

New labor-tracking tool proposed to reduce C-sections in first-time moms

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Researchers have designed a new version of a labor-tracking tool for pregnant women that they predict could reduce the use of hormonal intervention during labor and lower the number of cesarean sections performed on low-risk, first-time mothers.

The tool, called a partograph, takes into account the most recent research findings that suggest labor is not a linear process, but is instead slower during earlier labor and accelerates gradually as labor advances. A diagnosis of abnormally slow labor is the No. 1 reason that C-sections are performed in low-risk births by first-time moms.

A partograph is a printed graph on which a clinician can plot cervical dilation and the baby's descent to determine whether labor is progressing normally or if intervention might be needed.

The researchers, lead author Jeremy Neal of Ohio State University and co-author Nancy Lowe of the University of Colorado Denver, hope their partograph could be computerized or designed as a smartphone application.

When labor is considered too slow, [clinicians](#) often prescribe oxytocin to speed up the process. Oxytocin, known by the brand name Pitocin, is a hormone that stimulates uterine contractions. Research suggests that clinicians use it to speed up labor in about 50 percent of births by first-time mothers.

The term for an abnormally slow labor is dystocia. But no precise definition of dystocia exists, so it means different rates of labor for different clinicians. Though the use of oxytocin in cases of dystocia is intended to reduce the chances for a cesarean section, studies show that the hormone doesn't have that effect.

Neal and Lowe predict that if their partograph were adopted widely in the [United States](#), dystocia diagnoses would be limited to only the slowest 10 percent of first-stage labors; oxytocin interventions would drop by more than 50 percent; and cesarean sections performed because of dystocia would decrease by more than 50 percent. Currently, more than a quarter of births by low-risk, first-time mothers result in [cesarean section](#).

"Dystocia is known to be over-diagnosed, which leads to unnecessary intervention, including cesareans," said Neal, an assistant professor of nursing at Ohio State. "We can tackle this issue by giving dystocia a clinically meaningful definition. This would go a long way toward preventing unnecessary cesareans for first-time moms which would, in turn, increase their chances of having successful labors and vaginal births for second, third and fourth deliveries as well."

Neal and Lowe are preparing to lead a pilot study of their partograph's effectiveness. Their proposal was published in a recent issue of the journal *Medical Hypotheses*.

Of the 4 million births in the United States each year, about 40 percent of babies are born to first-time moms. This partograph is designed for in-hospital labor assessment of first-time mothers with normal pregnancies whose labor has begun spontaneously.

Labor trends have changed since the 1950s, but Neal asserts that studies from that era still influence clinician expectations today. These older

studies suggest that in first-time mothers, the cervix should dilate about 1.2 centimeters per hour once it has dilated 4 centimeters and until it has opened to 9 centimeters. Birth takes place at 10 centimeters, when the cervix is considered fully dilated.

"Clinicians tend to have an expectation that change in the cervix during labor is linear, with a dilation rate of 1 centimeter per hour often being considered to be the slowest acceptable rate of cervical change," said Neal, who also is a certified nurse-midwife. "However, these criteria are based on work started in the 1950s and ended in the 1970s that just doesn't fit the labor patterns of women today, for whatever reason. Research from the past two decades shows us that labor is not typically linear and rates of cervical change from one centimeter to the next are commonly much slower than 1 centimeter per hour. Clinging to defunct dilation expectations leads to unnecessary interventions during labor."

Neal said concerns over slow labor represent a "gray area" in labor assessment – some believe prolonged labor can cause distress for the baby, especially in developing countries where sophisticated fetal monitoring is less likely to be available, while others associate the use of oxytocin with adverse effects that include worrisome changes in fetal heart tones.

But what is undisputed is that dystocia, despite its vague definition, is the primary contributor to [C-sections](#) for low-risk, first-time moms. And with those come typical risks for bleeding and anesthesia complications associated with surgery as well as long-term risks for painful scarring, stillbirths and spontaneous abortions in subsequent pregnancies, future placenta attachment disorders and uterine rupture – and many of these risks are not commonly discussed with patients, Neal said.

Partographs have existed since the 1970s, and they are routinely used in most other countries, but have not taken hold in the United States. Neal

describes this proposed partograph as more physiologically based than existing partographs, which continue to describe labor as a linear process.

"Because we don't use partographs in the United States, it will take some work to get this up and running in the U.S., but that is our goal," Neal said. "We want to positively impact birth outcomes for moms and babies as well as long-term health for women in the U.S. If our partograph were to spread to other countries, that would be fantastic, too."

The partograph is not intended for use until a woman is in active labor – which also can be difficult to define. In general, active labor begins when uterine contractions cause the cervix to be dilated to between 3 and 5 centimeters. Women admitted to hospitals before active labor has begun are almost twice as likely to receive oxytocin than are women admitted in active labor.

The tool consists of a chart featuring time passed on the x axis and cervical dilatation and the baby's descent on dual y axes. The most distinctive feature of this new partograph, however, is that it takes into account the hyperbolic curve that typifies most labors. Previous partographs have predicted that labor progress will be plotted in a straight line.

The proposed partograph features a dystocia line, indicating that when [labor](#) plot points appear to the right of that line, a dystocia diagnosis and associated interventions are appropriate.

"Our 'dystocia line' is not meant to indicate increased risk of adverse [birth](#) outcomes for women who cross to the right of it. Instead, it is designed to improve the safety of those who do not cross this line by decreasing unnecessary [oxytocin](#) use and cesarean sections," Neal said. "Cesarean sections are clearly indicated for some women, but if we're

doing a high volume of unnecessary cesareans on first-time moms, then we are simultaneously affecting the future obstetrical course for those women since a primary cesarean is most commonly followed by repeat cesareans in subsequent pregnancies. Long-term health risks go up with each subsequent cesarean."

In addition to their pilot study, Neal and Lowe recommend that a large, multicenter clinical trial is needed to test whether their predictions about the partograph's effectiveness are supported by actual childbirth outcomes.

Provided by The Ohio State University

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