Commenting in *The Lancet* in 2016, Helena Nordenstedt and Hans Rosling criticized a UN report for stating that 60% of all maternal deaths take place in humanitarian settings. They found that this percentage was calculated based on the total population in the 50 most fragile states in the world. Indeed, not all people in fragile states live in humanitarian settings. In 2016, less than 25% of the population in all conflict-affected countries in the world lived less than 50 km away from where the actual fighting took place. Moreover, access to maternal health services varies strongly within countries. In order to explore the relationship between armed conflict and maternal health, we need detailed geographical data on how these factors are distributed within countries. This policy brief summarizes the first systematic attempt to study how local exposure to organized violence affects the access to maternal healthcare services.

**Brief Points**

- We present the first systematic attempt to study how local exposure to organized violence affects the use of maternal health care services in sub-Saharan Africa.
- Geographical and temporal proximity to organized violence events significantly reduces the likelihood that a woman gives birth at a health facility.
- More specifically, we estimate that organized violence in sub-Saharan Africa causes around 47,000 children to be born outside health facilities every year.
- The negative impact of conflict appears to be stronger in urban areas, as well as among poor and less educated mothers.
- Policymakers should invest more in conducting robust studies for evaluating specific interventions and projects to improve maternal health in conflict-affected societies.

**Local evidence from sub-Saharan Africa**

**How Does Organized Violence Affect the Chances of Giving Birth at a Health Facility?**

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Conflict, Health, and Gender: Status of Knowledge

One of the targets of the Sustainable Development Goals is to reduce the global maternal mortality ratio to less than 70 per 100,000 live births by 2030. The most recent years have seen some improvements in maternal health, but progress is still slow, in particular in sub-Saharan Africa (SSA). In a region where the majority of countries have experienced armed conflict since the end of the Cold War, this poor performance may arguably be due in some degree to detrimental effects of armed conflicts on maternal health.

There is an ongoing debate within the research community concerning overall health effects of war, or ‘excess mortality’. The latter term captures negative health effects that extend beyond ‘battle deaths’, including mortality stemming from the overall deterioration of the social, economic and political fabric. ‘Excess mortality’ translates into total war deaths that would not have happened had it not been for the war. Estimating the overall health effects in conflict areas is fraught with uncertainty, controversy, and methodological challenges, and collecting relevant data is typically not a priority during the chaos of a conflict.

There is a dearth of research investigating the effects of organized violence on maternal health, and existing findings do not point in one clear direction. Part of the problem may be the lack of systematic, sub-national studies that address the local dynamics of the conflict-maternal health relationship across countries. We know that both conflict patterns and access to services vary significantly within countries. Geographically disaggregated studies and micro-level evidence are therefore crucial. To our knowledge, the current study is the first to disaggregate patterns of organized violence and the use of maternal healthcare services across several countries.

How Can Conflict Affect Institutional Child Delivery?

During armed conflict, women face a myriad of challenges that can affect their use of maternal and reproductive health services. Local exposure to organized violence can negatively impact the access to reproductive and maternal health services – either directly, through severing the provision of such services, or indirectly, through making it more difficult to reach health facilities; by forcing people away from their homes; and by the long-term breakdown of social institutions, which makes it harder for certain groups to make use of the health system.

We can think of at least three different ways that conflict is likely to have a negative impact on institutional child delivery:

- by disturbing and changing population movement patterns (including causing refugee movements);
- by severely undermining economies both locally and nationally;
- and by destroying infrastructure including health centers, hospitals, and roads.

Even in conflict-ridden areas, women’s resilience with respect to healthcare-seeking behavior is widely assumed to be determined by certain socio-economic factors. We expect that these factors affect individuals’ and communities’ capacity to adapt to increasingly complex social, political and economic environments. Key socio-economic factors like rural/urban residence, wealth, and education have been found to greatly affect the use of maternal healthcare services.

Linking Data on Conflict and Maternal Health Services

To explore whether and how organized violence impacts institutional child delivery, we link survey data from Demographic Health Surveys (DHS) with violent events data from the Uppsala Conflict Data Program’s (UCDP) Georeferenced Event Dataset (GED).

The DHS surveys include information on respondents’ fertility behavior and utilization of various maternal health services covering all births within five years prior to the survey. For our study, we use survey data covering 569,201 births by 390,574 mothers in 31 countries in sub-Saharan Africa.

Figure 1: Institutional Births in SSA, Share (%) by Survey Cluster, Various Years. Source: DHS surveys
The maps in Figure 1 show the geographical distribution of delivery in a health facility by survey cluster for the last born in the year preceding each survey. Zooming in on particular countries reveals sharp geographical inequalities in access to maternal healthcare. For example, the map to the right (b) shows the distribution of deliveries in a medical facility by survey cluster point in Nigeria. The darker the color, the higher the percentage of women report that their last born was delivered at a medical facility. The pattern is clear: Women in northern regions seem to have much lower access to institutional delivery than women in southern Nigeria.

In order to assess whether institutional birth is affected by conflict, we need to link each child to nearby and recent events of organized violence. For this purpose, we rely on the UCDP GED, which includes information on the location of organized violence events, as well as the number of deaths caused by each event. The UCDP GED defines an event as ‘An incident where armed force was used by an organized actor against another organized actor, or against civilians, resulting in at least 1 direct death at a specific location and a specific date’.

The UCDP GED data includes information on three types of organized violence: State-based conflict (between two states or one state and one or more rebel groups); non-state conflict (between two organized actors, of which neither is the government of a state), and one-sided violence (by an organized armed group against civilians). We expect conflict events across all three types to have largely similar effects on institutional births.

Figure 2 maps all organized violence events in the UCDP GED data for years 1989 to 2014 for the countries included in the following analysis. Point coordinates represent each event, where the location has been retrieved using news reports and georeferenced using global gazetteers.

In order to assess whether institutional birth is affected by conflict we need to link each event to nearby events of organized violence. Since we know the date and location (geographical coordinate) of each birth as well as each conflict event we can match these data quite precisely. As shown in the map in Figure 3, around each survey cluster, i.e. the village/town of a surveyed mother (black dot), we draw a circle/ buffer with a radius of 50 km and we count the number of violent events (red dots) and fatalities that happened during the six last months before the birth took place (we also try 25 km and 100 km radii as well as other exposure windows of conflict). The number of violence events within the 50 km buffer 6 months prior to each birth date ranges from 0 to 129. However, the distribution is highly skewed, as 94% of the sample did not experience a recent conflict event within a 50 km radius.

**Empirical Findings**

Since fertility levels in Africa are high, and organized violence is relatively common, we observe a sizable number of women giving birth both before and after conflict. Hence, we can compare the access to institutional birth for siblings born of the same mother before and after a conflict event. This also implies controlling for all the observed and unobserved factors that are fixed over time for each woman.

Is the likelihood of institutional delivery affected by the recent and proximate exposure to organized violence in a woman’s home area? The short answer is: “yes”. Our results suggest that proximity to recent organized violence events decreases the chance that a child is born at a medical facility by app. 1 percentage point, or more directly by 10 children per 1,000 born.

A rough, ‘back of the envelope’ estimation based on the above result suggests that organized violence in sub-Saharan Africa causes around 47,000 children to be born outside health facilities every year. This is admittedly a modest number relative to the total number of births on the continent, possibly giving credence to critical voices suggesting that the focus on maternal deaths in humanitarian settings is grossly overstated relative to the importance of extreme poverty. However, our results should be considered a lower bound estimate since we are not capturing any long-term effects beyond 12 months after conflict, or effects that extend beyond the geographical domain, and because some conflict-ridden countries like Somalia and Angola are missing from the analysis. Since conflicts affect the access to maternal health...
Finally, there appears to be a sudden drop in institutional child delivery precisely in the month where a violent event takes place. It takes about three years before institutional child delivery reaches pre-conflict levels.

**Recommendations for Research and Policy**

In order to plan for effective interventions to improve maternal health in conflict and post-conflict settings, it is of vital importance to provide sound empirical evidence concerning the relationship between organized violence and access to maternal healthcare services. The study presented herein represents an important step in this regard, advancing the field and the existent knowledge base.

Further studies should explore why organized violence reduces the likelihood of institutional births. In particular, there is a need for detailed micro-level case studies. Moreover, policymakers should invest more in conducting robust future studies exploring to what extent early external interventions to reach vulnerable populations during conflict may mediate the negative maternal health effect of the conflict.

**Notes**

1. See dhsprogram.com/
2. See ucdp.uu.se/downloads/
3. Corresponding author: Gudrun Østby, gudrun@prio.org

**Further Reading**

Bahgat, Karim; Kendra Dupuy; Gudrun Østby; Siri Aas Rustad; Hävard Strand; and Tore Wig (2018) *Children and Armed Conflict: What Existing Data Can Tell Us*, background report for Save the Children. Oslo: PRIO.

