Monash researchers are close to perfecting an inhaler that will save the lives of new mothers. Antonia Maiolo reports

Every year up to 150,000 women in developing countries die during childbirth from postpartum haemorrhage but a new maternity drug that could be delivered in an inhaler might greatly reduce the mortality rate.

After giving birth, women in many countries are given an oxytocin injection to prevent blood loss. Unfortunately those in developing countries often do not receive the life-saving drug because of a lack of access to medical care. A shortage of suitable refrigeration to store the drug and counterfeit versions on the market also inhibit its use.

Dr Michelle McIntosh and her colleagues from Monash University are now working on a project to develop oxytocin in an aerosol inhalant device that would expand its availability to people in poorer countries.

McIntosh said oxytocin is injected into a woman once she has given birth as a preventive measure to encourage the uterus to contract, which is necessary to stop blood loss.

Monash Institute of Pharmaceutical Sciences (MIPS) has been awarded a $US1 million grant by the Bill & Melinda Gates Foundation, through its Grand Challenges Explorations scheme, to engineer the drug.

McIntosh said developing this drug presents a “big opportunity” to play a role in improving maternal healthcare in developing countries. “Every minute a mother will die from pregnancy and childbirth associated complications, and many of these deaths will occur within one to two hours of giving birth due to severe postpartum haemorrhage,” she said.

The World Health Organisation recommends that every woman receive an injection of oxytocin immediately after the baby is born.

In September, the United Nation’s public health arm published a report identifying oxytocin as one of the 13 life-saving commodities that they believe would make the greatest impact on saving lives if made available to women and children in developing countries.

The report specifically noted that the option of “inhaled” oxytocin should be explored. “Instead of being a liquid that’s injected we prepare it as a powder, so it has engineered particles that have the right size and characteristic to be inhaled into the lungs,” McIntosh said.

Currently the drug can only be administered via injection and only by a trained healthcare professional. The vials must also be kept refrigerated.

McIntosh said developing oxytocin in aerosol form would remove the need for refrigeration storage and would allow patients to inhale the drug immediately after childbirth, removing obstacles to treatment in developing countries.

She said an inhaler could also be used in home births, as over 50 per cent of women in developing countries choose to give birth at home. “Monash is the place where the research is happening,” McIntosh said, adding that the project wouldn’t be able to go ahead without the funding provided by the Bill & Melinda Gates Foundation.

McIntosh said the foundation put out a call asking for solutions for maternal health in developing countries.

The funding was provided in two phases. The project’s first phase covered research where it was proved that the inhalation of pharmaceutically engineered particles of oxytocin could rapidly induce contraction of uterine smooth muscle, preventing postpartum bleeding.

The director of MIPS and dean of the Faculty of Pharmacy and Pharmaceutical Sciences, Professor Bill Charman, said the university was well positioned to deliver the drug...
alternative that could change the lives of those disadvantaged.

“We're uniquely placed to bring together the technology skill sets, people with a passion to drive the program, and to make the linkages both within the institute and our broader partner network that enable this medicine to be developed as rapidly as possible,” Charman said.

McIntosh and her team are now working to improve the stability of the oxytocin and will test the effectiveness of the drug in a preclinical model.

The new version of the drug will be tested in clinical trials on humans next year and it is hoped that it will be released to the pharmaceutical market within four to five years.