

# Infant lungs and bushfire smoke

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Everyone at the Murdoch Children's Research Institute extends their heartfelt sympathy and condolences to those affected by the devastating Australian bushfire situation, which unfortunately looks likely to continue in the coming months. Associate Professor David Tingay is an NHMRC Research Fellow and Co-Leader of the institute's Neonatal Research Team. A/Prof Tingay lays out what we know about the potential impacts of bushfire smoke on the infant lung.

The current [catastrophic bushfires](#) facing Australia have blanketed much of the country in smoke and ash. The associated [poor air quality](#) and [high levels of air pollution](#) are unfamiliar to many Australians. Bushfires create smoke which suspends particulate matter in the air we breathe. Some of these particles are small enough to be breathed deep into the lungs. Appropriately, governments and public health authorities have been quick to highlight [health warnings](#) for the most vulnerable in our community, including infants and pregnant mothers. For the developing [lung](#) there is no safe level of air pollution but fortunately the risks from exposure to bushfire smoke are most likely short-term.

## **Why are infants at greater risk?**

The infant lung is small and infants breathe at a faster rate than adults. More importantly early life is a critical period for lung development. Lung growth commences in the womb, well before it has to begin gas exchange.

The lung grows like a tree, beginning with the trunk (trachea) and then branching into smaller and more complex parts. It is not until 34 weeks of pregnancy that the fetal lung has developed enough alveoli (the critical part of the lung in which oxygen enters the body) to safely support independent breathing. The growth of new alveoli does not stop at birth, with this process continuing well into later childhood. This provides the infant lung with remarkable abilities to tackle challenges. Unfortunately, it also means the infant and fetal lung is susceptible to insults.

Work from the Murdoch Children's Research Institute on the long-term respiratory outcomes of infants born preterm and those with [chronic illnesses](#) such as cystic fibrosis has shown that disrupting the normal process of [lung growth](#) and differentiation impacts lung function into later life. More worrying is that lung damage in [early life](#) may also slow

the trajectory of lung growth in later childhood.

## **What are the short-term risks?**

Due to their [small size](#), faster breathing rate and growing lungs infants can not manage the same exposure load to airborne particulate matter. Infants airways are also more reactive to new insults and challenges. For most infants the relatively short exposure to bushfire smoke will have minimal impact beyond irritating the airways and increasing the risk of coughing and respiratory infections. Infants with pre-existing illness, especially those born preterm or with congenital heart defects are at greater risk of worse respiratory complications or exacerbation of existing chronic lung problems.

## **Is the bushfire smoke likely to impact on infant lung growth?**

Unfortunately many children are raised in environments of increasingly high air pollution levels. It is well established that chronic exposure to air pollution impacts the fetus and infant, causing impaired in uterine growth, higher rates of prematurity, higher infant mortality, impaired cognitive development and worse childhood lung function. The details of these risks need to be considered before extrapolating to the current situation in Australia. The findings have arisen from large studies of chronic exposure in urban environments. The type of pollutants in the air differ from those caused by the bushfires, and the exposure has usually been much longer, over years.

Much less is known about exposure to bushfire smoke, and historically smoke exposure has been short. It is unlikely that this short-term exposure to bushfire smoke will cause serious adverse health outcomes for [infants](#) in the future. There is still much we do not know about the

impact of climate events on the developing lung. We have recently developed laboratory-based methods to better understand the complex molecular responses of the infant lung to specific insults, which will shed more light in the coming years.

In 2020 the MCRI is also [launching a new Victoria-wide longitudinal cohort study, GenV](#), which will be ideally suited to address this and other child health and wellness questions that may arise from major events like [bushfire](#) in the lives of children and parents.

## What should parents do?

- Young children and pregnant women should limit outdoor exposure and keep doors and windows closed on high air pollution days.
- If your child has an existing heart or lung condition they may be more susceptible to the effects of smoke. They are more likely to need any prescribed reliever medication.
- If your child develops difficulty breathing, and/or wheezing attend your Local Doctor or call 000 immediately if concerned.
- The Raising Children Network has a number of resources to aid you in talking to your child about the impact of disasters

Provided by Murdoch Children's Research Institute

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