New tool may help prioritize high-risk infants for RSV immunization

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A new tool may help identify newborns at highest risk for developing serious RSV LRTI. Credit: ATS

On the heels of a shortage of nirsevimab for infant respiratory syncytial virus (RSV) lower respiratory tract infection (LRTI) prevention, a new

tool may help identify newborns at highest risk for developing serious RSV LRTI, according to research published at the ATS 2024 International Conference.

"Timely identification of infants at highest risk of RSV-related morbidity is key to prevention," said lead author Brittney M. Snyder, Ph.D., assistant professor, Division of Allergy, Pulmonary and Critical Care Medicine, Vanderbilt University Medical Center.

"Our personalized risk prediction tool may have applications in allocating expensive and/or limited immunoprophylaxis (immunization with nirsevimab or palivizumab) to achieve the greatest benefit and in promoting RSV prevention among families with high-risk infants."

More than half of RSV LRTIs are among healthy, term infants who are generally considered low risk. These infants are, in fact, at risk of requiring intensive care unit -level care, and some may die from their illness.

Early immunization with nirsevimab is recommended for all infants by the Centers for Disease Control & Prevention, yet in October 2023 nirsevimab was in short supply and the CDC recommended giving it only to high-risk infants who weren't eligible for immunization with palivizumab. Both products, which prevent RSV LRTI in newborns and young children, are monoclonal antibodies (nirsevimab is long-acting and only requires one dose, while palivizumab is short-acting and requires monthly injections during RSV season).

In the population-based study by Dr. Snyder and colleagues including children insured by the Tennessee Medicaid Program, the researchers assessed infants who did not receive RSV immunoprophylaxis in the first year of life. They gathered demographic and clinical data from administrative health care encounters and linked birth certificates.

"To predict whether these infants developed severe RSV LRTI requiring ICU admission during the first year of life, we developed a multivariable logistic regression model. The model includes demographic and clinical variables collected at or shortly after birth–19 variables in all, such as prenatal smoking, delivery method, maternal age and assisted breathing (ventilation) during birth hospitalization," said lead biostatistician Tebeb Gebretsadik, MPH, Department of Biostatistics, Vanderbilt University Medical Center.

Among 429,365 infants in the study, 713 had severe RSV LRTI requiring ICU admission. The tool had good predictive accuracy and internal validation that indicated a good fit.

"Our objective was to develop a personalized tool for use in all newborns using readily available birth and postnatal data to predict risk of RSV LRTI requiring ICU admission, useful for prioritizing RSV prevention products with limited availability," said Principal Investigator Tina V. Hartert, MD, MPH, professor of medicine and pediatrics at Vanderbilt University Medical Center. Even though the recent nirsevimab shortage has, fortunately, eased up, it is not known whether shortages will occur in the future.

"This tool may be particularly helpful in prioritizing which infants should be immunized during times of limited availability of RSV prevention medicines. Using the tool to identify if their infant is at high risk for RSV infection requiring ICU care may also persuade vaccine-hesitant families to accept RSV immunoprophylaxis, by showing them their newborn is at high risk," she added.

"To ensure compatibility with nirsevimab and maternal vaccination, our tool was developed for use in all infants," concluded co-author Niek Achten, MD, postdoctoral fellow in pediatrics, Erasmus University Medical Center, Rotterdam, Netherlands, who imagined the need for

such a tool.

"In addition to use in the United States during times of limited availability, our tool may prove useful in countries with budgetary constraints needing to prioritize administration to the highest risk infants."

The authors note that next steps to ensure optimal usefulness include validation of the tool in external populations, further cost-effectiveness analyses and decision curve analyses.

More information: Session: C17 – Pediatric Impact of COVID-19 and Other Respiratory Infections, Clinical Prediction Tool for Prioritizing Respiratory Syncytial Virus Prevention Products for High-Risk Infants During Current Limited Availability of Nirsevimab in the United States

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