

# Reducing Unplanned Troubleshooting Rates of Non-Invasive Ventilators

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## INTRODUCTION

It is common to encounter issues such as improper fitting or mask leakage with non-invasive ventilation masks, which can affect patient compliance with the therapy.

These issues can lead to poor matching between the ventilation device and the patient, increased effort to trigger the ventilator, and increased work of breathing for the patient, all of which can worsen the patient's respiratory condition and lead to unstable vital signs.

## AIM

To promote public health and disease prevention, we strive to reduce the incidence of unplanned troubleshooting rates of non-invasive ventilators.

## METHOD

During the period from December 01, 2019 to February 28, 2020, a total of 3044 samples were collected from patients using non-invasive ventilators in the intensive care unit and wards. There were 394 occurrences of unplanned troubleshooting.

The causes were: "Poor mask wearing technique and improper mask size selection leading to mask leakage", and "Failure to timely reinforce bronchial hygiene techniques and poor mask wearing technique leading to changes in patient condition".

It was decided to implement the following actions: Producing educational videos to provide on-the-job training for correct mask wearing techniques; Creating a mask size selection chart for use by respiratory therapists; and Enhancing education for respiratory therapists to intervene in chest physiotherapy in a timely manner.

## CONCLUSIONS

Promoting on-the-job education through electronic teaching methods can benefit a larger number of healthcare professionals due to their diverse and rotating schedules. Conducting educational sessions via video recordings is more time-saving and efficient compared to traditional group presentations.

Providing post-training assessments allows for evaluating the learning outcomes of participants, offering valuable feedback for further improvement of the educational content. Additionally, conducting regular on-site demonstrations enables the provision of diverse learning methods, allowing participants to absorb knowledge in different ways.

These efforts are aimed at striving for overall professional standards, providing the best quality of care for patients, and promoting the enhancement of overall professional healthcare standards.

## REFERENCES

- Yoshitoyo Ueno, Nobuto Nakanishi, Jun Oto, Hideaki Imanaka, Masaji Nishimura. A Bench Study of the Effects of Leak on Ventilator Performance During Noninvasive Ventilation. RESPIRATORY CARE • NOVEMBER 2011 VOL 56 NO 11.
- Alban De Luca, Fatimata S Sall, Abdo Khoury. Leak Compensation Algorithms: The Key Remedy to Noninvasive Ventilation Failure? Respiratory Care January 2017, 62 (1) 135-136.
- Al Otair HA, BaHammam AS. Ventilator- and interface-related factors influencing patient ventilator asynchrony during noninvasive ventilation. Ann Thorac Med 2020;15:1 8.

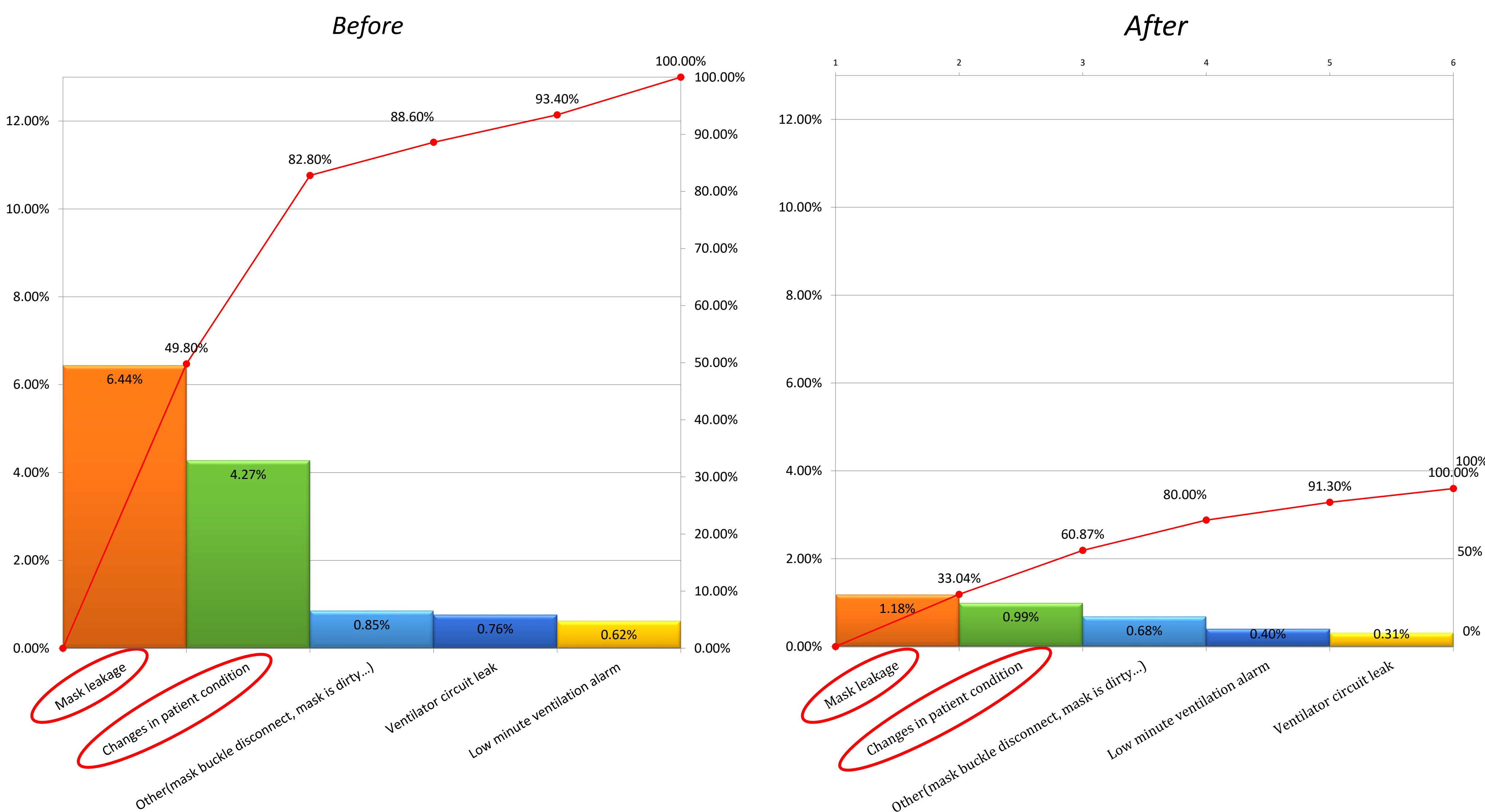
## RESULTS

Following the implementation of intervention strategies, the occurrence rate of unplanned troubleshooting with non-invasive ventilation decreased from 12.9% before intervention to 3.57% between July 1, 2020, and September 30, 2020.

In the analysis of specific reasons, the occurrence rate of unplanned troubleshooting due to mask leakage decreased from 6.4% before intervention to 1.18%, and the occurrence rate due to changes in patient condition decreased from 4.3% to 1.0%.

Both overall and in the stratified analysis, there was an improvement of over 50% in the occurrence rate of unplanned troubleshooting.

Effect Confirmation -Plato



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