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Evaluating the Impact of Respiratory Therapist–Led Case Management on Chronic Respiratory Disease Outcomes

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ABSTRACT

Respiratory diseases, particularly asthma and chronic obstructive pulmonary disease (COPD), continue to present major public health and economic challenges in the United States. These chronic conditions contribute significantly to healthcare expenditures and are associated with elevated morbidity and mortality rates. As healthcare systems shift toward value-based care, there is growing emphasis on strategies that improve chronic disease outcomes while containing costs. One promising solution is the expanded role of respiratory therapists (RTs) in case management. Given the burden of chronic respiratory diseases and the evidence supporting coordinated care, this paper examines the potential benefits of integrating RTs into case management positions. Through analysis of population-level data and a review of current care models, the goal is to assess whether RT-led case management can improve outcomes and reduce utilization in asthma and COPD populations. The purpose of this research is to evaluate the impact of integrating respiratory therapists (RTs) into case management positions, with particular emphasis on their impact on clinical outcomes, care coordination, and cost-effectiveness in the management of chronic respiratory diseases.

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Introduction

Respiratory diseases, particularly asthma and chronic obstructive pulmonary disease (COPD), continue to present major public health and economic challenges in the United States. These chronic conditions contribute significantly to healthcare expenditures and are associated with elevated morbidity and mortality rates. In 2023, respiratory diseases accounted for over \$170 billion in direct medical costs, with COPD ranked as the fourth leading cause of death [1-2]. Asthma affects over 25 million Americans, leading to frequent emergency department (ED) visits and hospitalizations. Structured case management models, modeled after programs for conditions like heart failure and diabetes, have similarly yielded improved outcomes and cost savings in respiratory care [3].

COPD is a costly disease, creates an economic burden, and is ranked as the sixth leading cause of death in the United States; that focuses on the direct economic burden of COPD and emphasizes how it remains a leading cause of healthcare utilization. COPD promotes expansion of evidence-based treatments and calls for public health initiatives aimed at prevention and early detection. COPD has continued to create a substantial burden on the U.S. healthcare system. Access to effective therapies remains limited and recommended interventions include investing in care models that support early intervention and chronic disease management. These critical findings support respiratory therapist-driven interventions [2].

As healthcare systems shift toward value-based care, there is growing emphasis on strategies that improve chronic disease outcomes while containing costs. One promising solution is the expanded role of respiratory therapists (RTs) in case management. RTs possess clinical expertise in pulmonary assessment, patient education, inhaler technique, and chronic disease self-management, making them uniquely qualified to coordinate care for individuals with respiratory conditions [4-5]. RT-led case management has demonstrated potential to improve patient adherence, reduce exacerbations, and enhance care transitions [6-7].

Despite well-established clinical guidelines, such as those developed by the Global Initiative for Chronic Obstructive Lung Disease, many patients with COPD continue to experience suboptimal disease control [8]. Treatment nonadherence, improper inhaler use, and inadequate follow-up are persistent barriers to effective management. Recent evidence supports the effectiveness of integrated disease management programs in improving quality of life, symptom control, and functional outcomes for COPD patients [9].

There is a need for specialized care coordination in managing chronic respiratory diseases. Traditional models often fail to address the multifaceted challenges patients face upon discharge from acute care. Respiratory therapists, with their expertise in pulmonary care and patient education, are well-positioned to fill this gap. RTs are integrated into interdisciplinary teams, they contribute to improved medication adherence, fewer exacerbations, and reduced readmission rates [8]. As healthcare expenditures continue to rise, particularly for hospital-based care

and respiratory medications, there is increasing demand for cost-effective strategies. Integrating RTs into case management roles may improve care continuity, reduce unnecessary emergency department utilization, and support the goals of value-based care models [6,8]. Respiratory diseases affect quality of life and create significant economic burdens. Healthcare GDPs in the United States are greater than in any other country, with respiratory diseases among the leading contributors at a cost of \$170.8 billion of total spending. This article examines data from 1996 to 2016. It reveals that pharmaceuticals were the most significant cost associated with asthma. COPD costs are dominated by inpatient care and prescriptions and continue to rise with an annual growth rate of 2.7% [1].

Problem Statement

Chronic respiratory diseases, such as chronic obstructive pulmonary disease (COPD) and asthma, represent a significant and growing public health burden in the United States. These conditions contribute substantially to healthcare utilization, accounting for billions of dollars annually in hospital admissions, emergency visits, and prescription medication [9]. Patients with COPD and asthma often experience exacerbations that result in preventable hospitalizations due to poor symptom management, inadequate follow-up, and barriers to care coordination [10].

Although evidence-based clinical guidelines exist for managing chronic respiratory conditions, implementation gaps remain. Many high-risk patients do not receive adequate patient education, inhaler technique training, or individualized support. Traditional case management models often lack pulmonary-specific expertise needed to address these challenges effectively. Respiratory therapists (RTs), with specialized training in chronic disease management, are uniquely positioned to help close these care gaps. However, RTs remain underutilized in outpatient and integrated care models, despite growing evidence of their effectiveness [11,12].

Purpose of the Study

In response to escalating readmission rates, the Centers for Medicare & Medicaid Services (CMS) implemented the Hospital Readmissions Reduction Program (HRRP) in 2015, which penalizes hospitals for excess readmissions of targeted conditions, including COPD. As a result, many healthcare organizations are exploring proactive, community-based approaches to managing chronic respiratory illness. RT case managers can provide high-impact interventions such as patient education, symptom monitoring, and timely follow-up care. All these strategies have been shown to reduce avoidable utilization and enhance patient satisfaction [11,12].

Given the burden of chronic respiratory diseases and the evidence supporting coordinated care, this paper examines the potential benefits of integrating RTs into case management positions. Through analysis of population-level data and a review of current care models, the goal is to assess whether RT-led case management can improve outcomes and reduce utilization in asthma and COPD populations. Therefore, the purpose of this research is to evaluate the impact of integrating respiratory therapists (RTs) into case management positions, with particular emphasis on their impact on clinical outcomes, care coordination, and cost-effectiveness in the management of chronic respiratory diseases.

Significance Statement

The rising prevalence of chronic respiratory diseases necessitates innovative care models that improve outcomes while containing

healthcare expenditures. In the United States, respiratory disease-related spending reached an estimated \$170.8 billion in 2023. Managing patients with complex chronic conditions requires clinical expertise, evidence-based strategies, and a coordinated approach to care. This research is significant because it explores the expanded role of respiratory therapists (RTs) in case management as a cost-effective strategy to address gaps in chronic disease care.

By leveraging RTs' specialized training in pulmonary care and chronic disease management, health systems can enhance care coordination, reduce preventable hospital admissions, and improve patient satisfaction. Demonstrating the effectiveness of RT-led case management supports workforce development and aligns with broader healthcare goals. Specifically, it complements federal priorities such as the Hospital Readmissions Reduction Program and supports accountable care organizations in delivering patient-centered, value-based services. As health systems aim to reduce readmissions and unnecessary utilization, the integration of RTs into case management frameworks warrants further study and implementation [11].

This research is grounded in a conceptual framework that examines the relationship between care coordination and healthcare utilization among adults with chronic respiratory conditions. Care coordination is used as a proxy for respiratory therapist (RT)-led case management. Prior research suggests that case management improves chronic disease outcomes by enhancing patient education, medication adherence, and timely follow-up care. The framework posits that individuals who receive help coordinating their medical care will have lower rates of emergency department (ED) use and overnight hospitalizations.

This conceptual model supports the research investigation of whether care coordination, interpreted in this context as a surrogate for potential RT-led interventions, correlates with reduced healthcare utilization among adults with chronic respiratory conditions.

Research Methodology, Design and Dataset

This study utilizes secondary data from the California Health Interview Survey Adult Public Use File (PUF), a large, population-based health survey conducted biennially by the UCLA Center for Health Policy Research [13]. CHIS collects self-reported data on health status, healthcare access, chronic conditions, and service utilization from diverse California communities via telephone and web in multiple languages [14]. The Adult PUF includes only individuals aged 18 and older; no additional age-based filtering was necessary. Using data from the 2023 California Health Interview Survey (CHIS), the variable COORDCARE (AJ80) is used as the independent measure representing receipt of coordinated care. Dependent outcomes include ED utilization (AH12V2), overnight hospitalization (AH14), and diagnosis of chronic lung disease or emphysema (AJ194_8). A subgroup analysis was also conducted for respondents currently diagnosed with asthma (AJ201), given their elevated risk for respiratory-related complications [15,16].

The research design was cross-sectional and exploratory, using existing CHIS data to examine whether receiving help with coordinated medical care (COORDCARE) is associated with reduced healthcare utilization (including emergency department visits and overnight hospitalization) among individuals with chronic respiratory conditions. The independent variable, receipt of care coordination, was measured using CHIS variable AJ80 (labeled COORDCARE in the dataset), which asked respondents whether they had received help coordinating their medical care in the past 12 months [17,18].

Sample and Inclusion Criteria

The analytic sample was restricted to adult respondents age 18 or older who reported a physician diagnosis of asthma. Cases with missing values on the primary independent variable or asthma-related outcome variables were excluded from the analysis. The final sample included only those with complete responses for relevant variables. A secondary subgroup analysis was conducted on respondents who reported having lung disease or emphysema, as indicated by a “yes” response to the variable AJ194_8. Inclusion in this subgroup required complete data for COORDCARE and hospitalization history (AH14). This subset was analyzed separately to explore whether coordinated care had an impact on hospitalization rates among individuals with chronic lung conditions [19,20].

Variables

This study examined one primary independent variable and three dependent variables related to healthcare utilization. The independent variable was receipt of care coordination, measured using the CHIS variable AJ80 (COORDCARE). Respondents were asked, “In the past 12 months, did anyone help you coordinate your medical care?” Responses were recoded into a dichotomous variable (1 = Yes; 0 = No).

Three dependent variables were included in the analysis:

- Emergency department (ED) utilization, measured by CHIS variable AH12V2, assessed whether the respondent had visited an emergency room for their own health in the past 12 months. This variable was recorded as binary (1 = Yes; 0 = No).
- Overnight hospitalization, measured by variable AH14, identified whether the respondent had been a patient in a hospital overnight during the past 12 months (1 = Yes; 0 = No).
- Chronic lung disease diagnosis, measured using variable AJ194_8, identified respondents who had been told by a doctor that they had lung disease or emphysema. Responses were recorded dichotomously (1 = Yes; 0 = No) and used to define a subgroup for additional analysis.

Statistical Analysis

To examine the relationship between coordinated care and emergency department (ED) utilization, a chi-square test of independence was conducted using data from the 2023 California Health Interview Survey (CHIS). In the overall adult sample, there was a statistically significant association between receiving coordinated care and having at least one ED visit in the past 12 months, $\chi^2 (1, N = 5,051) = 3.98, p = .046$. Individuals who received coordinated care were less likely to report ED visits compared to those who did not receive such care. A second chi-square test was performed focusing specifically on adults aged 18 and older who reported that they are currently having asthma. This subgroup analysis aimed to determine whether the observed relationship held among individuals at higher risk for respiratory-related complications [21,22].

The results indicated that the association between coordinated care and ED utilization was not statistically significant in this population, $\chi^2 (1, N = 1,935) = 1.06, p = .304$. These findings suggest that while coordinated care may be associated with reduced ED use in the general adult population, its effect may be diminished or require additional interventions when managing individuals with chronic conditions like asthma. Finally, to assess whether coordinated care impacts hospitalization outcomes among individuals with chronic lung disease, a chi-square analysis was

conducted using responses from those who reported a diagnosis of lung disease or emphysema (AJ194_8 = 1). The relationship between receipt of coordinated care (COORDCARE_BIN) and overnight hospitalization in the past 12 months (AH14) was examined. Results indicated no statistically significant association, $\chi^2 (1, N = 658) = 0.035, p = .852$. This suggests that, within this subgroup, coordinated care did not significantly reduce the likelihood of hospitalization.

Findings

This research analyzed the impact of coordinated care on emergency department (ED) utilization and hospitalization among adults with chronic respiratory conditions using data from the 2023 California Health Interview Survey (CHIS). A chi-square test of independence was conducted to examine the relationship between coordinated care and ED visits among all adult respondents. The results revealed a statistically significant association, $\chi^2 (1, N = 5,051) = 3.98, p = .046$, indicating that individuals who received coordinated care were less likely to report an ED visit in the past 12 months compared to those who did not receive such care (see Table 1).

Table 1: Emergency Department Utilization by Coordinated Care Status (All Adults)

Coordinated Care	Had ED Visit	No ED Visit	Total
Received	543	2,195	2,738
Not Received	529	1,784	2,313
Total	1,072	3,979	5,051

Note. $\chi^2 (1, N = 5,051) = 3.98, p = .046$.

A subgroup analysis was then conducted focusing on adults who reported currently having asthma. In this group, the association between coordinated care and ED utilization was not statistically significant, $\chi^2 (1, N = 1,935) = 1.06, p = .304$. While the direction of the association remained consistent with the general adult population, the results suggest a diminished effect on individuals managing chronic asthma (see Table 2).

Table 2: Emergency Department Utilization by Coordinated Care Status (Adults with Asthma)

Coordinated Care	Had ED Visit	No ED Visit	Total
Received	225	754	979
Not Received	228	728	956
Total	453	1,482	1,935

Note. $\chi^2 (1, N = 1,935) = 1.06, p = .304$.

Finally, a chi-square test was conducted to determine whether coordinated care impacted hospitalization among respondents who reported having lung disease or emphysema (AJ194_8 = 1). The analysis showed no statistically significant association between receipt of coordinated care and hospitalization in the past 12 months, $\chi^2 (1, N = 658) = 0.035, p = .852$ (see Table 3).

Table 3: Hospitalization in Past 12 Months by Coordinated Care Status (Lung Disease/Emphysema)

Coordinated Care	Had ED Visit	No ED Visit	Total
Received	225	754	979
Not Received	228	728	956
Total	453	1,482	1,935

Note. $\chi^2 (1, N = 658) = 0.035, p = .852$.

To further explore demographic differences, an independent-samples t-test (see table 4) was conducted to compare mean age between adults who received coordinated care and those who did not. Results indicated a statistically significant difference, $t(954.03) = 5.12, p < .001$, with participants in the coordinated care group ($M = 56.25, SD = 15.48$) being approximately four years older than those in the non-coordinated care group ($M = 52.15, SD = 15.91$).

Table 4: Independent-Samples t-Test Comparing Age by Coordinated Care Status

Coordinated Care	N	Mean Age	SD
Received	1,396	56.25	15.48
Not Received	539	52.15	15.91
Total	1,935	--	--

Note. $t(954.03) = 5.12, p < .001$.

It is noteworthy that individuals receiving coordinated care were, on average, older than those who did not, suggesting that age may be a factor influencing both care coordination enrollment and healthcare utilization patterns.

Limitations

Several limitations should be considered when interpreting these findings. First, the study relied on self-reported data from the California Health Interview Survey, which introduces the possibility of recall bias and misclassification of both exposure (coordinated care) and outcomes (ED visits and hospitalizations). Second, the cross-sectional nature of the dataset prevents determination of causality; coordinated care and health outcomes were measured at the same point in time, making it unclear whether coordinated care preceded reduced utilization. Third, the significant association observed in the full adult sample ($p = .046$) is close to the traditional cutoff for significance, which raises the possibility of a Type I error. Conversely, the non-significant findings in the asthma and lung disease subgroups may reflect Type II errors due to smaller sample sizes and reduced statistical power. Finally, the findings are limited to California residents and may not reflect outcomes in other states or healthcare systems.

Discussion and Conclusion

The findings from this research contribute to the growing body of literature supporting the value of coordinated care in chronic disease management. In the overall adult population, a statistically significant association was found between receiving coordinated medical care and a reduction in emergency department (ED) utilization. This supports previous research suggesting that care coordination enhances continuity of care and reduces avoidable healthcare utilization. Due to the p-value being close to the conventional .05 threshold, this result should be interpreted cautiously, as there is a possibility of a Type I error (identifying an association that may not exist).

However, the results were more nuanced among adults with asthma. While the trend still favored coordinated care, the association with ED utilization was not statistically significant in this subgroup. This may reflect the complexity of asthma management, where factors such as medication adherence, socioeconomic status, and access to specialty care all influence outcomes. The lack of statistical significance in this subgroup could also be related to a potential Type II error, as the smaller sample size may not have provided sufficient power to detect a meaningful difference. The

broad definition of “coordinated care” in the CHIS data may not have fully captured the specific interventions delivered by respiratory therapist case managers, which may limit the observed effect.

Similarly, among individuals reporting lung disease or emphysema, coordinated care was not significantly associated with a reduction in overnight hospitalizations. These results, aligned with other research indicate that more intensive, multidisciplinary interventions may be necessary to impact hospital admission rates in this high-risk population. This non-significant finding may also reflect a potential Type II error, as the subgroup was relatively small compared to the full sample. Given the high cost of hospitalizations and the burden of exacerbations in COPD, this finding highlights the importance of targeted case management strategies.

These results emphasize both the potential and the limitations of coordinated care when viewed through the lens of population-based survey data. While the proxy measure (COORDCARE) provides valuable insights, it may not fully represent the intensity or quality of case management that RTs could provide in structured roles. Future research should consider more detailed measures of care coordination, incorporate longitudinal designs, and examine outcomes such as exacerbation frequency, medication adherence, and patient-reported quality of life. Overall, the findings suggest that coordinated care may play a valuable role in reducing healthcare utilization, but its impact may vary depending on the population, severity of condition, and the interventions delivered. It is noteworthy that individuals receiving coordinated care were older on average, which may partly explain utilization patterns and should be considered when interpreting these findings. The integration of RTs into formal case management roles remains a promising avenue for improving outcomes in respiratory care and calls for further study and investment.

This research explores the relationship between coordinated care and healthcare utilization among individuals with chronic respiratory conditions, using data from the 2023 California Health Interview Survey (CHIS). The findings suggest that care coordination is associated with reduced emergency department visits in the general adult population. However, this relationship was not statistically significant among individuals with asthma or those reporting lung disease/emphysema, highlighting the complexity of managing chronic respiratory conditions and the need for targeted interventions.

These results support existing literature that demonstrates the potential of case management to reduce healthcare utilization and improve chronic disease outcomes [3,6]. Prior research has shown that respiratory therapists (RTs), with their specialized skills in pulmonary care, inhaler administration education, and disease self-management, can contribute to interdisciplinary care models [4,5]. Although the current research used coordinated care as a proxy, the findings support continued investigation into RT-led case management and its role in improving access, quality, and outcomes, particularly in alignment with clinical guidelines such as those from [8]. As healthcare systems aim to lower costs and improve chronic disease outcomes, the inclusion of RTs in case management frameworks represents a promising strategy. Future research should prioritize longitudinal studies and directly evaluate RT-led interventions to assess their clinical effectiveness and economic value.

A significant reduction in CAT scores emphasizes that RT-led case management programs provide better disease control. This study highlights significant reductions in exacerbations of nearly 45% annually and a 50% reduction in hospitalizations. This demonstrates that the RT-led case management model can transform patient care and system performance. Relevance: Patients with COPD must have appropriate education to aid in the reduction of undertreated symptoms. Respiratory therapists are trained to provide comprehensive COPD management. This study provides substantial evidence that expanding RT roles into case management leads to meaningful clinical improvements in COPD care. The expansion of respiratory therapists' role is supported by evidence demonstrating that RT-led interventions significantly reduce exacerbation rates and contribute to improved hospitalization outcomes [6].

It is crucial that RTs utilize evidence-based practices to offer patients the best possible outcomes. RTs can intervene during exacerbations and, with the timely use of NIV and the optimization of inhaled therapies, reduce ICU admissions. Post-exacerbation care, such as airway clearance and rehabilitation, is linked to a reduction of symptoms and the prevention of relapses. RTs possess the skill and knowledge to assist with early outpatient follow-up and patient education, key elements of respiratory care and case management.

Recommendations

conducted a systematic review of 29 studies to assess the cost-effectiveness of case management programs compared to usual care. The rigorous method aligned with PRISMA guidelines and the studies included diverse patient populations across health systems. The research concluded that cost-effectiveness was not fully conclusive due to the large variations present in programs. Future research can benefit from clearly defined components that measure economic and healthcare outcomes over longer periods. Of the 29 studies, 6 studies revealed that interventions saved costs while improving patient outcomes. There is an opportunity for RT led case management models to improve standardized protocols in California.

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