

Decreasing Utilization of the Comprehensive Respiratory Viral Panel in the Inpatient Setting at Lehigh Valley Health Network

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Decreasing Utilization of the Comprehensive Respiratory Viral Panel in the Inpatient Setting at Lehigh Valley Health Network

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- Respiratory viral testing of pathogens other than influenza is a costly diagnostic study of unclear value in the inpatient setting.
- Although timely diagnosis of respiratory virus infections has the potential to optimize downstream use of limited health care resources¹, there is mixed evidence in the cost-effectiveness of comprehensive respiratory viral testing²⁻⁴.
- Recommendations by the Infectious Disease Society of America and the American Society for Microbiology discourage use of broad multiplex respiratory viral pathogen testing and suggest more commonly suspected pathogens, such as Influenza⁵.
- At Lehigh Valley Health Network (LVHN), Respiratory Viral Panel (RVP) was the most overutilized lab in the top 10 diagnoses, and the lab cost report in 2019 revealed \$10.1M total cost of RVPs.

Problem Statement

- We implemented a multi-pronged intervention with goals to discourage broad, indiscriminate use of the RVP to improve patient care through clinical work standardization and a decrease in the cost of care.
- Our prospective quality improvement project implemented three interventions to decrease RVP utilization at LVHN:
 - Implementation of a new influenza testing algorithm (Fig.1) - Linked to order in December 2020
 - Removal of RVPs from all inpatient order sets in the electronic medical record (EMR) system - Removed in September 2020
 - Addition of clinical decision support via a soft-stop at the time of order entry requiring providers to choose a clinical indication for their inpatient RVP order - Activated in September 2020
- Primary outcome measures were the number of RVPs per 10,000 patient days and the number of influenza A/B/RSV tests per 10,000 patient days at all LVHN inpatient and emergency department (ED) sites between October 2018 to December 2020.
- A control chart (Fig. 2) was used to compare the lab utilization pre- and post- intervention. The RVP utilization in 2018 influenza season (September 2018 to March 2019) was calculated as a pre-intervention baseline mean.
- Hospital length of stay, 30-day readmission rate, and 30-day mortality rate for patients who underwent RVP testing were measured to review balancing measures that may have been affected by the intervention.

Fig. 1 New Influenza Testing Algorithm at LVHN

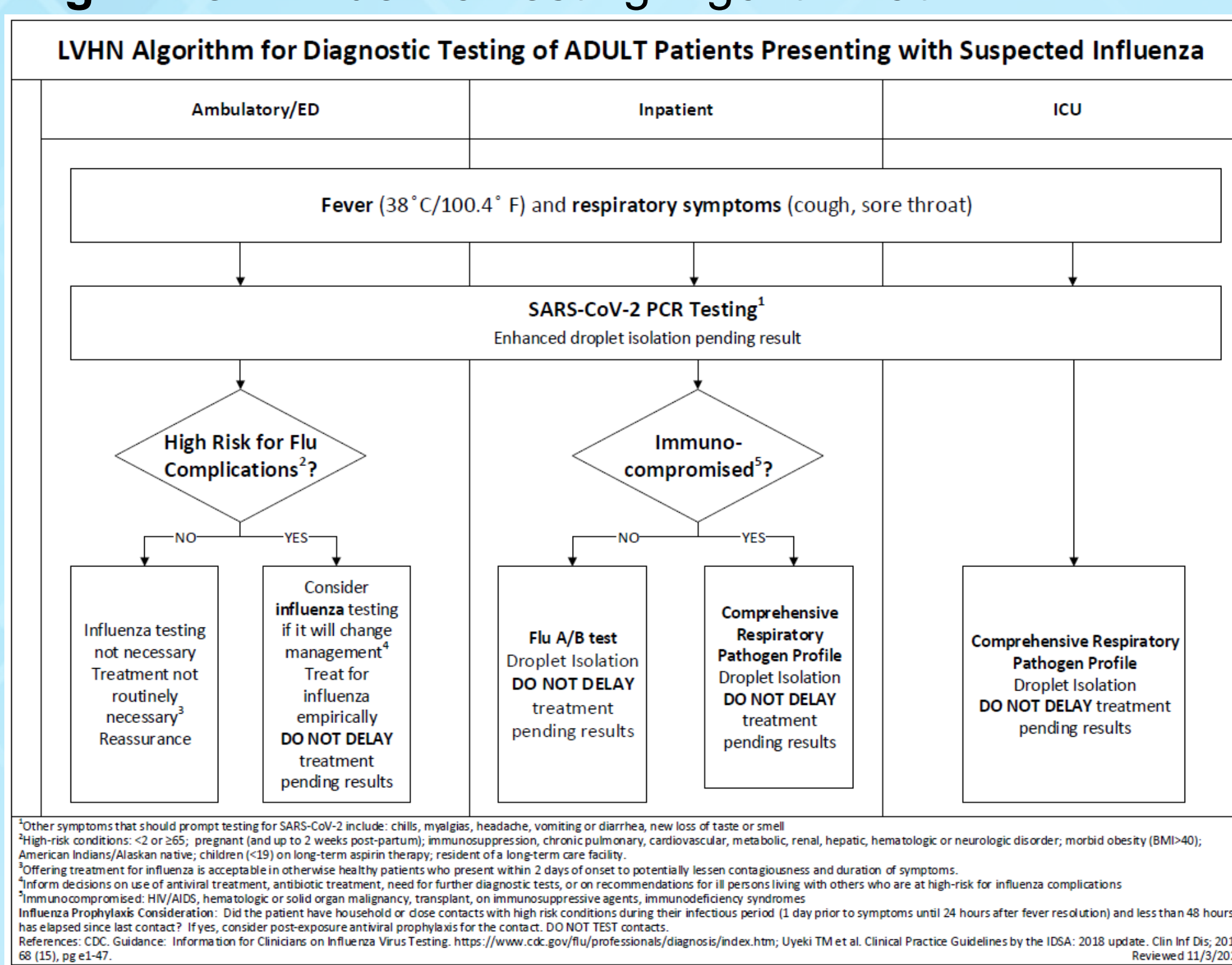


Fig. 2 Control Chart of Respiratory Viral Testing per 10,000 Patient Days at LVHN

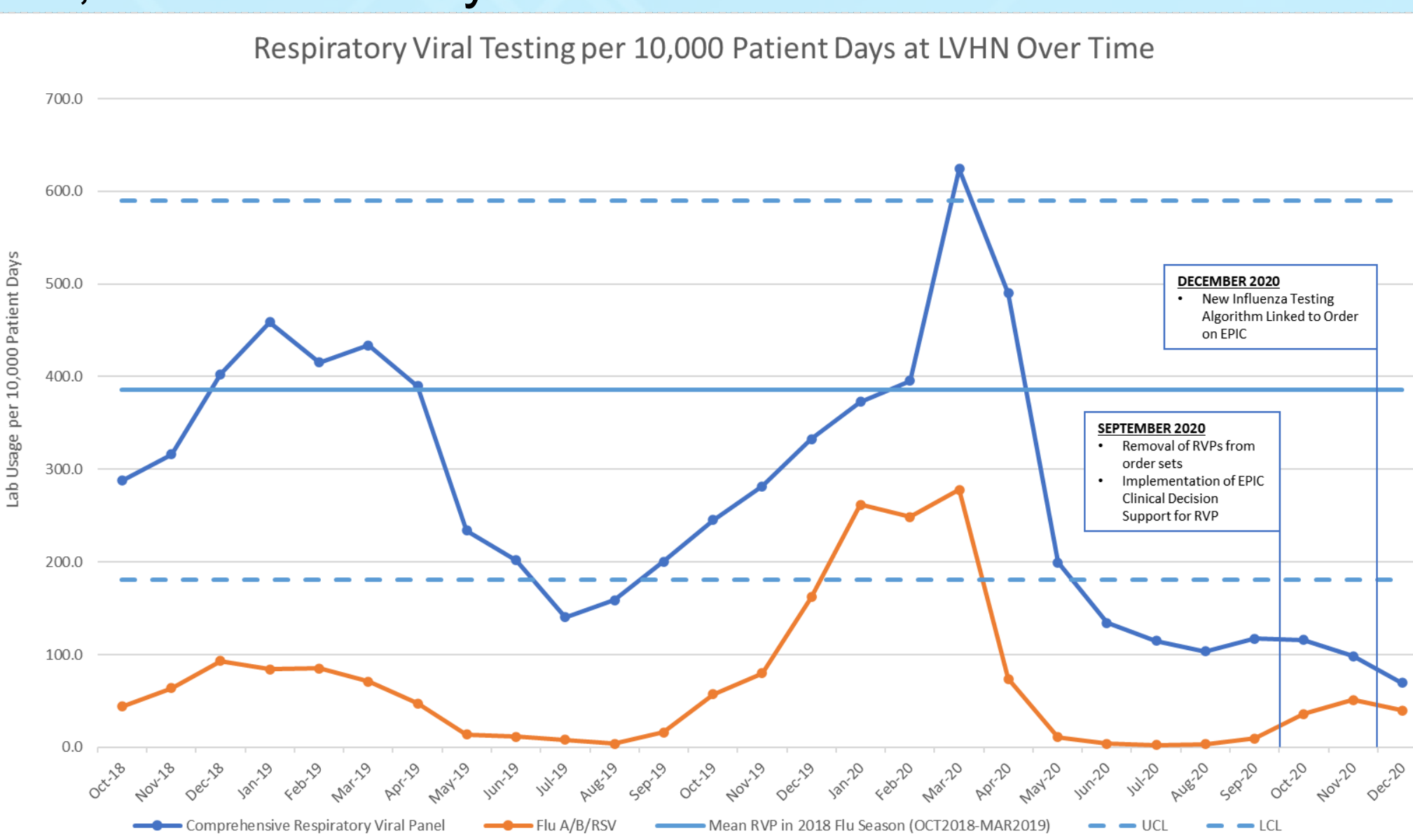


Fig. 3 30-Day Readmission and Mortality Rate for Patients Undergoing RVP Testing Over Time

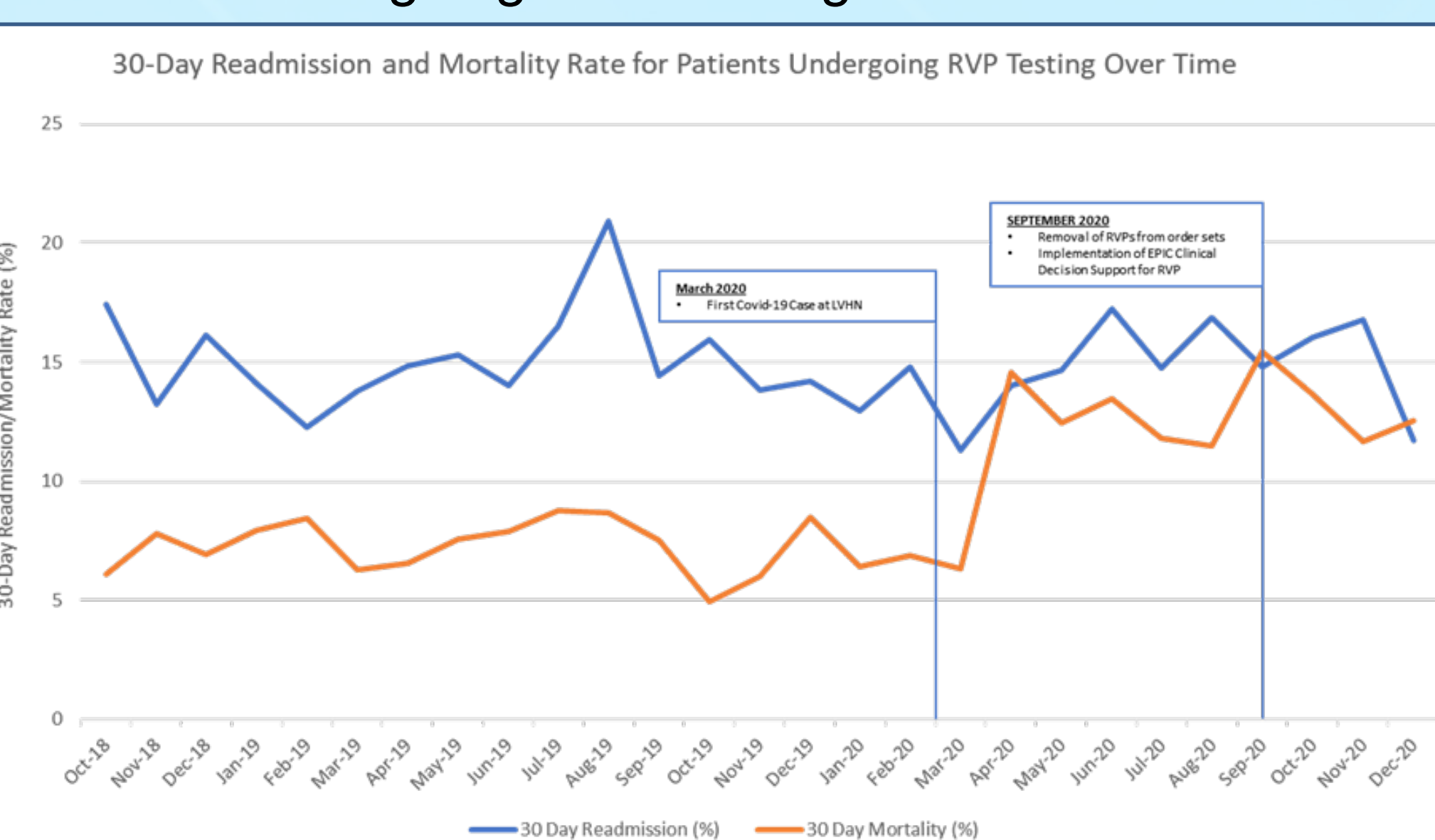


Table 1. Top 10 Most Common Diagnoses Used for RVP

	2018 Flu Season	2019 Flu Season	2020 Flu Season	
1	Sepsis, unspecified organism 7.7%	Sepsis, unspecified organism 8.4%	Sepsis, unspecified organism 10.1%	
2	COPD exacerbation 7.5%	COPD exacerbation 7.0%	COVID-19 5.6%	
3	Pneumonia, unspecified organism 5.1%	Pneumonia, unspecified organism 3.6%	Other specified sepsis 5.1%	
4	Hypertensive heart disease and CKD I-IV 3.5%	Hypertensive heart disease and CKD I-IV 3.5%	Pneumonia, unspecified 4.5%	
5	Acute upper respiratory infection, unspecified 3.4%	Acute upper respiratory infection, unspecified 3.1%	COPD exacerbation 3.3%	
6	Viral infection, unspecified 2.5%	Other specified sepsis 2.4%	Hypertensive heart disease and CKD I-IV 2.7%	
7	Acute bronchitis due to RSV 2.3%	Acute and chronic respiratory failure with hypoxia 2.2%	Acute respiratory failure with hypoxia 2.3%	
8	Influenza due to other respiratory manifestations 2.2%	Influenza due to other respiratory manifestations 2.0%	Fever, unspecified 2.2%	
9	Other specified sepsis 2.1%	Acute respiratory failure with hypoxia 2.0%	Acute and chronic respiratory failure with hypoxia 2.0%	
10	Fever, unspecified 1.8%	Hypertensive heart disease with heart failure 2.0%	Acute upper respiratory infection, unspecified 1.8%	

- Comparing the total number of RVPs from October to December, 2083 RVPs were ordered in 2018, 2389 RVPs were ordered in 2019, and only 860 RVPs were ordered in 2020. The estimated cost difference spent on RVPs in 2019 and 2020 was \$691,459.67 in just 3 months from October to December.
- However, because of the ongoing COVID-19 pandemic, respiratory viral testing for non-COVID pathogens also decreased considerably. Although there is a decline in RVP use after the October intervention, any significant change will be better elucidated after the COVID-19 pandemic.
- The increase in hospital length of stay and 30-day mortality rate is likely related to increased illness severity of our patient population during the pandemic, but also reflects that our interventions prompt providers to use this test only for immunocompromised or severely ill patients.
- Biggest limitation of our study was the impact of the COVID-19 pandemic. Respiratory viral testing was primarily focused on SARS CoV-2 and the prevalence of non-COVID pathogens were noted to decrease considerably during the pandemic⁶. Further data collected after the pandemic will be need to measure significant impact.

- After the implementation of our interventions, there was a decline in RVP utilization. However, it is difficult to ascertain how much our interventions played a role in the decline due to the impact of the COVID-19 pandemic.
- Data collected after the COVID-19 pandemic will show more convincing evidence of the impact of our interventions.
- Regardless, the three interventions we present in this project are a relatively minor change to the health system that could be used to avoid unnecessary cost to the health system, and these could be applied to other laboratory tests that are not cost-effective.

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