



## Dengue infections in-utero and the health of children

### Executive summary

Dengue fever is the most prevalent mosquito-borne disease, posing a risk to the health of about half of the world's population. Symptoms are similar to the flu and include high fever, severe headache, muscle and joint pain, nausea, vomiting, and skin rash lasting 2 to 7 days. Previously, only serious cases have been studied. We investigate the effects of mild or moderate dengue on expectant mothers and how it affects the health of newborns.

We found that contracting dengue during pregnancy poses the following risks for the baby:

- Reduced average birthweight by 27 grams.
- There is an increased risk of newborns being classified as having very low or extremely low birthweight (67% and 133% more common compared to non-dengue gestation).
- 77% increase in the risk of pre-term birth (before week 32).

Up to the age of 3, a child who was born to a mother who had dengue during pregnancy experiences:

- 27% increased risk of hospitalisation.
- During their second year, the child is 76% more likely to be hospitalised than the average.

Low birth weight has been shown to negatively affect socio-economic outcomes and health in adulthood, and our results indicate that maternal dengue contributes to the list of factors during pregnancy with long-lasting consequences for human capital.

### *Financial impact*

The impacts of inaction include increased healthcare costs for the most at-risk groups, increased intergenerational poverty across the tropics which suffer most from dengue infections, and further pressure on scarce healthcare resources.

### Policy recommendations

1. Prioritise pregnant women and those trying to get pregnant for dengue vaccinations.
2. Awareness campaign about previously unknown health risk of dengue fever.
3. Information campaign for pregnant women during first prenatal visit.
4. Free or subsidised provision of effective insect repellents to low-income groups.
5. Advice for travellers.

### About the research

In Foureaux Koppensteiner and Menezes (2024), we provide novel evidence on the negative health consequences of maternal dengue infections for newborns using large linked administrative data sets from Brazil. In a departure from previous work, this paper focuses on the vast majority of mild and moderate dengue infections (as opposed to serious cases, which are not representative of dengue infections in general) previously considered unproblematic during pregnancy.

We essentially compare the health of babies born from the same mother for pregnancies with and without maternal dengue infections and control for neighbourhood and time-varying mother and pregnancy characteristics.

Contrary to previous studies, we document a significant negative effect of even mild and moderate dengue infections on a range of birth outcomes. Our policy recommendations have come about as the direct result of our research.

1. Decisions regarding the adoption of safe and effective new generation of dengue vaccines should consider the novel evidence provided in this research on the short and long-term consequences of maternal dengue infections. When determining priority groups to receive the vaccines, **particular emphasis should be placed on considering women trying to conceive a priority.**

2. Information campaigns should provide guidance on minimising the risk of getting dengue. This involves safeguarding against mosquito bites through measures such as wearing long clothing, using approved mosquito repellents, sleeping under mosquito nets and installing window screens. Additionally, the **campaign should inform the potential impact of maternal dengue on the baby.**

3. **Pregnant women in areas where dengue is endemic should be informed directly on the health risk of maternal dengue infections** during their first prenatal visit by their public or private health providers and receive information about the above measures to avoid dengue infections.

4. To facilitate their uptake, **effective mosquito repellents should be provided for free** or at subsidised prices to low-income pregnant women in endemic areas, for example during prenatal visits. Similarly, assistance with the purchase of mosquito nets should be considered for low-income groups.

5. **Travel advice for pregnant women** to countries where dengue is endemic should include information on the potential health risk of maternal dengue infections, recommending appropriate protection against infection.

### *Knock-on effects*

Using information on the costs of hospital treatment for each admission, we find that maternal dengue increases subsequent medical expenditures from hospitalisation in the first and second year after birth. The increase in hospital admissions points to the negative longer-term health consequences of maternal dengue and also to the previously neglected cost of maternal dengue infections on public spending and utilisation of scarce public health resources.

The original research is published in *The American Economic Journal: Applied Economics*, 16(2): 530-53, 2024 and can be found [here](#). An ungated version of the paper can be accessed [here](#).

The policy summary 'Dengue infections in-utero and the health of children' is available from VoxDev [here](#).

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