially during public health emergencies like the COVID-19 pandemic. The disproportionate closure of hospitals serving socioeconomically disadvantaged and minority communities exacerbates existing healthcare inequities. Effective strategies are imperative to mitigate these impacts, including enhancing emergency response capabilities and ensuring equitable healthcare resource allocation across rural areas. Further research and policy initiatives are needed to safeguard the health and economic well -being of rural populations facing hospital closures.

ECONOMIC IMPACTS

Rural hospital closures have profound economic repercussions, affecting income levels and exacerbating poverty rates in affected communities[17-18]. A systematic review indicated that the majority of studies (89%) reported adverse economic outcomes following closures, underscoring the significant financial strain imposed on local economies[17]. Particularly vulnerable are rural hospitals serving socioeconomically disadvantaged and predominantly Black populations, which face heightened closure risks[19]. Cross-sectional analyses further confirm these disparities, highlighting the inequitable distribution of healthcare resources and amplifying economic hardships in already marginalized areas.[18-19]

HEALTH IMPACTS

The health effects of rural hospital closures demonstrate variability across different studies. Scoping reviews have shown mixed findings, with some studies reporting no significant health impacts, depending on the categorization of closures across different decades. However, during the COVID-19 pandemic, interrupted time-series analyses revealed alarming trends in rural areas. In-hospital mortality rates for critical conditions such as sepsis and pneumonia surged, closely linked to community COVID-19 prevalence levels. This underscores the vulnerability of rural healthcare systems during health crises, necessitating targeted strategies to enhance resilience and emergency response capabilities[17].

LOCATION OF CARE AND PATIENT MORTALITY

Harlan et al. (2024) investigated the relationship between rurality, location of care, and patient mortality among mechanically ventilated patients

using multivariable logistic regression. Their findings highlight significantly higher 30-day mortality rates in rural intermediate care settings compared to urban settings. This disparity underscores the critical need for comprehensive evaluations of healthcare utilization patterns and outcomes in rural hospitals, particularly in intermediate care settings where mortality risks appear heightened[37].

Challenges in achieving equitable hospital readmissions

Healthcare disparities in hospital readmissions highlight inequalities in access and quality of care, with studies revealing higher rates among minority groups and those with public insurance. Efforts to achieve equitable outcomes face challenges rooted in structural barriers like racial disparities and uneven distribution of healthcare resources.

Disparities in hospital readmissions underscore inequalities in healthcare access and quality[20-21]. Studies focusing on 30-day postpartum readmissions revealed significantly higher rates among Black mothers and those covered by public insurance, highlighting systemic disparities [20]. Additionally, rural hospitals lag behind urban counterparts in providing essential addiction consult services and medications for opioid use disorder, contributing to disparate health outcomes in opioid management[21].

Efforts to achieve equitable hospital readmissions have encountered challenges. Investigations into hospitals striving for parity across insurance and racial demographics found that only a minority achieved equitable outcomes. These hospitals tended to serve fewer Black patients and differed markedly in operational characteristics compared to their peers, indicating systemic barriers such as structural racism and patient distribution among facilities[22].

Impacts of social determinants of health (SDH) on hospitalization rates

Social Determinants of Health (SDH) exert a profound influence on hospitalization rates across various health conditions and populations, revealing significant disparities rooted in socioeconomic factors, access to care, and community dynamics.

INFLUENCE OF SOCIOECONOMIC FACTORS ON HOSPITALIZATION RATES

Research using Healthcare Cost and Utilization Project (HCUP) data has underscored the critical role of socioeconomic status in shaping hospitalization rates. Studies[23-24] have shown a notable correlation between low Child Opportunity Index (COI) scores and heightened hospitalization rates among children. This association highlights how socioeconomically disadvantaged areas face increased healthcare utilization, often due to disparities in access to preventive care and essential health services[23].

SOCIAL DETERMINANTS OF HEALTH IN PEDIATRIC CARE

Carroll et al. (2024) utilized data from the Healthcare Cost and Utilization Project and US Census to explore how social determinants of health (SDOH) impact hospitalization rates among children. Their findings revealed higher hospitalization rates in areas with lower Child Opportunity Index (COI) scores, underscoring the critical role of social context in shaping children's health outcomes. They advocate for community-engaged solutions to address these disparities and improve pediatric healthcare access and quality[38].

FACTORS INFLUENCING HEALTH OUTCOMES IN MAYO CLINIC'S ADVANCED CARE AT HOME PROGRAM

Williams et al. (2024) conducted a retrospective study to explore factors influencing health outcomes within Mayo Clinic's Advanced Care at Home program. Their findings underscored that older age and male gender significantly predicted 30-day mortality rates. Severity of illness emerged as a critical factor influencing readmission, mortality, and escalation of care needs. Moreover, the study highlighted the Community Gini Index and access to the internet as predictors of mortality rates. These insights underscore the potential of hospital-

at-home programs to deliver equitable treatment and emphasize the imperative of addressing health equity issues in healthcare delivery[25].

SOCIOECONOMIC FACTORS AND PATIENT OUTCOMES

Preventza et al. (2024) examined the impact of socioeconomic factors on long-term survival post-proximal aortic surgery. Their findings revealed disparities in outcomes based on race and surgical urgency, with Black patients and those undergoing emergency surgery experiencing poorer long-term survival compared to their White and elective surgery counterparts. To mitigate these disparities, enhancing follow-up care and establishing off-campus clinics are recommended strategies aimed at improving outcomes for patients from less advantaged socioeconomic backgrounds[34].

SOCIAL DETERMINANTS OF HEALTH AND OCULAR CANCER OUTCOMES

Choudhry et al. (2024) conducted a cross-sectional analysis to assess how social determinants of health (SDH) influence outcomes in ocular cancer patients. Their findings revealed significant differences in SDH-related characteristics across different cancer types, particularly noting that rural patients faced a higher likelihood of 30-day readmission. This underscores the impact of SDH on disease presentation and healthcare utilization patterns in ocular cancer, emphasizing the imperative for targeted public health interventions aimed at reducing disparities and improving outcomes in vulnerable patient populations[30].

Enhancing community health through hospital partnerships and social capital

Hospital partnerships, particularly among nonprofit and public institutions, significantly influence community health outcomes by leveraging community social capital. These collaborations are vital in addressing social determinants of health and promoting overall well-being through coordinated efforts and resource-sharing.

PARTNERSHIPS AND SOCIAL CAPITAL

Hospital partnerships play a crucial role in community health outcomes[26-27]. Hierarchical linear regression models demonstrated that nonprofit and public hospitals engaged in broader and deeper partnerships compared to for-profit hospitals. Community social capital positively influenced the breadth of these partnerships, highlighting the role of collaborative efforts in addressing social determinants of health and improving population health outcomes[26].

IMPACT OF MISSION ACT

Implementation of the MISSION Act had varied impacts on hospitalization trends among Veterans. Retrospective cohort studies using segmented regression models revealed shifts in treatment sites and payors post-implementation. While readmission risks increased for Veterans receiving community care, emergency department (ED) utilization decreased. These findings underscore the complex dynamics of healthcare utilization and outcomes under policy changes affecting Veteran healthcare delivery[27].

HOSPITAL CHARACTERISTICS AND COMMUNITY PARTNERSHIPS

Puro et al. (2024) employed hierarchical linear regression models to identify hospital and county characteristics associated with partnerships designed to enhance population health. Their findings indicated that nonprofit and public hospitals engaged in more extensive and deeper partnerships compared to for-profit hospitals. Additionally, community social capital was positively correlated with the breadth of these hospital partnerships, underscoring the importance of collaboration in addressing social determinants of health and fostering community well-being[35].

Racial disparities across healthcare continua: Insights from asthma to dementia care

Racial disparities persist in various aspects of healthcare outcomes across different conditions

and insurance types, highlighting systemic inequities in access and quality of care. Asthma hospitalization[28] outcomes demonstrate stark differences based on race and insurance status. According to retrospective cohort studies employing Bayesian mixed-effects models[32], Black patients experience shorter hospital stays but higher readmission rates compared to White patients. Moreover, those with public insurance face prolonged hospital stays and increased readmission risks, underscoring the urgency for targeted interventions to mitigate racial disparities in asthma management[32].

MEDICARE ADVANTAGE AND DISPARITIES

In the realm of Medicare Advantage (MA) versus Traditional Medicare (TM), disparities in hospitalizations also come to light. Case-control studies using generalized linear models reveal that Hispanic and Black enrollees in TM exhibit higher odds of frequent hospitalizations compared to their counterparts in MA. This suggests that MA may offer more equitable healthcare access and outcomes for minority populations, emphasizing the potential role of insurance type in reducing disparities[29].

RACIAL/ETHNIC DISPARITIES IN DEMENTIA CARE

Focusing on dementia care among Medicare beneficiaries, Mahmoudi et al. (2024) investigate disparities in 30-day readmission and frequent hospitalizations. Their findings indicate that enrollment in MA reduces these disparities compared to TM, highlighting MA's potential in mitigating healthcare inequities in older adults with dementia[29,39].

Further emphasizing racial disparities in health outcomes, Correa-Agudelo et al. (2024) utilize Bayesian mixed-effects models to explore asthma hospitalization outcomes across the United States. Their study reveals that Black patients experience a 20% shorter length of stay than White patients but face 12% higher odds of readmission. Additionally, patients with public insurance endure longer hospital stays and increased readmission rates compared to those with commercial insurance, underscoring the critical need for targeted interventions to address disparities in asthma care and enhance equitable health outcomes[32].

Impact of policy and algorithmic bias on hospital readmissions

Algorithmic bias assessments in readmission models reveal disparities among scoring systems. Measures like modified HOSPITAL scores show potential to reduce racial and income biases. Silver et al. (2024) highlights macro-level factors like economic conditions and opioid use influencing hospital readmissions, emphasizing environmental and individual factors' roles in healthcare strategies.

FAIRNESS IN READMISSION MODELS

Assessments of algorithmic bias in readmission models highlight disparities across different scoring systems[31]. Retrospective analyses indicate that modified HOSPITAL scores exhibit lower racial and income bias in various states, suggesting that fairness measures can potentially mitigate disparities in healthcare predictive analytics. However, these measures are insufficient alone to address systemic biases in healthcare delivery and policy formulation[31].

FACTORS INFLUENCING HOSPITAL READMISSIONS

Silver et al. (2024) utilized Partial Least Squares–Structural Equation Modeling to investigate macro level factors influencing hospital readmissions. They identified significant associations between negative economic factors, environmental conditions, opioid use, and hospital readmissions. Access to healthcare facilities was found to positively moderate the relationship between opioid use and readmissions. This underscores the critical role of environmental and individual-level factors in strategies aimed at reducing hospital readmissions[33].

HEALTHCARE UTILIZATION POST-POLICY IMPLEMENTATION

Axon et al. (2024) examined changes in hospitalization trends among Veterans post-MISSION Act implementation using segmented

regression models. They observed higher readmission risks for Veterans receiving community care and Medicare-funded admissions compared to those under VHA care. Furthermore, emergency department utilization decreased for community care admissions following policy implementation, indicating complex shifts in healthcare utilization patterns that warrant further investigation[36].

Strengths and limitations

This review's strength lies in its comprehensive synthesis of diverse studies, revealing the multifaceted nature of healthcare disparities and the impact of social determinants of health on patient outcomes. By integrating findings from systematic reviews, cross-sectional studies, retrospective cohort analyses, and policy evaluations, the review provides a nuanced understanding of how socioeconomic factors, access to care, and community dynamics shape health outcomes. However, notable limitations include variability in study methodologies and definitions, which introduces heterogeneity and complicates direct comparisons. Additionally, the review may lack specific actionable recommendations and depth in discussing qualitative aspects of patient experiences and community perspectives. Addressing these limitations in future research could enhance strategies to promote health equity.

Future directions and recommendations

Future efforts to reduce hospital readmissions in the United States should prioritize the development of tailored interventions that address the unique challenges of rural and urban populations. Enhanced telehealth services, expanded during the COVID-19 pandemic, should be further developed to overcome digital access barriers and ensure equitable healthcare delivery. Implementing comprehensive care coordination programs and strengthening primary care access, particularly in underserved rural areas, are crucial steps. Additionally, integrating social determinants of health into readmission risk models can help identify at-risk populations more effectively. Policymakers should focus on addressing socioeconomic disparities and ensuring that funding and resources are distributed equitably. Continuous evaluation of the MISSION Act and similar policies can provide insights into improving healthcare outcomes for veterans and other vulnerable groups. Lastly, fostering cross-specialty referrals and connections to downstream care facilities will enhance the continuity and quality of care, ultimately reducing readmission rates.

Conclusion

This comprehensive review synthesizes findings from diverse studies on healthcare disparities, hospital utilization, and the impact of social determinants of health on patient outcomes. The research highlights significant disparities rooted in socioeconomic factors, access to care, and community dynamics, necessitating targeted interventions to promote health equity. Hospital partnerships, especially among nonprofit and public institutions, are vital for improving community health outcomes through collaborative efforts supported by community social capital. Policy insights, such as those from the MISSION Act, emphasize the need for adaptive strategies to optimize healthcare delivery, particularly for marginalized groups. Future research should standardized methodologies, foster interdisciplinary collaborations, and incorporate qualitative insights to inform effective, equitable healthcare interventions and policies.

© 2024 European Society of Medicine

Disclaimers:

This article has not been submitted to other publications and/or presented at conferences or meetings.

Source(s) of fund support:

None.

Funding Statement:

The research received no specific funding from any source.

Data Availability:

The data used in this study was from publicly available published research papers.

Conflict of interest:

All authors declare no conflicts of interest.

Regulatory Approval or Research Subject Protection Requirements:

This manuscript does not require regulatory approval.

Ethical approval:

This Paper does not require ethical approval.

Author contribution

All authors played several overlapping contributory roles such as: Conceptualization, design, cross-referencing, and fact-checking; Formal Analysis and interpretation of data; project administration, curation, visualization, writing – original draft, writing – review & editing; supervision, oversight, and leadership, correspondence, data curation, quality control, internal review, communications, data collection and archiving, software, literature search, validation, and approval.

© 2024 European Society of Medicine

References:

1. Ballard Brief: Healthcare access disparities among rural populations in the united states (2023). Accessed on: June 10, 2024. Healthcare Access Disparities among Rural Populations in the United States - Ballard Brief (byu.edu)

2. Richman L, Pearson J, Beasley C, Stanifer J. Addressing health inequalities in diverse, rural communities: An unmet need. *SSM Popul Health*. 2019;7:100398. Published 2019 Apr 9. doi:10.1016/j.ssmph.2019.100398

3. Silvestri D, Goutos D, Lloren A, et al. Factors Associated With Disparities in Hospital Readmission Rates Among US Adults Dually Eligible for Medicare and Medicaid. *JAMA Health Forum*. 2022;3(1):e214611. doi:10.1001/jamahealthforum.2021.4611

4. Taylor K, Davidson PM. Readmission to the hospital: common, complex and time for a re-think. *J Clin Nurs*. 2021;30(17-18):e56-e59. doi:10.1111/jocn.15631

5. Wang S, Zhu X. Nationwide hospital admission data statistics and disease-specific 30-day readmission prediction. *Health Inf Sci Syst*. 2022;10(1):25. Published 2022 Sep 2. doi:10.1007/s13755-022-00195-7

6. CMS: Centers for medicine & Medicaid Services (2023). Accessed on: June 10, 2024. Home - Centers for Medicare & Medicaid Services | CMS

7. Coughlin SS, Clary C, Johnson JA, et al. Continuing Challenges in Rural Health in the United States. *J Environ Health Sci*. 2019;5(2):90-92.

8. NIH: Access to healthcare and disparities in access- 2021 national healthcare quality and disparities report (2021). Accessed on: June 10, 2024. ACCESS TO HEALTHCARE AND DISPARITIES IN ACCESS - 2021 National Healthcare Quality and Disparities Report - NCBI Bookshelf (nih.gov)

9. Dugani SB, Mielke MM, Vella A. Burden and management of type 2 diabetes in rural United States. *Diabetes Metab Res Rev*. 2021;37(5):e3410. doi:10.1002/dmrr.3410

10. Kolluri S, Stead TS, Mangal RK, Coffee RL Jr, Littell J, Ganti L. Telehealth in Response to the Rural Health Disparity. *Health Psychol Res*. 2022;10(3):37445. Published 2022 Aug 20. doi:10.52965/001c.37445

11. Richman L, Pearson J, Beasley C, Stanifer J. Addressing health inequalities in diverse, rural communities: An unmet need. *SSM Popul Health*. 2019;7:100398. Published 2019 Apr 9. doi:10.1016/j.ssmph.2019.100398

12. Karam M, Chouinard MC, Poitras ME, et al. Nursing Care Coordination for Patients with Complex Needs in Primary Healthcare: A Scoping Review. *Int J Integr Care*. 2021;21(1):16. Published 2021 Mar 19. doi:10.5334/ijic.5518

13. Gizaw Z, Astale T, Kassie GM. What improves access to primary healthcare services in rural communities? A systematic review. *BMC Prim Care*. 2022;23(1):313. Published 2022 Dec 6. doi:10.1186/s12875-022-01919-0

14. Kreuter MW, Thompson T, McQueen A, Garg R. Addressing Social Needs in Health Care Settings: Evidence, Challenges, and Opportunities for Public Health. *Annu Rev Public Health*. 2021;42:329-344. doi:10.1146/annurev-publhealth-090419-102204

15. Sosin AN, Carpenter-Song EA. Reimagining Rural Health Equity: Understanding Disparities And Orienting Policy, Practice, And Research In Rural America. *Health Aff (Millwood)*. 2024;43(6):791-797. doi:10.1377/hlthaff.2024.00036

16. CMS: Guide for reducing disparities in readmission (2024). Accessed on: June 10, 2024. Guide for Reducing Disparities in Readmissions (cms.gov)

17. Planey, A.M., Thomas, S.R., Friedman, H., Hecht, H.K., Kent, E., & Holmes, G.M. (2024). Rural Hospital Closures: A Scoping Review of Studies Published Between 1990 and 2020. *Journal of Health Care for the Poor and Underserved 35*(2), 439-464. https://www.muse.jhu.edu/article/928626.

18. Mills CA, Yeager VA, Unroe KT, Holmes A, Blackburn J. The impact of rural general hospital

closures on communities-A systematic review of the literature. *J Rural Health*. 2024;40(2):238-248. doi:10.1111/jrh.12810

19. Nash KA, Weerahandi H, Yu H, et al. Measuring Equity in Readmission as a Distinct Assessment of Hospital Performance. *JAMA*. 2024; 331(2):111–123. doi:10.1001/jama.2023.24874

20. Lui B, Khusid E, Tangel VE, et al. Disparities in postpartum readmission by patient- and hospital-level social risk factors in the United States: a retrospective multistate analysis, 2015-2020. *Int J Obstet Anesth*. Published online April 16, 2024. doi:10.1016/j.ijoa.2024.103998

21. Jiang HJ, Henke RM, Fingar KR, Liang L, Agniel D. Mortality for Time-Sensitive Conditions at Urban vs Rural Hospitals During the COVID-19 Pandemic. *JAMA Netw Open*. 2024;7(3):e241838. doi:10.1001/jamanetworkopen.2024.1838

22. Tung EL, Bruch JD, Chin MH, Menconi M, Peek ME, Huang ES. Associations of United States hospital closure (2007-2018) with area socioeconomic disadvantage and racial/ethnic composition. *Ann Epidemiol*. 2024;92:40-46. doi:10.1016/j.annepidem.2024.02.010

23. Pati D, Sheykhmaleki P, Chilaka DAU. Reimagining America's Rural Health: Challenges and Opportunities. *HERD: Health Environments Research & Design Journal*. 2024;17(2):269-280. doi:10.1177/19375867231209501

24. Franz B, Cronin CE, Lindenfeld Z, et al. Rural-urban disparities in the availability of hospital-based screening, medications for opioid use disorder, and addiction consult services. *J Subst Use Addict Treat*. 2024;160:209280. doi:10.1016/j.josat.2023.209280

25. Williams C, Paulson N, Sweat J, et al. Individual- and Community-Level Predictors of Hospital-at-Home Outcomes. *Popul Health Manag*. Published online March 28, 2024. doi:10.1089/pop.2023.0297

26. Gonzalez AA, Motaganahalli A, Saunders J, Dev S, Dev S, Ghaferi AA. Including socioeconomic status reduces readmission penalties to safety-net hospitals. *J Vasc Surg*. 2024;79(3):685-693.e1. doi:10.1016/j.jvs.2023.11.027

27. Wang H, Weiner J, Saria S, Kharrazi H Evaluating Algorithmic Bias in 30-Day Hospital Readmission Models: Retrospective Analysis. J Med Internet Res 2024;26:e47125 URL: https://www.jmir.org/2024/1/e47125 DOI: 10.2196/47125

28. Mentias A, Keshvani N, Sumarsono A, et al. Patterns, Prognostic Implications, and Rural-Urban Disparities in Optimal GDMT Following HFrEF Diagnosis Among Medicare Beneficiaries. *JACC Heart Fail*. 2024;12(6):1044-1055. doi:10.1016/j.jchf.2023.08.027

29. Alan A, Ennabe M, Withers J, Joshi N, Weinand M. Addressing healthcare disparities in homeless neurosurgical patients: A comprehensive literature review on strategies for equitable care and improved outcomes. *Surg Neurol Int*. 2024;15:49. Published 2024 Feb 16. doi:10.25259/SNI_549_2023

30. Choudhry HS, Patel AM, Nguyen HN, Kaleem MA, Handa JT. Significance of Social Determinants of Health in Tumor Presentation, Hospital Readmission, and Overall Survival in Ocular Oncology. *Am J Ophthalmol*. 2024;260:21-29. doi:10.1016/j.ajo.2023.10.024

31. Tajeu GS, Davlyatov G, Becker D, Weech-Maldonado R, Kazley AS. Association of hospital and market characteristics with 30-day readmission rates from 2009 to 2015. *SAGE Open Med*. 2024;12:20503121231220815. Published 2024 Jan 18. doi:10.1177/20503121231220815

32. Correa-Agudelo E, Gautam Y, Mendy A, Mersha TB. Racial differences in length of stay and readmission for asthma in the all of us research program. *J Transl Med*. 2024;22(1):22. Published 2024 Jan 4. doi:10.1186/s12967-023-04826-9

33. Silver, R.A., Haidar, J. & Johnson, C. A state-level analysis of macro-level factors associated with hospital readmissions. *Eur J Health Econ* (2024). https://doi.org/10.1007/s10198-023-01661-z

34. Preventza O, Henry J, Khan L, et al. Unplanned readmissions, community socioeconomic factors,

and their effects on long-term survival after complex thoracic aortic surgery. *J Thorac Cardiovasc Surg*. Published online February 1, 2024. doi:10.1016/j.jtcvs.2024.01.035

35. Puro N, Cronin CE, Franz B, Singh S, Feyereisen S. Differential impact of hospital and community factors on breadth and depth of hospital population health partnerships. *Health Serv Res*. 2024;59 Suppl 1(Suppl 1):e14238. doi:10.1111/1475-6773.14238

36. Axon RN, Ward R, Mohamed A, et al. Trends in Veteran hospitalizations and associated readmissions and emergency department visits during the MISSION Act era. *Health Serv Res*. Published online June 2, 2024. doi:10.1111/1475-6773.14332

37. Harlan EA, Venkatesh S, Morrison J, et al. Rural-Urban Differences in Mortality among Mechanically Ventilated Patients in Intensive and Intermediate Care. *Ann Am Thorac Soc*. 2024;21(5):774-781. doi:10.1513/AnnalsATS.202308-684OC

38. Carroll AR, Hall M, Noelke C, et al. Association of neighborhood opportunity and pediatric hospitalization rates in the United States. *J Hosp Med*. 2024;19(2):120-125. doi:10.1002/jhm.13252

39. Mahmoudi E, Margosian S, Lin P. Racial/Ethnic Disparities in Hospital Readmission and Frequent Hospitalizations Among Medicare Beneficiaries with Alzheimer's Disease and Related Dementia: Traditional Medicare vs. Medicare Advantage. *J Gerontol B Psychol Sci Soc Sci*. Published online May 11, 2024. doi:10.1093/geronb/gbae078

© 2024 European Society of Medicine