

Kids dependent on long-term ventilation require longer, more expensive hospital care, study finds

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Despite significant technological improvements, children reliant on long-term mechanical ventilation often require extensive additional care, including costly hospital stays and emergency visits.

A new study led by University of Michigan researchers found that children with complex chronic conditions who require long-term mechanical ventilation have significantly higher mortality, longer length of hospitalizations, higher mean charges, and more emergency department admissions.

The results of this study, led by Brian D. Benneyworth, M.D., M.S., Pediatric Critical Care and Health Service Research Fellow with the Child Health Evaluation and Research (CHEAR) unit at the U-M Medical School, are available now online in the journal *Pediatrics*.

The study found that the length of initial hospitalizations for children requiring long term mechanical ventilation remained the same between 2000 and 2006, but total admissions (for these children) were up 55%. Until now, researchers were unclear as to how often this technology was used and how often children requiring long-term mechanical ventilation were admitted for additional care. In an effort to improve patient care and anticipate continued growth in this group of patients, U-M researchers analyzed trends in relevant discharges nationally between 2000 and 2006. Pediatricians use long-term mechanical ventilation technology to treat lung failure in children with various complex chronic conditions such as muscular dystrophy and premature birth. These ventilation systems are preferred, because they can be used at home.

The study, which analyzed all hospitalizations for children 0-20 years of age requiring long term mechanical ventilation, also found that infants and young children consume the highest proportion of health care resources for this particular demographic.

"Infants less than one year old made up 25% of the population, but used about 50% of the healthcare resources for all the children requiring long-term medical ventilation," says Benneyworth, who also treats patients at the U-M C.S. Mott Children's Hospital. "This means that there may be

tremendous opportunities to improve the care that these young children receive."

The study also finds that infants have the longest length of hospitalization and the highest in-hospital mortality rates which may be important goals for additional research.

"Programs in many hospitals have been working to improve the discharge process and home care resources available to these children," says Benneyworth. "But these young children, with their long and expensive hospital stays, have different needs that we should identify."

The study showed a 55% growth in additional hospitalizations for children needing long-term mechanical ventilation support and a 70% increase in subsequent health care cost. Analysis also shows that in the final years of the study, the demand for additional care was greatest in patients between one and four years of age.

Most notably, infants less than a year old make up a small part of the total population, but also used about half of the total healthcare resources, demonstrating an opportunity for continued optimization in the care of young children requiring long-term mechanical ventilation.

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Journal Reference:

1. B. D. Benneyworth, A. Gebremariam, S. J. Clark, T. P. Shanley, M. M. Davis. **Inpatient Health Care Utilization for Children Dependent on Long-Term Mechanical Ventilation.** *Pediatrics*, 2011; DOI: [10.1542/peds.2010-2026](https://doi.org/10.1542/peds.2010-2026)