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Original Article

# Virus-Specific Patterns of Early Hospitalization after Pediatric Emergency Department Discharge: A Real-World Cohort Study

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**ABSTRACT**

**Aim:** To compare virus-specific clinical patterns predictive of early hospitalization within 7 days following emergency department (ED) discharge among children with polymerase chain reaction (PCR)-confirmed coronavirus disease-2019 (COVID-19), respiratory syncytial virus (RSV), and influenza.

**Materials and Methods:** This retrospective cohort study included children aged 0-18 years with PCR-confirmed COVID-19, RSV, or influenza who presented to the pediatric ED of a tertiary-care university hospital between January, 2020 and December, 2024 and who were initially discharged at the index visit. The primary outcome was hospitalization within 7 days following ED discharge. Multivariable logistic regression models were constructed separately for each viral etiology in order to identify virus-specific predictors of early hospitalization within 7 days.

**Results:** Among the 6,700 children included, hospitalization within 7 days occurred in 7.8% of COVID-19 cases, 9.0% of RSV cases, and 7.0% of influenza cases. In the COVID-19 cases, C-reactive protein ≥33 mg/L [adjusted odds ratio (aOR) 2.8, 95% confidence interval (CI): 1.7-4.3] and persistent fever longer than 3 days (aOR 3.2, 95% CI: 1.9-4.9) were independently associated with early hospitalizations. In the RSV cases, respiratory distress was the strongest predictor (aOR 3.7, 95% CI: 2.2-5.9). In the influenza cases, persistent systemic symptoms were independently associated with hospitalizations (aOR 3.1, 95% CI: 1.8-4.7).

**Conclusion:** Early hospitalization following ED discharge shows distinct clinical patterns across viral etiologies in children. Incorporating etiology-informed, readily available clinical features at ED presentation into discharge planning may improve the safety of outpatient management and support targeted early follow-up.

**Keywords:** Respiratory viral infections, early hospitalization, children, emergency department, risk factors, COVID-19, respiratory syncytial virus, influenza

## Introduction

Respiratory viral infections are one of the leading causes of emergency department (ED) visits and hospitalizations among children worldwide (1,2). In the post-pandemic era, coronavirus disease-2019 (COVID-19), respiratory syncytial virus (RSV), and influenza represent the most common causes of pediatric respiratory viral illnesses. Although these infections often present with overlapping clinical features at initial evaluation, recent evidence demonstrates that their early clinical trajectories differ substantially (3-5).

Unplanned revisits or hospitalizations shortly after ED discharge have emerged as a marker of suboptimal early

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etiology-specific risk assessment rather than disease severity alone. Population-based data have demonstrated that the timing and location of pediatric ED revisits vary substantially, with the majority occurring within the first 72 hours and frequently at institutions different from the index visit (6). Moreover, critical revisits [those resulting in intensive care unit (ICU) admission or death] disproportionately affect children who received respiratory diagnoses at the index visit (7). Although earlier studies have identified predictors of return visits in pediatric emergency populations (8,9), the first week following the initial presentation represents a clinically vulnerable period during which subtle clinical deterioration may emerge, particularly in those children initially classified as having a mild disease.

Pediatric COVID-19 has been associated with systemic inflammatory responses and prolonged fever, even in the absence of significant respiratory involvement (10-12). Emerging post-pandemic data from large electronic health record cohorts have further characterized the acute and post-acute clinical burden of severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2) infection in children, confirming that illness severity and younger age are associated with higher risks of complications (13). By contrast, RSV-related deterioration is largely driven by host-virus interaction at the airway level, resulting in progressive lower respiratory tract involvement, particularly in young infants (14,15). Influenza shows an intermediate clinical pattern, with persistent systemic symptoms frequently leading to repeat healthcare visits rather than hypoxemia (16-18).

However, most of the existing studies evaluate these viral infections in isolation and are often limited to single-center cohorts, thus limiting direct comparison. The 2022 simultaneous respiratory viral surge highlighted the clinical and operational challenges of concurrent pediatric viral epidemics in emergency settings (19). Consequently, early post-discharge risk assessment is frequently extrapolated across viral etiologies, despite the limited evidence supporting the validity of a uniform approach. In order to address this gap, we conducted a retrospective cohort study to compare virus-specific clinical patterns predictive of early hospitalizations within a standardized 7-day timeframe among children with COVID-19, RSV, and influenza.

## Materials and Methods

### Ethical Considerations

This study was approved by the İstanbul Medipol University Non-Interventional Clinical Research Ethics Committee (approval no.: E-10840098-202.3.02-8228, date: 04.12.2025) and conducted in accordance with the principles of the Declaration of Helsinki.

### Study Design and Setting

This retrospective cohort study included children aged 0-18 years with polymerase chain reaction (PCR)-confirmed COVID-19, RSV, or influenza who presented to a pediatric ED between January 2020 and December 2024. This study was conducted at a tertiary-care university hospital complex. Although data were obtained from two hospital campuses, both are affiliated to the same academic institution, share unified clinical protocols, and were therefore analyzed as a single-institution cohort. Discharge decisions were based on institutional pediatric ED protocols including clinical stability, oxygen saturation, oral intake adequacy, and physician assessment.

### Participants

Children with PCR-confirmed COVID-19, RSV, or influenza who were initially discharged from the ED at the index visit were eligible for inclusion. Only the first presentation per infection episode was analyzed; a new infection episode was defined as an acute respiratory illness with PCR-confirmed viral detection occurring at least 14 days after a prior confirmed episode. Those patients who were admitted at the initial visit, transferred to another facility, or had incomplete outcome data were excluded. A total of 8,942 children with PCR-confirmed COVID-19, RSV, or influenza were identified during the study period. Of these, 1,204 were admitted at the initial visit, 386 were transferred to another facility, 491 had incomplete follow-up data, and 161 (1.8%) had multiple simultaneous viral detections, yielding a final analytic cohort of 6,700 children (Supplementary Figure 1). Those children with a simultaneous detection of more than one respiratory viral pathogen were excluded from the primary analysis in order to ensure that clinical patterns could be attributed to a single viral etiology. The patient selection process is summarized in a flow diagram (Supplementary Figure 1).

### Data Collection

Demographic characteristics, comorbidities, and acute clinical findings assessed during the index ED visit, including fever duration, respiratory distress, oxygen saturation, and feeding difficulties, were extracted from the electronic medical records. Respiratory distress was defined as the presence of tachypnea (based on age-adjusted thresholds), subcostal or intercostal retractions, nasal flaring, or the use of the accessory muscles of breathing. Feeding difficulties

were defined as documented oral intake of less than 50% of the usual intake at the time of ED assessment. Laboratory parameters, including C-reactive protein (CRP), were recorded where available. Systemic symptoms were defined as a composite variable reflecting the presence of at least one of the following at the index ED visit: persistent fever longer than 48 hours, myalgia, severe headache, marked malaise, or the documented need for repeated antipyretic use. Fever duration longer than 3 days was additionally analyzed as a separate standalone predictor variable, distinct from the composite systemic symptom definition.

CRP testing was not protocolized and was performed at the discretion of the treating emergency physician. Missing data were handled using complete-case analysis, and the proportion of missing laboratory data reflected routine physician-directed testing rather than a protocolized assessment. This pragmatic approach reflects real-world clinical practice and enhances the external validity of CRP-based findings, although it introduces the possibility of indication bias in CRP measurements. CRP-tested and non-tested patients were not found to differ systematically in baseline clinical severity, as assessed by the attending physician's documented rationale; however, formal propensity adjustment was not performed.

### Outcome Definition

The primary outcome was hospitalization within 7 days following the initial ED discharge. The 7-day timeframe was selected a priori in order to capture early post-discharge clinical deterioration most plausibly related to ED disposition decisions, rather than later disease progression or unrelated healthcare utilization. This 7-day interval has been commonly used in pediatric emergency medicine studies evaluating early revisit and hospitalization outcomes (6-9). Hospitalizations were considered outcome events only when clinically related to the index viral respiratory illness based on the discharge diagnosis documentation in the electronic health record. Outcome attribution was determined by a structured review of the discharge diagnostic codes in the institutional EHR; no external adjudication panel was used, and those cases with ambiguous diagnostic coding were reviewed by a senior clinician in order to confirm relatedness to the index viral illness. Outcome data were ascertained through the integrated institutional electronic health record system, which covers all hospital campuses and affiliated units within the university network.

### Statistical Analysis

Multivariable logistic regression models were constructed separately for each viral etiology in order to identify virus-specific predictors of early hospitalizations. All models were adjusted for age, sex, and comorbidity status. Age-stratified analyses (<2 years vs. ≥2 years) were performed. The CRP cut-off value of 33 mg/L was determined using receiver operating characteristic curve analysis within the COVID-19 cohort [area under the curve (AUC) 0.73, 95% confidence interval (CI): 0.70-0.76]. Model discrimination was assessed using the AUC separately for each viral cohort: the COVID-19 model demonstrated acceptable performance (AUC 0.73, 95% CI: 0.70-0.76), the RSV model showed acceptable performance (AUC 0.76, 95% CI: 0.73-0.79), and the influenza model showed acceptable-to-good performance (AUC 0.79, 95% CI: 0.76-0.82). These values are consistent with the exploratory nature of the analysis and the inherent heterogeneity of clinical presentations across viral etiologies. Sensitivity analyses restricted to patients with available CRP measurements demonstrated similar direction and magnitude of associations. All statistical analyses were performed using SPSS Statistics version 26.0 (IBM Corp., Armonk, NY, USA). A two-sided p value <0.05 was considered statistically significant. Age was evaluated both as a continuous variable and as a dichotomized variable (age <2 years versus ≥2 years) in order to better capture clinically relevant pediatric risk stratification; the dichotomized parameterization was retained in the final models as it reflected a clinically meaningful threshold established in the pediatric respiratory illness literature and was consistent with the age-related vulnerability patterns observed across viral etiologies. Given the exploratory nature of the analysis with separate models for each viral etiology, no formal correction for multiple comparisons was applied; the results should be interpreted as hypothesis-generating and individual associations should be considered in conjunction with their effect sizes and CIs rather than for the p-values alone. The number of outcome events per viral cohort (COVID-19, n=156; RSV, n=198; influenza, n=175) satisfied recommended events-per-variable assumptions for stable multivariable logistic regression estimation.

## Results

### Study Population

A total of 6,700 children with PCR-confirmed viral respiratory infections were included in the final analysis (COVID-19, n=2,000; RSV, n=2,200; influenza, n=2,500). All patients were discharged from the ED at the index visit.

Baseline demographic and clinical characteristics varied across the viral etiologies, particularly with respect to age distribution, fever prevalence, and respiratory findings (Table I).

**Primary Outcome**

Hospitalization within 7 days following ED discharge occurred in 156 of the 2,000 children with COVID-19 (7.8%), 198 of the 2,200 children with RSV (9.0%), and 175 of the 2,500 children with influenza (7.0%). Early post-discharge hospitalization rates differed across the viral etiologies despite similar discharge decisions at the index ED visit.

**Clinical and Laboratory Characteristics**

The clinical and laboratory features of children with and without hospitalization within 7 days are compared in Table II. In the COVID-19 cohort, those children who were hospitalized within 7 days more frequently had prolonged fever and elevated inflammatory markers at the index ED visit. CRP measurements were available in 68% of COVID-19, 52% of RSV, and 61% of influenza cases, reflecting routine physician-directed testing; higher CRP values were associated with an increased likelihood of early hospitalization.

In the RSV cohort, early hospitalization was predominantly associated with respiratory findings. Those children who were hospitalized within 7 days more commonly presented with respiratory distress and oxygen desaturation at the index ED visit, consistent with lower airway involvement following discharge.

By contrast, respiratory compromise was less commonly observed as a driver of early hospitalizations in influenza. Instead, persistent systemic symptoms, including prolonged fever, marked malaise, and myalgia, were more commonly observed among those children who were hospitalized shortly after discharge.

**Multivariable Analyses**

In multivariable logistic regression analyses adjusted for age, sex, and comorbidity status, distinct virus-specific predictors of early hospitalization were identified (Table III). All models additionally included fever duration, respiratory distress, $SpO_2$, feeding difficulties, and systemic symptoms as candidate variables. In the cases of COVID-19, CRP ≥33 mg/L [adjusted odds ratio (aOR) 2.8, 95% CI: 1.7-4.3] and persistent fever longer than 3 days (aOR 3.2, 95% CI: 1.9-4.9) were independently associated with hospitalization within 7 days. In the RSV cases, respiratory distress emerged as the strongest independent predictor (aOR 3.7, 95% CI: 2.2-5.9). In the influenza patients, the presence of persistent systemic symptoms was independently associated with early hospitalization (aOR 3.1, 95% CI: 1.8-4.7). Age-stratified analyses demonstrated that these virus-specific associations were consistent across those children younger than 2 years and those aged 2 years or older (data not shown). These associations remained significant after adjustment for age.

A summary of virus-specific predictors of early hospitalization is presented in Figure 1, illustrating the distinct clinical pathways leading to early post-discharge deterioration across viral etiologies.

**Table I.** Baseline characteristics of children by viral etiology

| Characteristic | COVID-19 (n=2,000) | RSV (n=2,200) | Influenza (n=2,500) | p value |
|---|---|---|---|---|
| Age, months, median (IQR) | 36 (18-72) | 8 (3-18) | 48 (24-96) | <0.001 |
| Age <2 years, n (%) | 580 (29.0) | 1,540 (70.0) | 375 (15.0) | <0.001 |
| Male, n (%) | 1,060 (53.0) | 1,232 (56.0) | 1,275 (51.0) | 0.28 |
| Comorbidity, n (%) | 240 (12.0) | 264 (12.0) | 325 (13.0) | 0.52 |
| Fever at index visit, n (%) | 1,600 (80.0) | 1,320 (60.0) | 2,125 (85.0) | <0.001 |
| Respiratory distress, n (%) | 200 (10.0) | 660 (30.0) | 250 (10.0) | <0.001 |
| $SpO_2$ <94%, n (%) | 80 (4.0) | 286 (13.0) | 100 (4.0) | <0.001 |
| Feeding difficulty, n (%) | 140 (7.0) | 528 (24.0) | 175 (7.0) | <0.001 |
| CRP, mg/L, median (IQR)* | 12 (5-28) | 8 (3-18) | 10 (4-22) | 0.003 |

*CRP available in 68% of COVID-19, 52% of RSV, and 61% of influenza cases. Group comparisons were performed using the Kruskal-Wallis test for continuous variables and the chi-square test for categorical variables. Statistically significant overall p values ($p<0.05$) indicate differences across at least one pair of viral groups; post-hoc pairwise comparisons confirmed significant differences between all three groups for age, fever, respiratory distress, $SpO_2$, feeding difficulties, and CRP (all $p<0.05$ after Bonferroni correction)
COVID-19: Coronavirus disease-2019, IQR: Interquartile range, $SpO_2$: Peripheral oxygen saturation, CRP: C-reactive protein, RSV: Respiratory syncytial virus

**Table II.** Clinical characteristics of children with and without hospitalization within 7 days, by viral etiology

| | COVID-19 | | RSV | | Influenza | |
|---|---|---|---|---|---|---|
| | **Hospitalized (n=156)** | **No Hosp. (n=1,844)** | **Hospitalized (n=198)** | **No Hosp. (n=2,002)** | **Hospitalized (n=175)** | **No Hosp. (n=2,325)** |
| Fever >3 days, % | 58.3 | 22.1 | 31.8 | 18.4 | 48.6 | 21.3 |
| Resp. distress, % | 18.6 | 9.1 | 52.5 | 27.4 | 14.3 | 9.4 |
| $SpO_2$ <94%, % | 8.3 | 3.6 | 25.3 | 11.6 | 7.4 | 3.7 |
| CRP ≥33 mg/L, %* | 42.3 | 14.8 | 18.2 | 12.1 | 22.9 | 13.5 |
| Systemic sx, % | 35.9 | 18.2 | 20.7 | 14.3 | 54.3 | 22.6 |
| Feeding diff., % | 14.7 | 6.3 | 38.9 | 22.1 | 12.0 | 6.5 |
| Comorbidity, % | 19.9 | 11.1 | 17.7 | 11.4 | 20.6 | 12.3 |

Hospitalized: hospitalized within 7 days. *Among patients with available CRP measurements. All within-etiology comparisons p<0.05
COVID-19: Coronavirus disease-2019, $SpO_2$: Peripheral oxygen saturation, CRP: C-reactive protein, RSV: Respiratory syncytial virus

**Table III.** Multivariable predictors of hospitalization within 7 days after emergency department discharge, by viral etiology

| Viral etiology | Predictor | aOR (95% CI) | p value |
|---|---|---|---|
| **COVID-19** | CRP ≥33 mg/L | 2.8 (1.7-4.3) | <0.001 |
| | Persistent fever >3 days | 3.2 (1.9-4.9) | <0.001 |
| | Age <2 years | 1.6 (1.1-2.4) | 0.02 |
| **RSV** | Respiratory distress | 3.7 (2.2-5.9) | <0.001 |
| | $SpO_2$ <94% | 2.4 (1.5-3.8) | <0.001 |
| | Age <2 years | 2.1 (1.3-3.5) | 0.004 |
| **Influenza** | Persistent systemic symptoms | 3.1 (1.8-4.7) | <0.001 |
| | Prolonged fever >3 days | 2.1 (1.3-3.4) | 0.003 |
| | Comorbidity | 1.8 (1.1-2.9) | 0.02 |

All models adjusted for age, sex, and comorbidity status
COVID-19: Coronavirus disease-2019, $SpO_2$: Peripheral oxygen saturation, CRP: C-reactive protein, RSV: Respiratory syncytial virus, aOR: Adjusted odds ratio, CI: Confidence interval

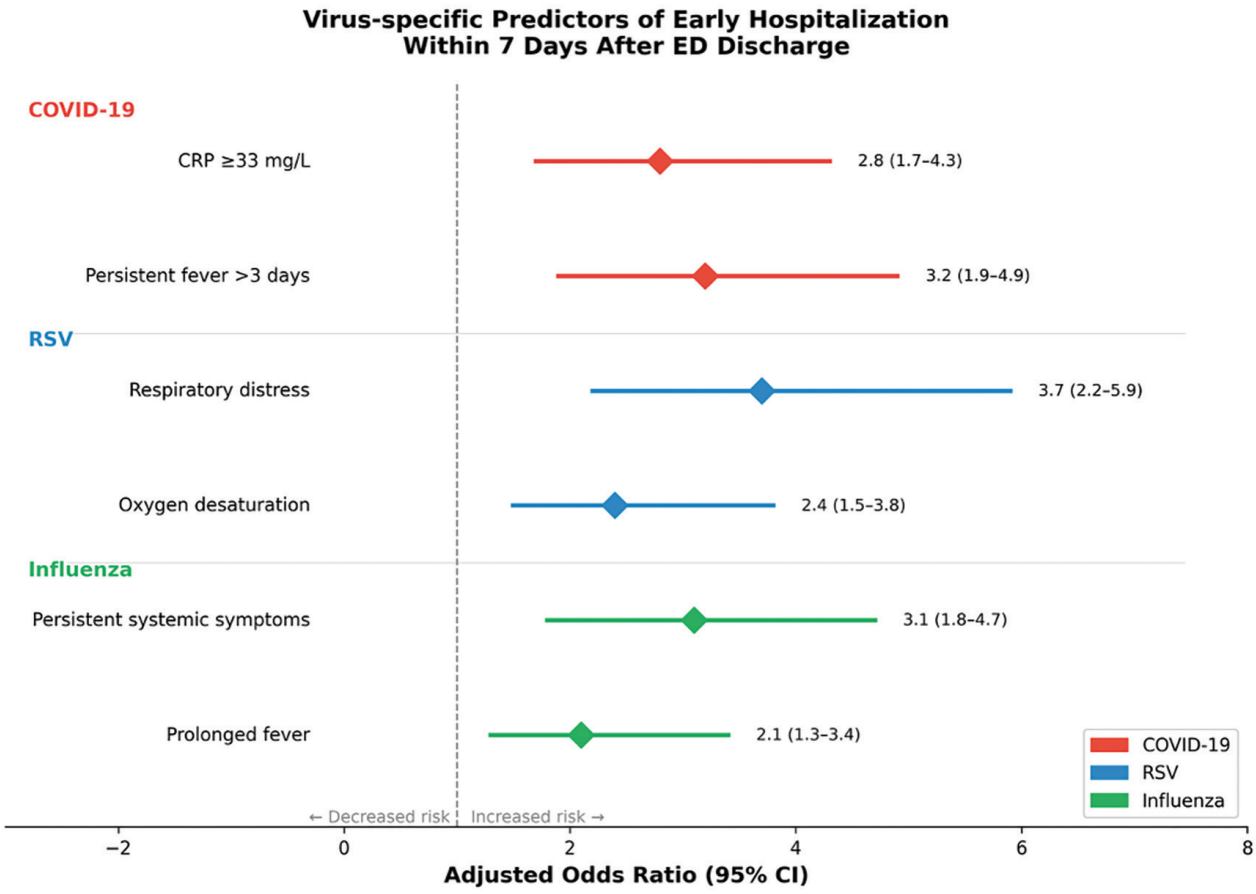


**Figure 1.** Virus-specific clinical predictors of early hospitalization within 7 days after emergency department discharge in children. Adjusted odds ratios with 95% confidence intervals from separate multivariable logistic regression models adjusted for age, sex, and comorbidity status
COVID-19: Coronavirus disease-2019, RSV: Respiratory syncytial virus, CI: Confidence interval, ED: Emergency department, CRP: C-reactive protein

## Discussion

This retrospective cohort study demonstrates that early hospitalization following ED discharge reflects distinct, virus-specific clinical deterioration patterns in children with viral respiratory infections. Although the outcome (hospitalization within 7 days) is shared across etiologies, the clinical drivers of early deterioration differ substantially. In a large multi-state population-based analysis, critical ED revisits in children, defined as those resulting in ICU admission or death, were disproportionately associated with respiratory diagnoses at the index visit (7).

In pediatric COVID-19 cases, early hospitalization was primarily associated with systemic inflammatory features and prolonged fever rather than respiratory compromise, supporting prior observations that host inflammatory response plays a central role in early disease progression (10-12). Data from the RECOVER consortium have further demonstrated that illness severity is an important determinant of post-acute complications in children with SARS-CoV-2, reinforcing the relevance of inflammatory markers at early clinical encounters (13). While these studies did not directly evaluate post-discharge outcomes, the association between CRP elevation and clinical severity supports the biological plausibility of CRP as a possible indicator of early deterioration risk in febrile children being considered for ED discharge. It should be noted, however, that CRP was measured in only a subset of our patients (68% of COVID-19 cases) and was subject to indication bias; accordingly, the role of CRP as a predictive marker should be interpreted with caution and requires prospective validation before informing routine clinical practice. Sensitivity analyses restricted to patients with available CRP measurements demonstrated similar direction and magnitude of associations, partially mitigating but not fully excluding the influence of indication bias.

By contrast, RSV-related early deterioration was dominated by respiratory distress and hypoxemia,

consistent with classical bronchiolitis phenotypes described in contemporary cohorts (14,15). This finding underscores the well-established pattern of progressive lower airway obstruction which may not be fully apparent at the initial ED presentation, particularly in young infants. Although age was evaluated both as a continuous and as a dichotomized variable (<2 years) in our multivariable models, the clinical risk associated with age in RSV is not linear even within this youngest group; infants younger than 6 months represent a distinctly vulnerable subgroup in whom even mild respiratory distress at ED presentation may herald rapid deterioration, a pattern well-recognized in the bronchiolitis literature. Clinicians should exercise heightened caution when considering discharge in this youngest age group, even when initial oxygen saturation remains above threshold values.

Influenza exhibited an intermediate pattern, with persistent systemic symptoms rather than progressive respiratory failure driving early hospitalizations (16-18). This observation has practical implications for ED discharge counseling, as families may underestimate the significance of persistent constitutional symptoms in the absence of overt respiratory distress.

Our findings are particularly relevant in the context of the post-pandemic respiratory viral landscape. The 2022 simultaneous respiratory viral surge demonstrated that pediatric ED systems face substantial operational strain during concurrent epidemics, with increased visit volumes associated with higher revisit rates across diverse emergency settings (19). These observations collectively support the need for virus-specific, rather than uniform, approaches to ED discharge risk assessment in the current epidemiological era. The independent association between elevated CRP and early hospitalizations in our cohort is consistent with observations from pooled laboratory analyses demonstrating that elevated inflammatory markers are characteristic of more severe pediatric COVID-19 presentations (20,21). The identification of respiratory distress as the strongest predictor of early hospitalization in the RSV cohort reinforces current recommendations for close respiratory monitoring following discharge, especially during the first 48-72 hours (22,23). These findings support the notion that early post-discharge vigilance in children with influenza should prioritize the monitoring of systemic symptom persistence rather than focusing exclusively on respiratory parameters (24). Post-pandemic surveillance data have further demonstrated a substantial surge in RSV-related hospitalizations and respiratory support requirements, with older children and those with fewer comorbidities disproportionately affected during the 2022-2023 season (25,26). Recent surveillance data from the COVID-19-Associated Hospitalization Surveillance Network similarly identified chronic comorbidities and younger age as key determinants of severe disease among children hospitalized with COVID-19 during 2022-2024, underscoring the continuing clinical relevance of these risk factors in the post-pandemic era (27).

Importantly, the objective of this study was not to derive or validate a clinical risk score, but rather to identify clinically observable, etiology-specific warning patterns relevant to early post-discharge vigilance and ED disposition decisions. The distinct predictor profiles identified across the three viral etiologies suggest that a one-size-fits-all approach to discharge risk assessment may be suboptimal and that virus-specific clinical trajectories should be considered when counseling families at the time of ED discharge. This study was designed as an exploratory etiologic analysis rather than a derivation of clinical prediction rules, and the findings are intended to generate hypotheses for future prospective validation studies. The selected outcome, namely hospitalization within 7 days restricted to the index viral illness, reflects clinically meaningful early deterioration directly relevant to ED disposition quality, rather than incidental or unrelated healthcare utilization.

**Clinical Implications**

These findings have direct and practical implications for ED discharge planning. In pediatric COVID-19 cases, discharge counseling should emphasize close monitoring of fever trajectory, as prolonged fever emerged as a key marker of early post-discharge deterioration. CRP measurement, when obtained during routine ED evaluation, may provide additional risk stratification for febrile children being considered for discharge.

For RSV cases, respiratory monitoring remains paramount, particularly in young infants. Families should be specifically educated about early warning signs of progressive respiratory distress, including increased work in breathing, feeding difficulties, and changes in respiratory rate or effort, even when initial oxygen saturation appears acceptable at the time of discharge.

In children with influenza, symptoms such as severe myalgia, marked malaise, or sustained fever may warrant re-evaluation after discharge, even in the absence of overt respiratory deterioration.

These virus-specific clinical patterns may inform more tailored post-discharge follow-up strategies in routine pediatric emergency care.

### Study Limitations

This study had limitations inherent to its retrospective design, including potential selection bias and residual confounding. Laboratory testing was performed at physician discretion rather than protocolized assessment. Virological data such as viral load or genomic characterization were unavailable. This study was limited to a single academic institution, which may restrict its generalizability to community-based pediatric emergency settings. Although the cohort was derived from tertiary-care EDs, the reliance on routinely collected clinical variables enhances the applicability of the findings to similar pediatric emergency care settings. The findings should be interpreted as hypothesis-generating and therefore require prospective validation. Furthermore, hospitalization outcomes may partially reflect physician decision-making variability inherent to real-world emergency care rather than clinical deterioration alone. The COVID-19 cohort spans the entire pandemic period (2020-2024), encompassing multiple SARS-CoV-2 variants with potentially different clinical profiles in children; variant-level subgroup analysis was not feasible due to the absence of routine genomic surveillance data, and temporal changes in clinical severity across variant waves should be considered when interpreting COVID-19-specific findings. Additionally, inter-campus variability in physician practices or admission thresholds was not formally assessed; although both campuses share unified institutional protocols, unmeasured differences cannot be entirely excluded and should be considered as a potential source of heterogeneity. Standardized discharge criteria or formal scoring systems were not used; discharge decisions were based on clinician assessment, which may introduce variability. With respect to outcome ascertainment, hospitalizations occurring at non-affiliated community hospitals within the 7-day follow-up period may not have been captured by the institutional EHR system. Although this institution serves as the primary regional referral center, a proportion of admissions to outside facilities could have been missed, and the hospitalization rates reported in this study should therefore be interpreted as a representative assessment rather than an exhaustive enumeration of all post-discharge events.

## Conclusion

Early hospitalization within 7 days following ED discharge is associated with distinct clinical patterns across viral etiologies in those children with respiratory viral infections. COVID-19-related deterioration is driven by systemic inflammation and prolonged fever, RSV by progressive respiratory distress, and influenza by persistent systemic symptoms. Incorporating etiology-informed, readily available clinical features at ED presentation into discharge planning may inform outpatient management strategies and improve post-discharge vigilance.

### Ethics

**Ethics Committee Approval:** This study was approved by the İstanbul Medipol University Non-Interventional Clinical Research Ethics Committee (approval no.: E-10840098-202.3.02-8228, date: 04.12.2025).

**Informed Consent:** Retrospective cohort study.

### Footnotes

### Authorship Contributions

Concept: F.B., Design: F.B., Data Collection or Processing: F.B., M.A., Analysis or Interpretation: F.B., M.A., Literature Search: F.B., Writing: F.B.

**Conflict of Interest:** The authors have no conflicts of interest to declare.

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**Supplementary Figure Link:** https://d2v96fxpocvxx.cloudfront.net/00df66f2-5bbf-4336-8ecd-25d1bc79ad25/content-images/69dc407f-5de5-429c-a68a-827be1576b5d.pdf

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