Predictive Analytics and Care Management Reduces COVID-19 Hospitalization Rates Avoiding Nearly $2M in Costs

$1.8M in cost savings, achieved by avoiding 61 hospital admissions and seven intensive care unit admissions.

PRODUCTS

- Health Catalyst® Data Operating System (DOS™)
- Healthcare.AI™

EXECUTIVE SUMMARY

For people 65 years of age and older, COVID-19 hospitalization rates in the U.S. have been as high 1,245.7 per 100,000 population, straining the resources and capacity of health systems. ChristianaCare needed to deploy its care management resources to greatest effect by identifying patients with COVID-19 who were most at risk of severe illness and hospitalization. By leveraging its analytics platform and the predictive power of the Healthcare.AI™ solution to provide COVID-19 risk prediction, the organization was able to provide targeted interventions to those most likely to benefit and help patients avoid unnecessary hospitalization.

COVID-19 HOSPITALIZATION RATES ON THE RISE FOR HIGH-RISK PATIENTS

In the U.S., COVID-19 hospitalization rates for patients 65 years of age and older continue to rise, stretching the resources and capacity of health systems.[1] Predictive analytics can help healthcare organizations identify patients at risk for COVID- 19 hospitalization, potentially preventing complications, and proactively address resource constraints.[2]

EFFECTIVELY IDENTIFYING PATIENTS AT HIGH RISK FOR COVID-19

COVID-19 challenged ChristianaCare to make the most effective use of their care management team. It was challenging to identify patients with COVID-19 who were at risk of severe illness. ChristianaCare was using simple rule-based methods to prioritized outreach and provide the interventions required for high-risk patients with COVID-19 to avoid hospitalization, which was critical due to limited available resources in the wake of the pandemic, such as care management personnel, portable pulse oximeters, home care staff, and inpatient beds.

ChristianaCare needed a solution that could expeditiously and equitably identify high-risk patients with COVID-19, who have an increased likelihood of hospitalization, enabling the organization to prioritize and deliver targeted interventions to quickly mitigate adverse outcomes.

USING PREDICTIVE ANALYTICS TO DELIVER COVID-19 RISK PREDICTION

ChristianaCare leveraged the Health Catalyst® Data Operating System (DOS™) platform and a robust suite of analytics applications, including data science tools and predictive analytics, to identify patients with COVID-19 who were at risk for hospitalization. The organization first identified patients 18 years and older who tested positive for COVID-19 within the last 24 hours and who had not been admitted to the hospital. ChristianaCare then created a machine-learning model to predict the likelihood of hospitalization.

The machine-learning model uses 15 different factors to predict hospitalization and assign a risk score to each patient. The patient list and risk scores are pushed to ChristianaCare's CareVio™ care coordination team dashboard. Care coordinators reach out to and assess patients with the highest risk scores and enroll patients in the appropriate care management program, enabling optimal allocation of resources and effective management of COVID-19.

ChristianaCare can use the data platform to evaluate differences in hospital admission, ICU admission, ventilator utilization, and length of stay. The organization can also assess the final discharge disposition difference between patients identified as high risk who were enrolled in the care coordination and those who were not enrolled.

ABOUT CHRISTIANACARE

ChristianaCare, headquartered in Wilmington, Delaware, is one of the country's most dynamic healthcare organizations centered on improving health outcomes, making high-quality care more accessible, and lowering healthcare costs.

> We quickly recognized that we could use the Health Catalyst data science tools to provide clinicians the insight required to direct clinical resources for COVID-19. Our care coordination teams rapidly integrated predictive analytics into their workflow, reducing hospitalizations from COVID-19, and avoiding nearly $2M in costs.
>
> **Ed Ewen, MD, Director, Clinical Data and Analytics, Center for Strategic Information Management**

RESULTS

ChristianaCare's COVID-19 hospitalization risk-prediction model effectively enabled the accurate identification of patients at the highest risk, allowing the organization to make data-informed decisions about resource allocation and enroll patients in the appropriate care management program, positively impacting patient outcomes. Results include:

- $1.8M in cost savings, achieved by avoiding 61 hospital admissions and seven intensive care unit admissions.

WHAT'S NEXT

ChristianaCare will continue to expand its use of data science and predictive analytics to improve the care provided to its patients and the effectiveness of its operations.

> We're committed to health equity and are aware that COVID-19, both nationally and locally, is disproportionately impacting our most vulnerable and disadvantaged communities. The Health Catalyst data science tools and methods support us in developing robust predictive models than can help us correct this bias and advance equity.
>
> **Ed Ewen, MD, Director, Clinical Data and Analytics, Center for Strategic Information Management**

REFERENCES

1. COVID-19 Hospitalizations. (2021). Retrieved from https://gis.cdc.gov/grasp/covidnet/COVID19_3.html
2. Kent. J. (2020). 3 ways healthcare is using predictive analytics to combat COVID-19. *Health IT Analytics.* Retrieved from https://healthitanalytics.com/news/3-ways-healthcare-is-using-predictive-analytics-to-combat-covid-19

ABOUT HEALTH CATALYST

Health Catalyst is a leading provider of data and analytics technology and services to healthcare organizations, committed to being the catalyst for massive, measurable, data-informed healthcare improvement. Our customers leverage our cloud-based data platform—powered by data from more than 100 million patient records, and encompassing trillions of facts—as well as our analytics software and professional services expertise to make data-informed decisions and realize measurable clinical, financial, and operational improvements. We envision a future in which all healthcare decisions are data informed.

Learn more at **www.healthcatalyst.com**, and follow us on **Twitter**, **LinkedIn**, and **Facebook**.