

Benefits of higher oxygen, breathing device persist after infancy

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By the time they reached toddlerhood, very preterm infants originally treated with higher oxygen levels continued to show benefits when compared to a group treated with lower oxygen levels, according to a follow-up study by a research network of the National Institutes of Health that confirms earlier network findings. Moreover, infants treated with a respiratory therapy commonly prescribed for adults with obstructive sleep apnea fared as well as those who received the traditional therapy for infant respiratory difficulties, the new study found.

In the original 2010 study, of infants born between 24 to 27 weeks of gestation, investigators in the Neonatal Research Network found:

- Infants were more likely to survive if they had received higher [oxygen levels](#), although they were at higher risk of an [eye condition](#) that can impair vision or lead to [blindness](#).
- Continuous positive [airway pressure](#) (CPAP), a treatment typically reserved for adults with obstructive sleep apnea, was as effective as standard therapy with a ventilator and [surfactant](#) (a sticky substance that coats the inside of the lungs).

For the current study, the researchers checked on the children's progress, comparing the groups' survival rates and cognitive and motor development 18 to 22 months after they were originally due to be born. The re-evaluation of the original study treatment groups examined:

- Children treated with [oxygen saturation levels](#) that were either low (85 percent to 89 percent) or high (91 percent to 95 percent).
- Children treated with CPAP therapy and

those treated with a [ventilator](#) and surfactant.

The researchers compiled the results of their analysis in terms of a combined primary outcome. This primary outcome took into account two possibilities: whether an infant either died in the first or second year of life or had a neurodevelopmental impairment—any of a number of conditions affecting the [nervous system](#). These included [cerebral palsy](#), blindness, [hearing loss](#) or low scores on tests of infant mental and motor development. The researchers selected this outcome because infants who died before 18 months of age could not be classified as having a neurodevelopmental impairment.

In terms of the primary outcome, the researchers found no differences between the groups.

When the researchers looked at outcome measures separately, however, they did observe differences. The researchers documented higher [survival rates](#) among children who received oxygen with higher saturation rates. The study's original findings showed that survivors in this group also had a greater risk of developing retinopathy of prematurity, an eye condition that can impair vision or cause blindness. Although those receiving higher oxygen levels were more likely to have had corrective eye surgery, by the time the children reached 18 to 22 months corrected age—their age had they been born at the approximate time they were due. The researchers found that there was no difference in the rate of vision problems between the two groups.

"CPAP for infants has been available since the 1970s. This is the first study to compare surfactant treatment to CPAP in a large group of infants, and these results reassure us that CPAP is as good a choice in the first hour of life as traditional methods for very preterm babies who need help breathing," said senior author Rosemary D. Higgins, M.D., of

the Pregnancy and Perinatology Branch of the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD), one of two NIH institutes supporting the study. "We've also confirmed that higher oxygen targets improve survival and don't appear to threaten survivors' vision in the longer term."

The study also received funding from the National Heart, Lung and Blood Institute.

Their findings appear in the *New England Journal of Medicine*.

The research was conducted at hospitals affiliated with the NICHD-funded Neonatal Research Network.

More than 1,300 [preterm infants](#) born between 2005 and 2009 were included in the study. Between 18 and 22 months after the infants' original due date, researchers assessed whether the children had cerebral palsy and evaluated their vision, hearing, physical mobility and cognitive development.

The researchers found that 60 percent of the children showed typical physical and cognitive development for their age.

"Although these findings can give delivery room practitioners confidence in a suitable approach, they can't help predict how these children will grow or how well they'll do in school," Dr. Higgins said. "Our group will continue to monitor the health of a subset of these children through childhood, to determine if there are any major differences between the groups."

Provided by NIH/National Institute of Child Health and Human Development

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