

Change in respiratory care strategies for preterm infants improves health outcomes

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A decade's worth of data shows that neonatologists are shifting the type of respiratory support they utilize for preterm infants, a move that could lead to improved health outcomes.

Using two large national datasets that included more than 1 million [preterm infants](#), researchers in a new Vanderbilt-led study found that from 2008 to 2018 there was a greater than 10% decrease in the use of [mechanical ventilation](#) for this patient population. Concurrently, there was a similar increase in the use of non-invasive respiratory support, such as continuous positive airway pressure (CPAP), for these infants.

The study, "Changes in Use of Respiratory Support for Preterm Infants in the U.S.," published July 6 in *JAMA Pediatrics*.

"It's a pretty big success story for the field of neonatology. We've been able to keep a lot of babies off mechanical ventilation and potentially spare them of lung injury and injuries to other [organ systems](#) as well," said Dupree Hatch, MD, MPH, senior study author and assistant professor of Pediatrics in the Division of Neonatology at Monroe Carell Jr. Children's Hospital at Vanderbilt.

For preterm infants, mechanical ventilation can have adverse pulmonary and neurodevelopmental outcomes. To reduce these risks, neonatologists over the past two decades have been exploring and researching non-invasive respiratory support options like CPAP therapy for these infants. Much of the shift in mechanical ventilation seen in the study coincided with a large study released in 2010 that showed mechanical ventilation was not superior to non-invasive ventilation, and in fact may involve more risks.

"In multiple studies mechanical ventilation has been associated with adverse outcomes. There are several studies that show for every week you stay on a ventilator as a preterm baby, your odds of having adverse neurodevelopmental outcomes go up," Hatch said.

"Since large studies were published in 2008, 2010 and 2011 showing the effectiveness of non-invasive respiratory support, we thought that

respiratory support patterns in preterm infants had likely changed, but no one had really quantified that, or looked if it was widespread across the entire country or if it was just in pockets."

Hatch and colleagues examined two large national datasets, confirming the changes in practices. They looked at data collected over an 11-year period on the type of respiratory support used for infants born between 22 weeks' and 34 weeks' gestation.

In one of the study datasets that included admissions to over 350 NICUs in the U.S., they found that mechanical ventilation utilization in preterm infants decreased from 29.4% in 2008 to 18.5% in 2018. Nationally, the study authors wrote, the changes were associated with about 30,000 fewer infants receiving mechanical ventilation during the study period. As the number of infants on mechanical ventilation went down, the duration of time that ventilated babies spent on mechanical ventilators also went down.

Also, in their findings, researchers discovered that the total number of days on non-invasive respiratory support went up across all gestational ages from 13.8 days to 15.4 days. Hatch said more research is needed to understand the implications of spending more time on non-invasive respiratory support therapies.

"We need to figure out if the increase in duration of respiratory support is a good thing, and what does that do to NICU length of stay and overall resource utilization for preterm infants in the U.S. It raises more questions," he said.

Additionally, they saw an increase in the number of extremely preterm infants, 22 to 24 weeks' gestation, being placed on mechanical [ventilation](#) as there has been increased intervention and improved survival for this age group. Hatch notes that the respiratory support

strategies for this particular population of [infants](#) needs more examination.

"The field of neonatology has worked really hard to examine our practices and get better. I am proud of how quickly some of the landmark respiratory care studies have penetrated our [clinical care](#)," said Hatch. "Care in the NICU is becoming less invasive and gentler because it is the right thing to do for babies' long-term outcomes."

More information: L. Dupree Hatch et al, Changes in Use of Respiratory Support for Preterm Infants in the US, 2008-2018, *JAMA Pediatrics* (2021). [DOI: 10.1001/jamapediatrics.2021.1921](https://doi.org/10.1001/jamapediatrics.2021.1921)

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