

# Study provides insight into use of critical care resources

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A study by Massachusetts General Hospital (MGH) investigators has found wide variation in the use of different hospital units—intensive care or general medical units—to deliver a type of advanced respiratory support called non-invasive ventilation. The team's report published in *Critical Care Medicine* found no differences in length of stay or in-hospital deaths among patients with chronic obstructive pulmonary disease (COPD) receiving this treatment that were associated with whether they were treated on a general medical unit or an intensive care unit (ICU).

"Even hospitals in the same city deliver respiratory care differently," says lead and corresponding author Laura C. Myers MD, MPH, of the MGH Division of Pulmonary and Critical Care Medicine. "Some hospitals try to bring critical care resources to the general medical unit to avoid transferring patients—which can be disruptive to their care—while others centralize critically ill patients in the ICU. Our goal was to document the variation in practice and determine whether hospitals more likely to deliver non-invasive [ventilation](#) on the general medical unit have equivalent outcomes after adjusting for patients' severity of illness."

Non-invasive ventilation delivers respiratory support through a mask rather than through an endotracheal or tracheostomy tube. For their study, the investigators used data from 424 hospitals from the State Inpatient Database maintained by the U.S. Agency for Healthcare Research and Quality. They selected 12 states—Arkansas, Kentucky,

Massachusetts, Maryland, North Carolina, New Jersey, Nevada, New York, Oregon, Utah, Vermont and Washington—that provided information on whether a patient was treated in an ICU and analyzed data from 2014, before the imposition of penalties for COPD readmissions.

Of more than 5,000 patients receiving non-invasive ventilation whose data were analyzed, 48 percent were treated on a general medical unit, while 52 percent were treated in an ICU. While some hospitals delivered almost all non-invasive ventilation in the ICU, others delivered almost all of it on the general medical unit. As might be expected, when patients were treated on the general medical unit, costs per hospitalization were around \$1,500 less. Patients in higher-ICU-utilizing hospitals also had a greater likelihood of receiving invasive monitoring, such as the placement of central/arterial lines, which could reflect the need to monitor key respiratory parameters and deliver life-saving medications. But there was little difference in the incidence of organ failure, which is a marker of severity of illness, between lower- and higher-ICU-utilizing hospitals. The difference in the average number of organ failures per patient between the lowest- and highest-ICU-utilizing hospitals was only 0.15, which is strikingly small, Myers notes.

She says, "We may be able to deliver safe and less costly respiratory care on the general medical unit, but we have to acknowledge the limitations of our data. It's not clear from this retrospective study whether patients who received the invasive monitoring—central/arterial lines—in the ICU actually needed it to achieve outcomes equivalent to those of patients on the general medical unit or whether that represented a lower threshold for [intensive care](#) specialists at some hospitals to do such procedures when patients are admitted to the ICU."

Further studies may reveal the reasons why hospitals have such variations in policies regarding the delivery of non-invasive ventilation.

"Based on the data we analyzed, we cannot advocate for standardizing a single policy across all hospitals," says Myers. "Going forward, we'd like to use a qualitative approach to understand the range of hospitals' policies. Some hospitals have team 'huddles' prior to initiating non-invasive ventilation on a general medical unit, a practice we follow at MGH. Others require pulmonary consultation if [patients](#) do not improve within a certain time frame. Still others may have dedicated respiratory floors with specially trained respiratory nurses/therapists available. A network-based study may help us determine whether a specific method of care delivery is associated with better outcomes, which we could then test in a prospective trial."

**More information:** Laura C. Myers et al, ICU Utilization for Patients With Acute Exacerbation of Chronic Obstructive Pulmonary Disease Receiving Noninvasive Ventilation, *Critical Care Medicine* (2019). [DOI: 10.1097/CCM.0000000000003660](#)

Provided by Massachusetts General Hospital

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