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2015

| WORKING TO BUILD A HEALTHY AUSTRALIA |

BREATHING EASY: SUPPORTING LUNG DEVELOPMENT OF PREMATURE BABIES

Associate Professor Jane Pillow

Associate Professor Jane Pillow and her team sought to understand the respiratory problems of premature babies to help the sickest and smallest babies develop their lungs. This research has contributed a great deal to improving both the quality of healthcare available to premature babies at birth as well as their long-term health prospects.

UNIVERSITY OF
WESTERN AUSTRALIA

PROJECT GRANT

\$395,696

2011-2013

TEAM MEMBERS

Professor Andrew Bassom

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Breathing is the most pressing challenge for premature infants at birth, and is the main focus of Associate Professor Jane Pillow's research.

Through their important research, the team is discovering new ways to help premature babies breathe more easily, playing a valuable role in enhancing the immediate and long-term health outcomes for these babies.

Associate Professor Pillow explained that babies with underdeveloped lungs often suffer from severe breathing difficulties.

"Preterm infants often need mechanical ventilation, but their underdeveloped and fragile lungs are very easily damaged by ventilation.

"Our research focuses on finding more gentle and effective ways to assist their breathing.

"We are investigating new treatment strategies to minimise the long-term effects of premature birth on lifelong respiratory health," she explained.

Associate Professor Pillow's team has made some fascinating discoveries about the respiratory systems of premature infants. The most intriguing and exciting observation was identifying new ventilator waveform properties that have distinct advantages for enhanced gas exchange than traditional waveforms.

Using a novel mode of mechanical ventilation called high-frequency oscillatory ventilation, the team examined which components of the ventilator waveform are most beneficial to the airway and lungs of premature babies.

**Across the world each year, more than
15 million babies are born prematurely,
of which 1 million will die during infancy.**



Associate Professor Jane Pillow.

“ This research offers the possibility of significantly improving neonatal health and wellbeing at a global level.

“We found that combining multiple different frequencies into the high frequency ventilator waveform resulted in additional benefits for the patient.

“This enables us to ventilate babies using lower pressures and average breath volumes, potentially reducing the injurious effects of mechanical ventilation.”

Associate Professor Pillow hopes these findings will contribute to new and improved future treatments.

“Our findings will advance the technologies used to treat premature babies with significant breathing difficulties, whilst reducing the damage inflicted on their lungs by lifesaving artificial respiration.

“Gentle artificial breathing technologies will encourage more normal lung development, reducing the likelihood and severity of long-term lung disease that adversely affects quality of life,” she concluded.

Next steps:

In collaboration with international colleagues and industry, Associate Professor Pillow and her team will further develop new ventilator modality and evaluate its application to other respiratory diseases, including acute respiratory distress syndrome in adults.

Premature birth in Australia

Normally, a pregnancy lasts about 40 weeks, but a premature, or preterm, birth is one that occurs before the start of the 37th week of pregnancy. In Australia, around eight per cent of babies are born prematurely, but these babies need vital care in the first weeks and months of their fragile lives. Their short and long-term health outcomes are improved greatly by the care they receive during this time. As premature birth gives the baby less time to develop in the womb, some babies, especially those born earliest, experience complicated medical problems because their organs are too immature to function properly outside the womb.