

Submission

Climate Change Act: the 'Duty of Care Bill'

Dear Senator Pocock,

Thank you for the opportunity to present a submission to the Duty of Care Bill. The Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG) is the leading national organisation involved in oversight of maternity services, with the responsibility for education and accreditation of medical practitioners in maternity care. RANZCOG is committed to improving the health and wellbeing of women and pregnant people.

Climate change is the greatest threat to health of the 21st century (World Health Organisation, 2023). The broad impacts of climate change on health and wellbeing are increasingly recognised in the health domain. The specific risks of climate change to pregnancy, the developing fetus, and the future health of children are emerging as a major element of our maternity care efforts, and as such RANZCOG is committed to addressing the broader issues relating to climate change that are contributing to the health and wellbeing of our patients. RANZCOG, as the peak Australian Obstetric College, with its long history of leadership in maternal safety and birth outcomes, is therefore in full support of all governmental efforts to recognise and minimise the risks of climate change, as proposed in this Duty of Care Bill.

In this submission, we contribute a maternal and fetal health perspective to the two statutory duties described in the Bill:

1. *The decision maker must consider the likely impact of the emissions on the health and wellbeing of current and future Australian children and consider their health and wellbeing as the paramount consideration.*

Pre-birth events and exposures can have a profound effect on health and well-being (Moore et al, 2017), and should be included in the assessment of adverse effects of climate change on children's well-being. In the first part of this submission, we present an overview of the links between maternal exposures to adverse environments, pregnancy complications, and health outcomes in childhood and beyond. In the second part of the submission, we summarise current evidence concerning the impacts of climate change on pregnancy, and the implications for longer term health and well-being.

2. *In the case of decisions involving the exploration or extraction of coal, oil or gas, the decision maker is prevented from making decisions where the resulting greenhouse gas emissions are likely to pose a material risk of harm to the health and wellbeing of current and future Australian children.*

In the third part of the submission, we discuss the evidence around the harms arising from maternal exposure to the extraction and combustion of coal, oil, and gas, independent of green-house gas emissions. Extraction and combustion of fossil fuels leads to contamination of air, soil and water with toxic pollutants that are known to cause significant long term health effects following in-utero or childhood exposure. *We submit that the harms from the pollutants associated with fossil fuel extraction and combustion must be considered together with the harms of greenhouse gas emissions.* The toxic by-products of fossil fuels and the impacts of climate change act synergistically, each amplifying the harms of the other. Climate change is also expected to further degrade air, soil, and water quality, and exacerbate the inequalities which make some humans more vulnerable to their effects (Perera, 2018).

Part 1: Connections between pregnancy exposures and child health and well-being.

Much of the research on the effects of environmental exposures in pregnancy are observable in outcomes such as miscarriage, stillbirth, preterm birth and low birth weight. A growing body of evidence links maternal exposure to environmental disasters, toxic pollution, heat, poor nutrition, and stress to an increased risk of these outcomes (Ha, 2022).

Although there are many underlying causes for miscarriage and stillbirth, some unpreventable, the excess risk seen in association with certain environmental exposures can be seen as representing a denial of life to otherwise healthy children.

Preterm birth (defined as birth before 37 completed weeks of pregnancy) is the leading cause of death and poor health in infants. Extreme prematurity is associated with an increased risk of respiratory distress syndrome, intestinal injury (necrotising enterocolitis), retinal damage, bleeding in the brain (intraventricular haemorrhage), cerebral palsy and death. Admission to neonatal intensive care units and prolonged and repeated hospital stays, as well as the increased risk of chronic lung, eye and neurological conditions, result in serious emotional impacts on families (Department of Health and Aged Care, 2016). Although the risks decrease in incidence and severity with advancing gestation, even late prematurity is associated with increased vulnerability to poor health outcomes. These include an increased incidence of behavioural disorders such as attention deficit-hyperactivity disorder (ADHD) or autism spectrum disorder, mental health and socialisation challenges, poor academic performance, reduced growth, and chronic cardiovascular, kidney and metabolic dysfunction (Morniroli et al 2023).

Low birth weight encompasses children born preterm as well as those who were born at any gestation but were unable to achieve their genetic growth potential (fetal growth restriction or FGR). Fetal growth restriction is associated with an increased likelihood of cognitive, emotional, and behavioural challenges in childhood (Sacchi et al, 2020). Negative health effects can continue into adulthood, and include increased adolescent and adult rates of type 2 diabetes, chronic lung disease, kidney disease and cardiovascular disease, which result in reduced quality of life and increasing burdens on the health system (Armengaud et al, 2021)

Even in the absence of obvious pregnancy complications, the developing fetus is exquisitely sensitive to the inflammatory, metabolic, and hormonal changes resulting from maternal stress and poor nutrition, as well as the effects of environmental toxins. The potential for harm from environmental exposures begins even before conception, with environmentally induced (epigenetic) changes in gene function in eggs and sperm. The brain is highly sensitive to environmental exposures during pregnancy and early infancy. During in-utero life, all organs undergo critical periods of development, when they are highly vulnerable to environmental influences. Adverse environmental exposures at these times have been linked to increased risks of metabolic, cardiovascular, immunological and neurobehavioral disorders, and even cancer (Moore et al 2017).

Part 2: Impact of Climate Change on Pregnancy

The impact of climate change on pregnancy can be considered in terms of direct and indirect (or delayed) effects (World Health Organisation, 2023). Discrete weather-related events such as floods, bushfires and heatwaves pose a significant threat to pregnant people, leading to negative effects on pregnancy health, birth outcomes, and the future health trajectory of the resulting child. Pregnant and postpartum women, and their babies, are particularly vulnerable to both the immediate and longer-term negative effects of disasters (E Harville, 2012). These impacts are elaborated on below, noting that this is not an exhaustive list, but provides a summary of the most clear and understandable effects.

Direct Impacts

Heatwaves

The physiological changes associated with pregnancy results in greater vulnerability to environmental hazards. As such, heatwaves can increase the risk of many adverse pregnancy outcomes, such as the following:

- Preterm Birth
 - o *16% increase in rates of preterm birth* during heatwave days, along with an increasing rate noted with increasing temperatures.
- Low Birth Weight
 - o *Rates of low birth weight increased by 9%* during heatwaves (Chersich M, 2020).
- Stillbirth
 - o *Risk of stillbirth was 46% higher* during heatwave conditions compared to non-heatwave days, with increasing rates noted with increasing temperatures (Chersich M, 2020) (L Strand, 2012). Stillbirth is a medical tragedy, with families experiencing stillbirth suffering profound and enduring psychosocial effects (Perinatal Society of Australia and New Zealand, 2020).
- Additional heat-related effects
 - o Increased environmental temperatures have been associated with increased rates of premature rupture of membranes, gestational hypertension and pre-eclampsia, birth defects and neonatal death (Chersich M, 2020).

Bushfires

Bushfire smoke exposure during pregnancy increases the risk of lifelong poor health effects for the developing fetus (Ha, 2022). Preterm birth and low birth weight carry greater risks of illness into childhood and beyond, as described above.

- Preterm Birth
 - o In a study completed by Monash School of Public Health Australia, *14.3% of preterm births were found to be attributable to maternal bushfire smoke exposure* (Y Zhang, 2023).
- Reduced Birth Weight
 - o International study data has provided some contrasting information, but the predominant effect of bushfires on birth weight is a trend towards lower birth weights with higher bushfire smoke exposure (S Amjad, 2021). The Monash study found that *more than 8% of term, low birth weight cases were attributable to bushfire exposure* (Y Zhang, 2023).
- Asthma exacerbation
 - o Asthma is the most common comorbidity in pregnancy in Australia, affecting approximately 13% of pregnant people (Hunter Medical Research Institute, 2023). Poor asthma control in pregnancy can lead to increased rates of preterm birth, low birth weight, stress, and anxiety (V McDonald, 2023).

Floods

- Low Birth Weight
 - o *The prevalence of low birth weight increases after flooding*, particularly if the exposure is earlier in pregnancy (C Hilmert, 2016). Greater impacts on birth weight have been observed in groups with higher levels of pre-existing disadvantage (N Partash, 2022).
- Stress and Emotional Disturbance
 - o Flooding severely disrupts livelihoods, and is associated with loss of housing, possessions, employment and support networks (L Mallett, 2018). *Maternal flood-related stress can lead to changes in birth weight*, noting that this effect might result in higher birthweights and potentially increased rates of childhood obesity (E Kroska, 2018).
- Disruption in access to care
 - o For obstetric emergencies, labour care and for routine antenatal services and monitoring (G Lee, 2023).

Indirect Impacts

- Shifts in Vector Pathogen Distribution and Infectious Disease Prevalence
 - o Water shortages, flooding and increasing ambient temperatures have the potential to change the patterns of distribution of infectious diseases (A McMichael, 2008). These illnesses can cause *disease and poor health in the mother* and can also result in *vertical transmission from mother to baby and lead to significant congenital illness* in childhood and beyond (Australasian Society for Infectious Diseases, 2022).
- Disruption in Housing, Financial Stability and Employment
 - o Temporary housing is often limited, with inadequate provision of safe and appropriate food and water use (E Harville L. B., 2021). Job loss, change and the subsequent change in family income can have detrimental impacts on nutrition, physical activity, access to care and mental health.
- Domestic Violence
 - o Pregnancy is a well-recognised risk period for increases in *domestic and intimate partner violence* (Australian Institute of Family Studies, 2015). Rates of domestic violence can be significantly exacerbated by disaster situations such as floods, bushfires and drought (T Chowdhury, 2022), resulting in higher risk of poor birth outcomes such as *low birth weight, premature birth and sexually transmitted infections with risk for congenital transmission*, along with other risks to childhood wellbeing such as *maternal substance use, depression and anxiety* (Australian Institute of Family Studies, 2015).
- Food insecurity and undernutrition
 - o The current prevalence of food insecurity in Australian households is at least 5% (McKay, 2022), and climate change is expected to adversely affect the price, availability, and nutritional value of food (Bartos, 2022). Even short-term food insecurity and hunger can lead to mental and physical health implications and can impact learning, development, productivity, and family life, while food insecurity in pregnancy is associated with increased risks of diabetes, high blood pressure and heart disease in later life (McKay, 2022).

Part 3: Additional impacts of fossil fuel extraction and combustion

Unconventional oil and natural gas extraction

Every stage of the unconventional oil and natural gas lifecycle, from well construction to extraction, operations, transportation, and distribution can lead to air and water contamination with a range of toxic chemicals including heavy metals (arsenic and manganese), particulate matter, benzene, toluene, ethylbenzene, xylenes, polycyclic aromatic hydrocarbons, and endocrine disrupting chemicals.

- In-utero and early life exposure to the above chemicals is associated with *potentially permanent learning and neuropsychological deficits, neurodevelopmental disorders, and neurological birth defects* (Webb et al, 2017).
- Significant associations between natural gas development and *preterm birth, infant mortality, and low birth weight* have been observed. An increased incidence of *major congenital anomalies* has also been associated with residential proximity to hydraulic fracturing (fracking) sites (Cairncross et al, 2022).

Coal mining

Coal mining deposits or releases toxic chemicals into local environments, including polycyclic aromatic hydrocarbons (PAH), arsenic, mercury, lead, cadmium, selenium, nickel, and copper. Coal processing involves the use of toxic chemicals, as well as equipment powered by diesel engines, explosives used in mining, dust from uncovered coal trucks and trains, and dust from unpaved haul roads, all of which cause environmental pollution (Ahern, 2011).

- Residential proximity to coal mining sites in China has been shown to be related to *an increased incidence of neural tube defects*, a class of birth defects involving abnormal development of the tissues covering the brain or spinal cord, such as spina bifida (Liao et al, 2016).
- Mountaintop coalmining in Appalachia has been associated with an *increased prevalence of a range birth defects* including circulatory, respiratory, central nervous system, musculoskeletal, gastrointestinal, and urogenital defects (Ahern, 2011) and *low birth weight* (Ahern 2011).

Fossil Fuel Combustion

One third of the existing global burden of disease is due to environmental factors. Air pollution is the leading environmental cause of disease and the greatest contributor to air pollution is the combustion of fossil fuels in energy generation, transport, and industry. The emissions from the burning of fossil fuels include directly emitted fine particulate matter (PM), black carbon, polycyclic aromatic hydrocarbons (PAHs), mercury, nitrogen dioxide (NO₂), sulphur dioxide (SO₂), and carbon monoxide (CO).

Children and fetuses are more vulnerable to the effects of air pollution than adults. In highly polluted areas outside of Australia in-utero exposure to air pollution is associated with *increased risks of low birth weight, infant death, allergies, asthma and other respiratory conditions, and cancer*. Of particular concern is the growing evidence of significant effects of combustion-related air pollution on children's *cognitive, behavioural and emotional development* (Perera, 2018).

Summary

RANZCOG supports the intention of the Duty of Care Bill to impose a statutory duty on decision-makers to consider the health and well-being of children when approving projects likely to result in greenhouse gas emissions.

We recommend that:

1. Impacts of climate change on pregnant persons and unborn children be routinely considered, as these have significant effects on childhood health and well-being.
2. The effects of toxic pollutants arising from fossil fuel extraction and combustion be considered alongside those of greenhouse gas emissions.

Yours sincerely,



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President

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