

# Life-saving promise in simple steps

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The debate over the best time to clamp a baby's umbilical cord has been around forever. In about 350 BCE, Aristotle, reputedly the world's first genuine scientist, advocated delaying clamping until placenta delivery.

Some 2100 years later, English physician – and Charles Darwin's grandfather – Erasmus Darwin weighed in. "Another thing very injurious to the child is the tying and cutting of the navel string too soon," he wrote.

By the 1970s and after the passage of almost another two centuries, the health of the mother had become the priority and, in western hospitals in

particular, an immediate [umbilical cord](#) cut became the norm to prevent post-partum haemorrhage.

Today, technology has delivered a little more flexibility through the administration of the drug oxytocin, which mitigates the risk of blood loss at birth. International guidelines currently recommend delaying umbilical cord clamping for at least one minute in healthy infants.

But Monash University research now shows that cord clamping should be determined not by a time frame but by the baby's physiology. This adds to a body of new international evidence that could change, once again, the approach to our arrival in the world. Norwegian researchers recently analysed 15,000 births in Tanzania and found if cord clamping occurred after a baby was breathing (not according to whether a minute had passed) the likelihood of the baby dying or being admitted to intensive care was significantly reduced.

"It is true that if you clamp the cord after the infant has started breathing the outcomes for babies are significantly better," says Monash physiologist Professor Stuart Hooper of the study. "And this is particularly important for low-resource countries."

This is because delayed cord clamping is a simple intervention. "There is no expense and no equipment needed. All the attendant has to do is pause, let the baby breathe and then clamp the cord," he says.

## **Blood flow critical**

Professor Hooper, who is the head of the Ritchie Centre at MIMR-PHI Institute of Medical Research (a merger of the Monash Institute of Medical Research and Prince Henry's Institute) and Monash University, has recently published research demonstrating the physiology on which the Tanzanian study was based.

He says babies do better if cord clamping is delayed because a continuity of blood flow is maintained while they experience the seismic shift in heart and lung function that occurs in the transition from fetus to newborn.

In a fetus, much of the blood pumped by the heart comes from the placenta, via a shunt bypassing the lungs, which are filled with liquid.

At birth, the shunt closes and the baby's physiology changes as blood begins passing through the lungs, which become the primary source of blood (known as venous return) for the heart to pump.

But blood can only be passed efficiently through the lungs once they are functioning. And at the same time, when the umbilical cord is cut, blood supply from the placenta ceases.

"The heart can only pump the [blood](#) it receives, so delaying cord clamping until a baby is breathing is simply a matter of sustaining the input to the pump," Professor Hooper says. "It allows the input to immediately switch from the placenta to the lung when the cord is cut because the lungs are already aerated."

Otherwise, reduced [blood flow](#) from the heart combined with oxygen restriction can result in brain damage, other tissue damage or death.

Professor Hooper's research is supported through the Australian National Health and Medical Research Council and undertaken with colleagues from MIMR-PHI Institute of Medical Research, the Royal Women's Hospital in Melbourne, the University of Sydney, the University of Western Australia and the Leiden University Medical Center in the Netherlands.

Now that the physiology has been proved through laboratory trials, the

next step is to take the research to the clinic. One trial delaying [cord clamping](#) in preterm babies born vaginally is already under way at the Royal Women's Hospital and, in the future, Professor Hooper hopes to extend the research to preterm caesarean babies.

Provided by Monash University

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