

The carbon footprint of different modes of birth in the UK and the Netherlands: An exploratory study using life cycle assessment

Nienke A. Spil, Kim E. van Nieuwenhuizen, Rachel Rowe, Jim G. Thornton, Elizabeth Murphy, Evelyn Verheijen, Clifford L. Shelton, Alexander E. P. Heazell 

First published: 25 January 2024 | <https://doi.org/10.1111/1471-0528.17771>

Spil, N.A., van Nieuwenhuizen, K.E., Rowe, R., Thornton, J.G., Murphy, E., Verheijen, E., Shelton C.L., & Heazell, A.E.P. (2024). The carbon footprint of different modes of birth in the UK and the Netherlands: An exploratory study using life cycle assessment. *BJOG*. doi: 10.1111/1471-0528.17771.

Abstract

Objective: To compare the carbon footprint of caesarean and vaginal birth.

Design: Life cycle assessment (LCA).

Setting: Tertiary maternity units and home births in the UK and the Netherlands.

Population: Birthing women.

Methods: A cradle-to-grave LCA using openLCA software to model the carbon footprint of different modes of delivery in the UK and the Netherlands.

Main Outcome Measures: 'Carbon footprint' (in kgCO₂ equivalents [kgCO₂e]).

Results

Excluding analgesia, the carbon footprint of a caesarean birth in the UK was 31.21 kgCO₂e, compared with 12.47 kgCO₂e for vaginal birth in hospital and 7.63 kgCO₂e at home. In the Netherlands the carbon footprint of a caesarean was higher (32.96 kgCO₂e), but lower for vaginal birth in hospital and home (10.74 and 6.27 kgCO₂e, respectively). Emissions associated with analgesia for vaginal birth ranged from 0.08 kgCO₂e (with opioid analgesia) to 237.33 kgCO₂e (nitrous oxide with oxygen). Differences in analgesia use resulted in a lower average carbon footprint for vaginal birth in the Netherlands than the UK (11.64 versus 193.26 kgCO₂e).

Conclusion

The carbon footprint of a caesarean is higher than for a vaginal birth if analgesia is excluded, but this is very sensitive to the analgesia used; use of nitrous oxide with oxygen multiplies the carbon footprint of vaginal birth 25-fold. Alternative methods of pain relief or nitrous oxide destruction systems would lead to a substantial improvement in carbon footprint. Although clinical need and maternal choice are paramount, protocols should consider the environmental impact of different choices.