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Stanford startup's $25 'sleeping bag' could save newborns

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A group of Stanford students has developed a simple, low-cost product they say could save many of the millions of premature babies born each year in developing countries, far from advanced medical care.

The Embrace organization aims to cut mortality and illness among newborns through a $25 portable device that regulates a baby's body temperature without electricity, says CEO and co-founder Jane Chen, 29. The company expects to begin product trials in India in three to six months, with sales starting in 2009. It could be used to help 15 million of the 20 million premature and low-birth-weight babies born every year, says Chief Technology Officer and co-founder Rahul Panicker. Because of scarce resources, 3.5 million die, and survivors may have lifelong health problems.

"There is a true need out there, and we found a way to possibly address that need," he says.

Embrace plans to raise $805,000 to cover operations for the first four years, and expects positive cash flow in year five. The students are applying to fellowships and foundations and reaching out to Stanford business school alums, venture capital philanthropic arms, individuals and corporations for backing.

They hope to sell the product to governments and non-governmental organizations, which would distribute it to health care centers or midwives. Hope Worldwide and Real Medicine Foundation have expressed interest, they say. Embrace plans to market the device itself, but could license it down the line.

The students were asked to create a neonatal incubator for less than 1 percent of the up-to-$20,000 cost of traditional incubators used in urban hospitals and in the United States.

The idea originated from a challenge from Design That Matters -- a nonprofit creating

low-cost solutions to improve social services in developing countries -- and a 2007 Entrepreneurial Design for Extreme Affordability class, taught by Stanford professor Jim Patell, now one of the company's advisers.

The design uses an innovative phase-change material in a sleeping bag design to regulate a baby's temperature. The wax-like substance, when heated with hot water, can maintain a temperature of 37 degrees Celsius -- a level critical for the baby's survival -- for four-hour stretches, Chen says. The device has no moving parts, complements 'kangaroo care' -- a way of holding a child that includes skin-to-skin contact between the caregiver and infant -- and is designed to allow interaction, unlike an isolating incubator.

Dr. Vinod Bhutani, a professor in neonatology at Lucile Packard Children's and Stanford hospitals, has been working in India for the past 25 years in newborn care. With 6 million premature and underweight babies in India alone, he says, the national government sees the problem and is committed to reducing it.

Bhutani is consulting with Embrace on the product and says it could be valuable in the short term, allowing a baby to be born at a rural home, then transported to a specialty care facility or larger hospital.

"The government [in India] is trying to ensure all babies are delivered in hospitals versus in homes," he says. "It has increased by 40 percent over the last three years, but they have a long way to go."

The device, he says, still must to be tested to see if it meets safety standards and can be made convenient.

Embrace, still seeking nonprofit status, was founded by business and engineering students: Chen, Panicker, Razmig Hovaghimian, Linus Liang, Naganand Murty and Fabio Tran. They have experience in consulting, engineering, venture capital and nonprofit health care. Collectively, they have lived in eight countries and speak nine languages.

The group is working to file a provisional patent to use the phase-change material and for the sleeping bag design. They are also pursuing a U.S. Food and Drug Administration approval.

Chen says comparable products include donated and low-cost incubators made in China and India that require electricity and cost $1,000 to $2,000. "Spare parts are oftentimes impossible to find."

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