



## Commentary

# Rising Trend in Non-Indicated Caesarean Deliveries: Can the Trend be Reversed?

Fernando Althabe,  José M Belizán

*Instituto de Efectividad Clínica y Sanitaria, Buenos Aires, Argentina*

The rate of caesarean deliveries in most countries with a high coverage of facility births largely exceeds what is considered medically justifiable. In 2014, the Americas had the highest rates, with almost a third (32%) for the North American countries, and 40.5% for Latin America and The Caribbean (LAC).<sup>1</sup> The rates show a strong annual temporal increases of around 2%; if this staggering trend continues, more than 50% of births will be by caesarean in the LAC region in 2025.

The long term health and social consequences of such high caesarean section rates remain unknown. In contrast, we do know that these high rates do not reflect what most women want and that they are unlikely to reduce maternal and perinatal mortality. Across a range of countries, available evidence shows that approximately 16% of women express a preference for caesarean delivery.<sup>2</sup> In a recent study in Argentina, only 6% and 8% of nulliparous low-risk women at term in public and private hospitals, respectively, preferred caesarean delivery. Among women who expressed a preference for vaginal delivery, 34% and 40% had caesareans in public and private hospitals respectively.<sup>3</sup> Thus, it seems clear that the high rates of caesarean are mostly independent from women's choices. We also know that while increases in caesarean rates up to 19% have been associated with decreases in maternal, neonatal and infant mortality at the population-level, further increases do not appear to provide additional benefits.<sup>4,5</sup>

In this issue of *Paediatric and Perinatal Epidemiology*, Zhao and colleagues<sup>6</sup> have provided further evidence in this direction. They compared caesarean rates and maternal and perinatal outcomes in 259 hospitals in 20 low and middle income countries (LMIC) that participated in two consecutive multi-country cross-

sectional surveys conducted between 2004 and 2011. Across these facilities, caesarean rates rose, on average, by 4.0% annually, while a composite of maternal and perinatal adverse outcomes declined by 4.6%. However, when this association was adjusted by important prognostic factors, the increase in caesarean rate was no longer associated with a decrease in adverse outcomes. The fact that both surveys were prospective, included a large number of facilities and deliveries, used similar methods, collected high quality data, and analysed with robust methodology not only corroborates, but strengthens the inferences in our view.

Moreover, a different study based on the WHO Global Survey<sup>7</sup> showed that when caesarean deliveries were performed in the absence of any medical indications, there was an intrinsic three-fold increase in the risk of severe maternal outcomes, including maternal death, blood transfusion, admission to intensive care unit, and hysterectomy. It is obvious that a population with a caesarean rate exceeding 40% most likely includes sections done on a substantial proportion of women for whom the procedure is not medically justified. So, it is plausible that such high rates of caesarean may contribute to an increase in the rates of maternal mortality and morbidity.

Several interventions have been rigorously evaluated in an attempt to reduce unnecessary caesareans. Complex multifaceted interventions targeting birth attendants and obstetrical services have been shown to be effective in reducing the need for caesarean deliveries. However, the magnitude of these effects remains marginal, with absolute reductions of <5% in caesarean rates. There is insufficient evidence that interventions targeting women (e.g. prenatal education, birth preparation sessions) effectively reduce unnecessary caesarean.<sup>8–10</sup>

It is our collective opinion that interventions aimed at 'health systems', instead of individual women or health providers, including a different organisation of

### Correspondence:

Fernando Althabe, Departamento de Investigación en Salud de la Madre y el Niño, Instituto de Efectividad Clínica y Sanitaria (IECS), Emilio Ravignani, Buenos Aires, Argentina.  
E-mail: falthabe@iecs.org.ar

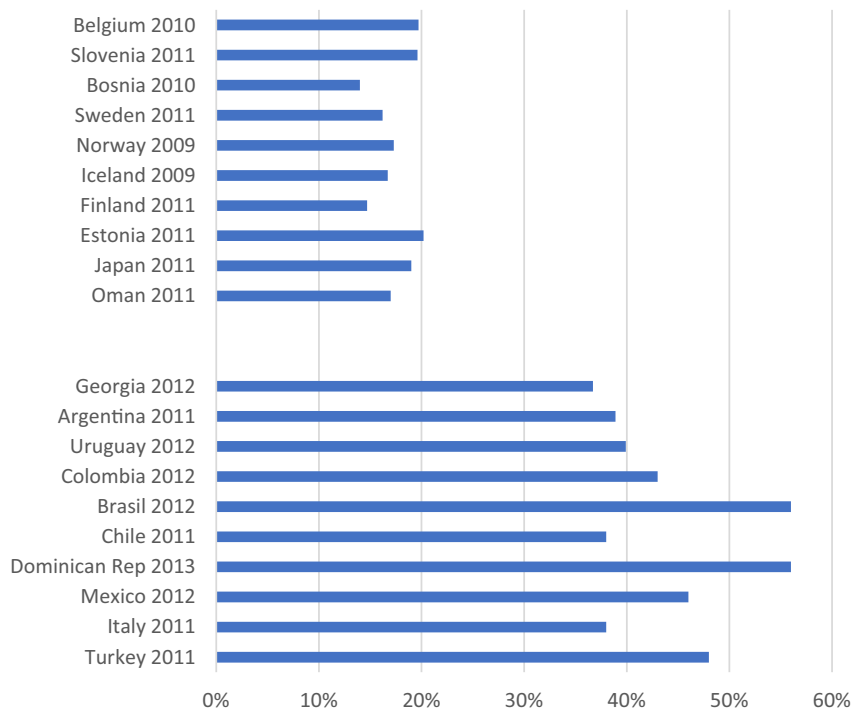
maternity care are more likely to reduce unnecessary surgical interventions and reverse the current trend in caesarean rates. Pregnant women at low-risk of complications should be cared for, and delivered by midwives, preferably in midwifery-led units. Several facts and evidence support this position. Trials evaluating midwifery-led models of care have consistently shown that women assigned to these models receive fewer interventions during childbirth (including a borderline reduction in caesarean), and are more satisfied with their care with comparable health outcomes for them and their infants.<sup>11</sup> This is not surprising. Obstetrics is a surgical specialty, and obstetricians are trained as surgeons to resolve complications fast and effectively, rather than to continuously support women during labour or to try expectant management.

Midwifery care is now recommended for low risk women during labour in high quality evidence based guidelines in order to provide respectful care with low level of interventions and good outcomes.<sup>12</sup> Midwifery-led units alongside or inside maternity or general hospitals are proposed as a strategy to reduce overuse of interventions and are currently used in several countries, such as South Africa, UK<sup>13</sup>, Sweden and Netherlands.

Could such a model implemented at the country level potentially reduce unnecessary caesarean and

the overall caesarean rates in the LAC region? All the trials referenced above comparing models of care were conducted in high income countries, and none in any country of America, so it is fair to say that still we have no evidence that those findings are generalisable to all regions. However, when we compare LAC and other countries that show some of the highest caesarean rates in the world, with countries with the lowest caesarean rates (those with over 90% of facility births), the former countries have a predominantly 'medical model' for maternity care, while the latter have midwifery or mixed models of care (Figure 1). Nevertheless, even operating under the assumption that a midwifery or mixed model of maternity care would be beneficial for LAC countries, the feasibility of widely implementing such a model in the short-term remains highly unlikely. The two largest countries in LAC, Brazil and Mexico, don't have the adequate numbers of professional midwifery schools to train enough number of midwives to attend the huge number of deliveries in those countries.

Thus, it is likely that the trend will continue and the LAC regions will reach the staggering 50% caesarean delivery rate in less than 10 years. As mentioned above, we still remain in the dark as to the long-term consequences for individuals and the populations of such a dramatic shift in the mode of delivery. The limited existing experimental evidence of long-term



**Figure 1.** Selected countries with the highest, and lowest caesarean rates among countries with >90% facility births. Data source (1). Countries with the higher figures have a predominantly 'medical model of care', while most of those with lower figures have midwifery or mixed.

effects such as infant neurodevelopment and medical problems, and women's health and well-being (including relationship with baby and partner, depression, and subsequent pregnancies) at 2 years, comes from trials comparing planned caesarean vs. planned vaginal delivery in high-risk populations like breech pregnancies;<sup>14</sup> such findings, unfortunately, cannot be generalisable to all women and their infants. Most of the available evidence on a wider population are from observational studies, from which confounding by indication is often a likely explanation of the findings.<sup>15</sup>

In our opinion, it is time for well-designed, prospective, long-term follow up studies. These studies may include comprehensive cohorts comparing women with planned caesarean or planned vaginal delivery based on their preferences as well as women randomised to either option if they express no clear preference for either vaginal birth or caesarean. Long-term outcomes should include consequences for breast feeding, infant development, and maternal-infant bonding, autoimmune diseases and allergies in infants and children, women's reproductive outcomes, and maternal and infant outcomes in future pregnancies. We strongly believe that the importance of such a study for public health in the Americas, whether it is ethical, and acceptable to women and providers are questions worthy of discussion.

It is also imperative that concerted actions by multiple stakeholders be taken to stop the 'epidemic of unnecessary caesareans', involving research funding agencies, researchers, clinicians, public health authorities, and stakeholder user groups. The current trend remains unjustified from the medical and women's preferences perspective, and imposes an economic and financial burden associated with higher costs to the health care system in middle income countries. Research looking for interventions and strategies to attain a medically justified caesarean rate remains a critical perinatal priority.

### About the author

**Fernando Althabe** is an obstetrician, and professor of public health at the University of Buenos Aires; an adjunct associate professor in the Department of Epidemiology, Tulane University School of Hygiene and Tropical Medicine, LA, and Director of the Department of Mother and Child Research at the Institute for Clinical Effectiveness and Health Policy (IECS) in

Buenos Aires. He has considerable experience in the design and conduction of multicenter, multinational randomised controlled trials in implementation research in maternal and child health. He serves on the editorial board of *Paediatric and Perinatal Epidemiology*.

**José M Belizán** is an obstetrician with doctoral training in Biology of Reproduction. He has been involved in many research trials looking for interventions to improve obstetrical care, and on the dissemination and implementation of evidence-based practices of care. He is currently Senior Researcher at the Department of Mother and Child Research at the IECS. Both authors have jointly conducted cluster randomised trials to evaluate complex interventions to reduce unnecessary cesarean sections; increase the use AMTSL and reduce episiotomy; increase the use of brief counselling for tobacco cessation; and to increase the use of antenatal steroids and evaluate their effectiveness, within the NICHD's Global Network for Women's and Children's Health Research.

### References

- 1 Betrán AP, Ye J, Moller A-B, Zhang J, Gülmezoglu AM, Torloni MR. The increasing trend in caesarean section rates: global, regional and national estimates: 1990-2014. *PLoS One* 2016; 11:e0148343. <https://doi.org/10.1371/journal.pone.0148343>.
- 2 Mazzoni A, Althabe F, Liu NH, Bonotti AM, Gibbons L, Sánchez AJ, *et al.* Women's preference for caesarean section: a systematic review and meta-analysis of observational studies. *BJOG* 2011; 118:391-399.
- 3 Mazzoni A, Althabe F, Gutierrez L, Gibbons L, Liu NH, Bonotti AM, *et al.* Women's preferences and mode of delivery in public and private hospitals: a prospective cohort study. *BMC Pregnancy Childbirth* 2016; 8:34.
- 4 Betrán AP, Torloni MR, Zhang JJ, Gülmezoglu AM. WHO Working Group on Caesarean Section. WHO statement on caesarean section rates. *BJOG* 2016b; 123:667-670.
- 5 Molina G, Weiser TG, Lipsitz SR, Esquivel MM, Uribe-Leitz T, Azad T, *et al.* Relationship between cesarean delivery rate and maternal and neonatal mortality. *JAMA* 2015; 314:2263-2270.
- 6 Zhao Y, Zhang J, Zamora J, Vogel JP, Souza JP, Jayaratne K, *et al.* Increases in caesarean delivery rates and change of perinatal outcomes in low- and middle-income countries: A hospital-level analysis of two WHO surveys. *Paediatric and Perinatal Epidemiology* 2017; 31:forthcoming.
- 7 Souza JP, Gulmezoglu A, Lumbiganon P, Laopaiboon M, Carroli G, Fawole B, *et al.* Caesarean section without medical indications is associated with an increased risk of adverse short-term maternal outcomes: the 2004-2008 WHO Global

- Survey on Maternal and Perinatal Health. *BMC Medicine* 2010; 8:71.
- 8 Althabe F, Belizán JM, Villar J, Alexander S, Bergel E, Ramos S, *et al.* Latin American Caesarean Section Study Group. Mandatory second opinion to reduce rates of unnecessary caesarean sections in Latin America: a cluster randomized controlled trial. *Lancet* 2004; 363:1934–1940.
  - 9 Chaillet N, Dumont A, Abrahamowicz M, Pasquier JC, Audibert F, Monnier P, *et al.* QUARISMA Trial Research Group. A cluster-randomized trial to reduce cesarean delivery rates in Quebec. *New England Journal of Medicine* 2015; 372:1710–1721.
  - 10 Khunpradit S, Tavender E, Lumbiganon P, Laopaiboon M, Wasiak J, Gruen RL. Non-clinical interventions for reducing unnecessary caesarean section. *Cochrane Database of Systematic Reviews* 2011. <http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD004667.pub5/full>
  - 11 Sandall J, Soltani H, Gates S, Shennan A, Devane D. Midwife-led continuity models versus other models of care for childbearing women. *Cochrane Database of Systematic Reviews* 2016. doi:10.1002/14651858.CD004667.pub5.
  - 12 Miller S, Abalos E, Chamillard M, Ciapponi A, Colaci D, Comandé D, *et al.* Beyond too little, too late and too much, too soon: a pathway towards evidence-based, respectful maternity care worldwide. *Lancet* 2016; 388: 2176–2192.
  - 13 Campbell OM, Calvert C, Testa A, Strehlow M, Benova L, Keyes E, *et al.* The scale, scope, coverage, and capability of childbirth care. *Lancet* 2016; 388:2193–2208.
  - 14 Hofmeyr GJ, Hannah M, Lawrie TA. Planned caesarean section for term breech delivery. *Cochrane Database of Systematic Reviews* 2015. <http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD004667.pub5/full>
  - 15 National Collaborating Centre for Women’s and Children’s Health. *Caesarean Section. NICE Clinical Guideline.* November 2011. <https://www.nice.org.uk/guidance/cg132/evidence/full-guideline-pdf-184810861> [last accessed 1 May 2017]