FinThrive

White Paper

Mechanical Ventilation in Inpatient Care

Comparing Claim-Based Reporting to Charge Capture Data

Abstract

Claims data is widely utilized in Real World Evidence (RWE) studies to support health services research, quality measurement and policy evaluation.

Claims, however, reflect only services that are coded and billed, not the full scope of care delivered.

This retrospective study compares FinThrive inpatient Charge Description Master (CDM) data to corresponding 835 electronic claims data to evaluate how mechanical ventilation is reported across 135 U.S. hospitals for the period January 1, 2021, through December 31, 2025 (the “Study Period”). The study examined 4.8 million patients and more than 8.1 million patient encounters.

Among encounters with mechanical ventilation identified in the CDM data, fewer than 35% included mechanical ventilation on the associated claims. While commercial claims were more likely to report mechanical ventilation than Medicare or Medicaid, underreporting was consistent across payer types.

The findings in this study indicate that reliance on claims data alone materially understates the prevalence and burden of high-acuity inpatient services. CDM data provides a more complete view of mechanical ventilation use and should be incorporated into RWE analysis to avoid systematic underrepresentation of hospital resource utilization.

Problem Statement

Mechanical ventilation provides artificial respiration to patients whose natural ability to breathe is compromised.

Invasive mechanical ventilation ("IMV") is accomplished by endotracheal intubation or an artificial airway such as a tracheostomy along with certain medications for sedation.

Non-invasive ventilation ("NIV") uses positive airway pressure to help move air into the lungs, improving oxygenation and ventilation while reducing work of breathing. The presence of an artificial airway is what distinguishes IMV from NIV.

In 2016, the Department of Health and Human Services Office of Inspector General (OIG) Workplan identified a mechanical ventilation **billing error rate exceeding 95%** in Medicare claims from 2009-2011. A subsequent OIG audit released in August 2024, focused on Medicare Standard Diagnosis Related Groups for the period October 2015 through September 2021, demonstrated nearly the exact opposite result — **a 93% compliance rate with an error rate of only 7%** — when reviewing claims that require more than 96 consecutive hours of mechanical ventilation.

This study examines whether the improvement observed in the 2024 audit reflects better documentation practices or if hospitals increasingly provide IMV and NIV without billing for these services.

Methods

This retrospective analysis evaluated inpatient hospitalizations from 2021-2025 across 135 hospitals using FinThrive data.

CDM data was used to identify encounters with charges for IMV or NIV.

Encounters were linked to corresponding claims using FinThrive's Derived Patient Key where both CDM and claims data were available.

The study population includes patients aged 12 and older with at least one inpatient hospitalization where both CDM and claims data were available.

The analysis compared the prevalence of mechanical ventilation identified in CDM data versus what was reported on claims to quantify underreporting by payer type.

Background

Charge capture systems integrated with Electronic Health Records are designed to record services at the point of care. Coding and billing, however, translate clinical documentation into standardized codes based on reimbursement criteria, not the full spectrum of services delivered.

To code and bill mechanical ventilation, documentation must explicitly include:

- Start date and time
- Ventilator mode or setting (e.g. assist-control, SIMV, pressure control, etc.)
- Confirmation that ventilation is delivered via the artificial airway for IMV
- Total continuous hours of mechanical ventilation
- Stop time or daily confirmation of continued ventilation until day/time discontinued

ICD-10-PCS procedure codes are driven by ventilation duration:

- Less than 24 consecutive hours
- 24-96 consecutive hours
- Greater than 96 consecutive hours

The duration of mechanical ventilation cannot be inferred from other documentation or treatment. If IMV is the ordered route for the patient, the medical record documentation must demonstrate why IMV was required rather than NIV. The medical necessity for continued mechanical ventilation must also be documented daily.

Common Documentation Gaps

Mechanical ventilation charges often do not translate into billable codes due to missing or inconsistent documentation, including:

- Ventilation documented without the confirmation of invasive airway
- Failure to document both start and stop times
- Lack of diagnoses to support invasive ventilation
- Conflicting documentation or confusion between BiPAP via mask and invasive ventilation via tube

Charge does not Equal Documentation

With charging integrated into electronic health records, it may be presumed that a charge would not be created unless the documentation is present to support coding/billing.

However, clinical language and coding requirements differ significantly.

A charge is generated when supplies are used, a procedure performed or medication given, but **this does not mean that the medical record documentation supports all the elements necessary to bill** for the specific care.

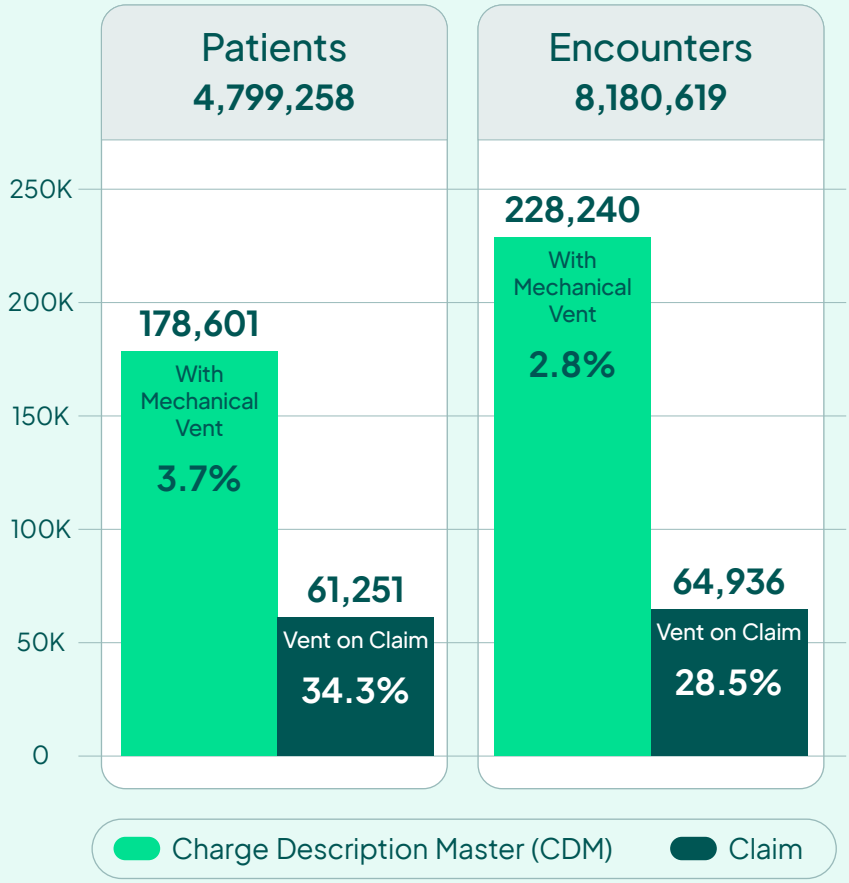
Study Findings

Patients with Mechanical Ventilation Charges Identified in CDM Versus Reported on the Corresponding Claim

178,601 patients had mechanical ventilation charges identified in CDM during the study period.

Fewer than 35% of these encounters include mechanical ventilation on the corresponding claim.

When mechanical ventilation is provided but not billed, it results in lower reimbursement. Reimbursement is reduced because Diagnosis Related Group (DRG) assignment is driven by mechanical ventilation procedures and duration.



Mechanical Ventilation on Claim by Payer Type

The published 2013 and 2024 OIG audits only included Medicare claims. FinThrive data shows that mechanical ventilation is captured more frequently on commercial insurance claims than on Medicare or Medicaid claims.

Payer Mix

While the overall payer mix for CDM included 47.8% commercial insurance payers, only 29.22% of those claims included mechanical ventilation. This means only 29.22% of the study population (that is, patients with mechanical ventilation charges during the study period) were patients with a commercial insurance payer.

Commercial Insurance

When commercial insurance was the primary payer, mechanical ventilation charges were billed 36.49% of the time.

Medicare

A much higher percentage of patients with Medicare required mechanical ventilation during their hospitalization: 42.75% with only 29.3% of the total CDM being Medicare. This means that patients with Medicare as their payer are more likely to require mechanical ventilation during an inpatient hospitalization.

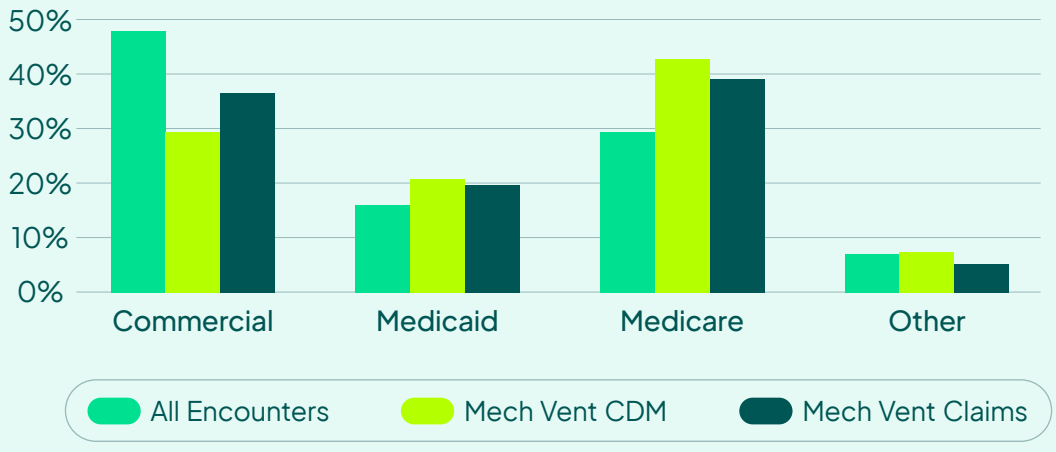
Of these encounters, the percentage with mechanical ventilation being billed, 38.98%, was similar to the commercial patient population.

Medicaid

Patients with Medicaid as their primary payer were most likely to require mechanical ventilation during their inpatient hospitalization. CDM is only 15.9% Medicaid; but, of those, 20.7% required mechanical ventilation during their hospitalization with only 19.48% of claims including mechanical ventilation.

Payer Type Summary

Commercial payers are the most likely to be billed for mechanical ventilation charges while Medicaid and other payers are the least likely. The below chart shows that mechanical ventilation is more likely to be billed on a commercial insurance Claim than Medicare, Medicaid or other payers.



Impact on Length of Stay and Quality Reporting

Under Medicare's Inpatient Prospective Payment system, hospitals are paid a fixed amount per hospitalization calculated based on the assigned DRG. This reimbursement remains the same regardless of the patient's length of stay. In very limited cases that meet high-cost thresholds, hospitals may qualify for outlier payments. While cost and length of stay can go together, these outlier payments are based on cost, not length of stay.

Most commercial insurance contracts use DRG or per-case rate reimbursement methodology. These payers monitor length of stay against the billed DRGs for medical necessity as well as readmissions.

Hospital length of stay is also an element of quality reporting. While length of stay itself is not a quality measure, it is used indirectly in some programs monitoring excess days as well as risk factors for complications and readmissions. Hospitals are expected to efficiently manage length of stay without compromising patient outcomes. For this reason, **length of stay is closely linked to quality performance even when it is not directly scored**.

Length of stay is reported and measured based on claims submitted to payers. A patient requiring mechanical ventilation would be expected to require a longer period of hospitalization than a patient without requiring these services. When mechanical ventilation is not billed, the publicly reported data does not reflect the severity of the patient's illness nor the risk or mortality.

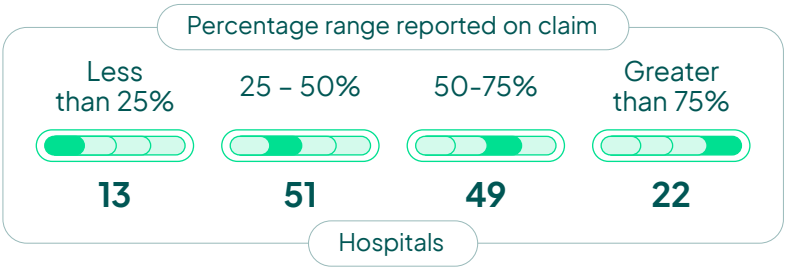
	CDM	Claims
IMV	16.3 days	13.26 days
NIV	13.3 days	9.01 days
Total Population	14.83 days	11.14 days

Mean length of stay is **3-4 days higher** in CDM population

There are specific DRGs assigned to cases requiring greater than 96 hours of mechanical ventilation. These DRGs are highly scrutinized by payers to ensure the medical record documentation shows all required elements to bill for greater than 96 hours of mechanical ventilation.

Facilities Reporting Mechanical Ventilation on Claims

Of the 135 hospitals in the study population, each billed for mechanical ventilation in at least a portion of the encounters with IMV or NIV charges.



Lessons Learned

Comparing inpatient CDM data to claims shows that mechanical ventilation is consistently underreported in claims-based analyses.

Because CDM captures services at the point of care, it provides a more complete representation of high-acuity inpatient treatment. Studies relying solely on claims data materially understate hospital burden, patient acuity and associated resource utilization.

Incorporating CDM data into RWE analyses is essential to accurately evaluate inpatient care, outcomes, estimates and system-level decision-making.

Learn more about FinThrive's Chargemaster and Claims data and the clinical and financial questions it can answer.

Visit finthrive.com/markets/life-sciences or contact Stephen Harrop at stephen.harrop@finthrive.com.

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