

**Measles deaths in the current Democratic Republic of Congo epidemic: estimates from four population-based surveys**

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**Introduction**

The Democratic Republic of Congo (DRC) is currently experiencing the largest measles outbreak reported to date. From January 2018 to December 2019, DRC reported 334,277 cases and 6,325 deaths. Under-reporting of measles deaths is common, particularly where access to healthcare is limited; additionally deaths may only occur once the rash has disappeared. We conducted four retrospective population-based mortality surveys in two DRC provinces, to document in four DRC health zones the number of measles-related deaths caused by the current epidemic.

**Methods**

We carried out the surveys in four health zones; three (Malemba-Nkulu, Mukanga and Kinkondja) in Haut-Lomani province, and one (La Tshopo) in Yakusu province. These zones collectively have 1,028,792 inhabitants and experienced measles epidemics in 2018-2019, where MSF supported the Ministry of Health in its outbreak response. Within these zones, households were selected using spatial sampling in Haut-Lomani and two-stage cluster sampling in La Tshopo. We interviewed heads of households using a standardised questionnaire, with a recall period covering the duration of the measles epidemic in each health zone (254 days for Haut Lomani; 550 days for La Tshopo). We recorded cause of death for any deaths, as reported by the interviewee. To estimate the total number of measles related deaths, we extrapolated the measles-specific mortality rate, with confidence intervals, to the entire population for each health zone from which the samples were drawn.

**Ethics**

This study was approved by the Comité d'Éthique de l'Université de Kisangani, DRC, and the MSF Ethics Review Board.

**Results**

We interviewed 5,550 households, representing 37,515 individuals, of whom 1,125 died during the recall period. 419 of these deaths were attributable to measles (37% of all deaths). Children under 5 years old were the most affected,

accounting for 88% (369/419) of measles-related deaths. We estimated an excess of 8,801 (95%CI 6,673-10,926) deaths due to measles in the surveyed health zones, among which 6,968 (95%CI 4,906-8,707) were in children aged under five. This equates to one in every 27 children dying of measles during the recall period. During the study period, only 276 measles-related deaths were notified through national surveillance in these four health zones.

### **Conclusion**

We show a profound impact of the measles epidemic on the risk of death among DRC children. Estimating mortality in retrospective surveys is prone to recall bias, since head of household performs cause of death ascertainment; however, we observed a peak of measles-related deaths concomitant with the epidemic peaks in each health zone. The epidemic, declared nationally on 6 June 2019 is still current. It is critical to rapidly improve access to treatment for measles cases and protect susceptible children with single shot of life-saving vaccine.

### **Conflicts of Interest**

None declared.

Word count: final 443

Author approval final edits (via email EG/26/feb)