

# Studies examine cesarean delivery rates, outcomes

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Two studies in the December 1 issue of *JAMA* examine the relationship between cesarean delivery rates and maternal and infant death, and adverse outcomes in childhood health following planned cesarean delivery at term.

In one study, Alex B. Haynes, M.D., M.P.H., of Ariadne Labs at Brigham and Women's Hospital and the Harvard T.H. Chan School of Public Health, Boston, and Thomas G. Weiser, M.D., M.P.H., of the Stanford University Medical Center, Stanford, Calif., and colleagues collected data for 2005 to 2012 for all 194 World Health Organization (WHO) member states to estimate annual cesarean delivery rates. The year of analysis was 2012. Cesarean delivery rates were available for 54 countries for 2012. For the 118 countries for which 2012 data were not available, the 2012 cesarean delivery rate was imputed from other years. For the 22 countries for which no cesarean rate data were available, the rate was imputed from total health expenditure per capita, fertility rate, life expectancy, percent of urban population, and geographic region.

Cesarean delivery is lifesaving for obstructed labor and other emergency obstetrical conditions; however, as a surgical procedure, there are risks of complications and overuse can be harmful to both mothers and newborns. Based on older analyses, the WHO recommends that cesarean delivery rates should not exceed 10 to 15 per 100 live births to optimize maternal and neonatal (birth to four weeks) outcomes. Studies of the relationship between cesarean delivery rate and mortality have yielded inconsistent results.

In this study, the researchers found that the estimated global number of cesarean deliveries for 2012 was 22.9 million, yielding a global cesarean delivery rate estimate of 19.4 per 100 live births. Analysis indicated that the optimal cesarean delivery rate in relation to maternal and [neonatal mortality](#) was approximately 19 cesarean deliveries per 100 live births. Higher cesarean delivery rates were not correlated with maternal or neonatal mortality at a country level. A sensitivity analysis including only 76 countries with the highest-quality cesarean delivery rate information had a similar result; cesarean delivery rates greater than 6.9 to 20.1 per 100 [live births](#) were inversely correlated with the maternal mortality ratio. Cesarean delivery rates of 12.6 to 24.0 were inversely correlated with neonatal mortality.

"Previously recommended national target rates for [cesarean deliveries](#) may be too low," the authors write.

"The study of Molina et al highlights the need for an evaluation of cesarean [delivery rates](#) by the international obstetrical community," write Mary E. D'Alton, M.D., and Mark P. Hehir, M.D., of the Columbia University College of Physicians and Surgeons, New York, in an accompanying editorial.

"The optimal level of cesarean delivery cannot be as simple as a one-fits-all figure to be applied to all institutions and health care systems, and the obstetrical community must accept the fact that 'the appropriate' cesarean delivery rate remains unknown. However, it is not whether the cesarean delivery rate is high or low that really matters, but rather whether appropriate performance of cesarean delivery is part of a system that delivers optimal maternal and neonatal care after consideration of all relevant patient and health system information."

In another study, Mairead Black, M.R.C.O.G., of the University of Aberdeen, United Kingdom, and colleagues examined the relationship

between planned cesarean delivery and offspring health problems or death in childhood.

Planned cesarean delivery comprises a significant proportion of births globally. Observational studies have shown that offspring born by cesarean delivery are at increased risk of ill health in childhood, but these studies have been unable to adjust for some key factors. Additionally, risk of death beyond the neonatal period has not yet been reported for offspring born by planned cesarean delivery.

This study included data on 321,287 term first-born offspring born in Scotland between 1993 and 2007, with follow-up until February 2015. Offspring born by planned cesarean delivery in a first pregnancy were compared with offspring born by unscheduled cesarean delivery and with offspring delivered vaginally.

The authors found that compared with offspring born by unscheduled cesarean delivery (17 percent), those born by planned cesarean delivery (3.8 percent) were at no significantly different risk for the outcomes examined in the study, including asthma requiring hospital admission, salbutamol inhaler prescription at age 5 years, obesity at age 5 years, inflammatory bowel disease, cancer, or death, but were at increased risk of type 1 diabetes (0.66 percent vs 0.44 percent). In comparison with children born vaginally (79 percent), offspring born by planned cesarean delivery were at increased risk of asthma requiring hospital admission (3.73 percent vs 3.41 percent), salbutamol inhaler prescription at age 5 years (10.3 percent vs 9.6 percent), and death (0.40 percent vs 0.32 percent), whereas there were no significant differences in risk of obesity at age 5 years, [inflammatory bowel disease](#), type 1 diabetes, or cancer.

These findings suggest that avoidance of vaginal birth may be an important early-life factor in the growing global burden of asthma, although absolute increase in risk to individuals is low, the researchers

write. "Health professionals and women considering planned cesarean delivery should be made aware of this. However, the magnitude of risk is such that in the presence of a medical indication for cesarean delivery, the apparent risk to offspring health is unlikely to justify a plan for vaginal birth."

"Until indications for cesarean delivery can be fully accounted for and cause of mortality measured, it would be premature to assume that planned cesarean delivery increases the risk of death in childhood—but given the consistency of findings from published studies, it is important to investigate this further."

**More information:** *JAMA*, [DOI: 10.1001/jama.2015.15553](https://doi.org/10.1001/jama.2015.15553)

*JAMA*, [DOI: 10.1001/jama.2015.15948](https://doi.org/10.1001/jama.2015.15948)

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