

For a **WEB EXTRA** with a video of Braga showing how he teaches child CPR, see [dartmed.dartmouth.edu/w09/we05](http://dartmed.dartmouth.edu/w09/we05).

## Studying whether girth affects birth

Could the obesity epidemic in the United States be affecting newborns? Diabetes, high blood pressure, and heart disease are just some of the health problems associated with obesity in adults, but they usually tend to arise later in life. Juliette Madan, M.D., a Dartmouth neonatologist, has been exploring how obesity in young women of child-bearing age may affect their babies.

She and her team were able to take a historical look at the question thanks to a database of information collected on pregnant women in New England over the past 25 years. First, they determined that, just as is true of the population as a whole, pregnant women today are heavier on average than pregnant women in the 1980s. In fact, 60% of New England mothers-to-be are now overweight or obese.

**Database:** And what about their babies? “Many of the full-term babies who we cared for who had significant difficulties around the time of birth happen to be delivered to mothers who were obese,” Madan says. These were babies whom doctors hadn’t expected to have problems. So, to determine if this observation was real, Madan’s team used the database to compare mothers’ weights to their babies’ Apgar scores. An Apgar score (named after the physician who developed it) is an assessment of a baby’s health at birth; a high score indicates a healthy baby and a low score means the baby requires medical attention. Madan found that, indeed, babies with lower Apgar scores were more likely to have obese mothers.

She also suspected that maternal obesity could increase the risk of having a premature baby. To address this question, her team again mined the database and was able to show that premature babies were, in fact, more likely to have been born to obese women. Madan thinks the reasons for this are very complex.

**She suspected that maternal obesity could increase prematurity.**

High blood pressure is one likely culprit, but Madan believes there are other causes, too. One may be inflammation. Obese people have been shown to have more inflammatory molecules in their bodies, and this is thought to contribute to some of their health problems, such as diabetes and heart disease. Madan has looked at the levels of inflammatory molecules in blood samples from pregnant women and found that they are higher in obese pregnant women than in normal-weight pregnant women.

**Link:** This finding lays the groundwork for what Madan believes is the next step: studies to determine if the heightened inflammation actually causes some of the complications seen in babies. If there is a causal link, not just a correlation, perhaps doctors can intervene. Ideally, Madan says, physicians like to help mothers get to a normal weight before they become pregnant. But that can be a challenge. So in an imperfect world, she says, “there may be some medications that might be utilized to decrease some of the systemic inflammation that could be affecting the mother—and the baby.”

KRISTEN GARNER



Braga shows off one of the manikins he uses to teach child CPR to residents.

## Does child CPR need to be revised?

Push hard. Push fast. Avoid interruptions. Allow full recoil. These simple steps—the CPR mantra that DMS’s Matthew Braga, M.D., teaches his pediatric residents—can make all the difference in saving a child in cardiac arrest. Still, survival rates are very low for such children. They range from less than 5% for an out-of-hospital cardiac arrest to between 20% and 50% for an in-hospital arrest. So Braga, a pediatric critical care specialist, has been trying to improve the way child CPR (cardiopulmonary resuscitation) is conducted.

The American Heart Association recommends that when doing chest compressions on a child, the chest be depressed about one-third to one-half the depth of the chest. But, says Braga, “there’s really no data to support [this recommendation].” So he and colleagues conducted one of the first studies to assess the recommendation.

**Cutoff:** They collected pediatric chest CT scans done for other reasons on 280 children of various ages. Using computer simulation, they calculated the children’s residual internal chest depth—the space not taken up by bone or solid tissue—after a compression half the depth of their chest. They then figured what percentage of children would have a residual depth of 10mm (just under half an inch) or less. The researchers used 10mm as a cutoff point since an internal depth less than that, they believe, could injure internal organs—and in some children may not even be possible to achieve.

They discovered that 15 of 60 children between the ages of 3 months and 12 months “would theoretically have no residual internal depth,” after a one-half-depth compression. And 59 of those 60, as well as 96 of 100 1- to 3-year-olds, would have a residual depth of less than 10mm. On the other hand, a one-third-depth compression on nearly all the children would be well above the 10mm mark.

The researchers concluded that one-third-depth compressions may be a better guideline. What is really needed to be sure, says Braga, are larger studies on actual pediatric patients receiving CPR. Those would be “the Holy Grail,” he says, “but because they’re infrequent and unpredictable, it’s going to be difficult.”

MATTHEW C. WIENCKE