

High Early neonatal mortality for infectious causes in DRC is not an unavoidable low of nature. don't you?



Hello sir, I'm Mary,

I'm very sad. I lost my three-days-old baby at your hospital.

I was well during the pregnancy. The delivery was assisted by a skilled birth attendant.

The childbirth went well, but 48 hours after, my baby presented weak suck and hypothermia, and they told me that it was a severe infection due to bacteria.

Despite the following national and WHO antibiotic therapy guidelines, the baby did not survive.

My cousin and a colleague experienced the same situation in another city hospital. I'm confused; even my Obstetrician is really uncomfortable.

Where did the infection come from?

Problem

Early neonatal mortality due to infection remains very high in the Democratic Republic of the Congo, **But** we do not know how vaginal disruption during pregnancy could influence it.

Solution

Therefore we set up AVEONS study

Relevance

So that we can determine the epidemiology and risk factor of/for BV, VCC and pathogens causing EOS, and the associations between BV, VVC and ABOs in a population of mothers and neonates from Bukavu, DRC. Furthermore, we evaluated an affordable in-house CRP test for EOS management.

Is the second-trimester vaginal disruption a source of adverse birth outcomes among pregnant women attending antenatal care in Bukavu, Democratic Republic of the Congo?

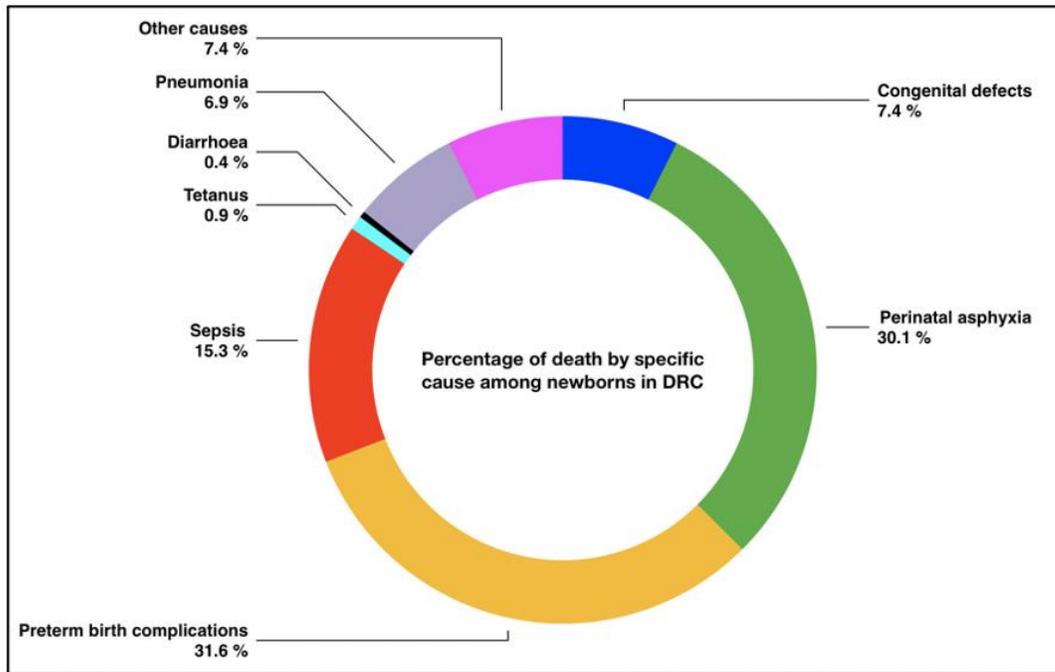
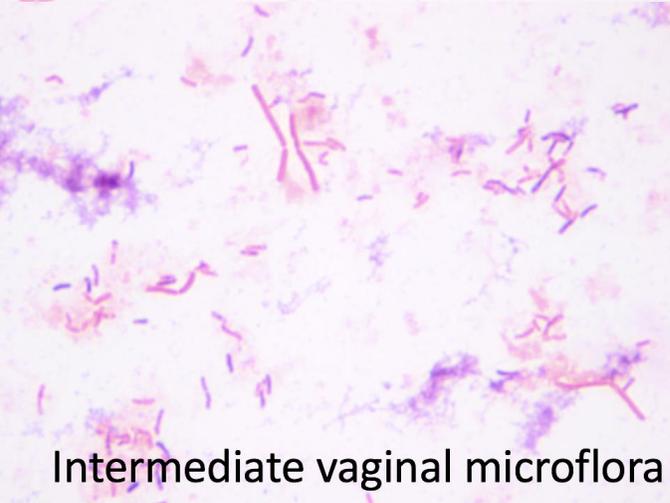


Figure 2. Causes of neonatal mortality in DRC (adapted from UNICEF data, source 2019).

Adverse birth outcomes (ABO) including low birth weight (LBW), preterm birth (PTB) and early onset neonatal sepsis (EOS) are the most important contributor of neonatal mortality in the Democratic Republic of the Congo (DRC).

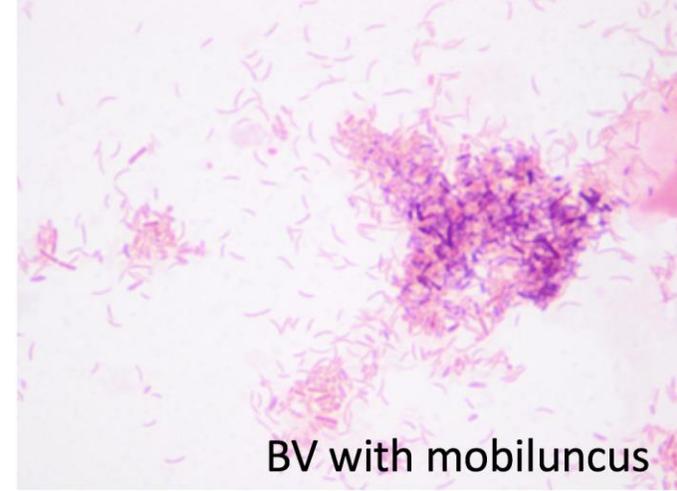


Normal vaginal microflora

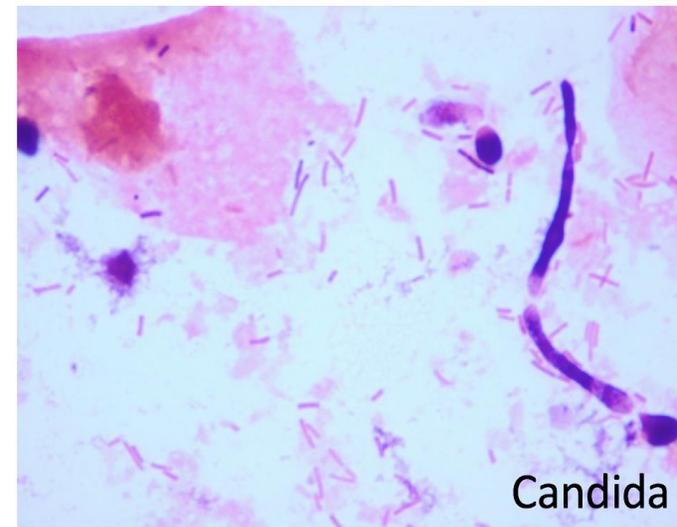


Intermediate vaginal microflora

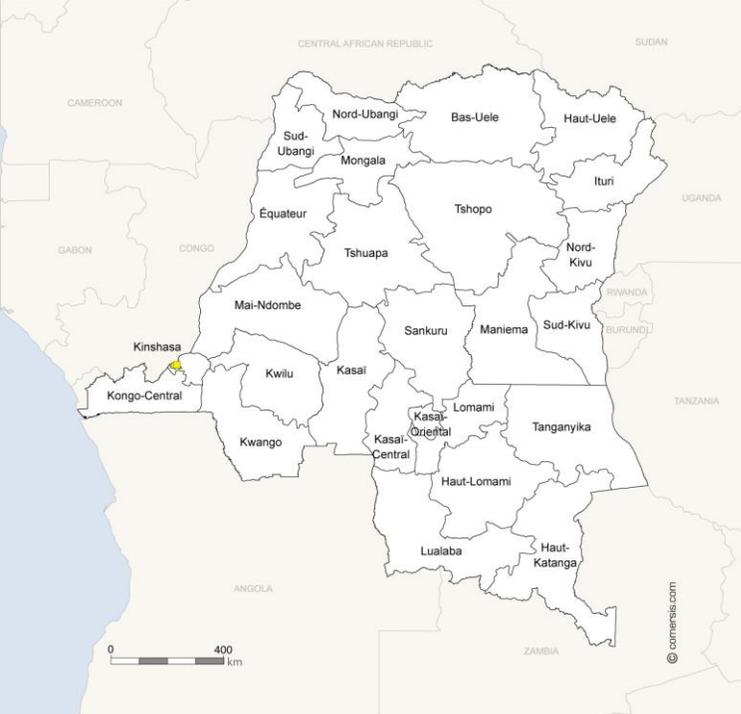
Disturbances of a healthy vaginal microbiota (VM) such as bacterial vaginosis (BV) and vulvovaginal candidiasis (VVC) have been linked with numerous ABO. Furthermore, the pathogens causing EOS are most often transmitted from mother to fetus/newborn originating from the vagina.



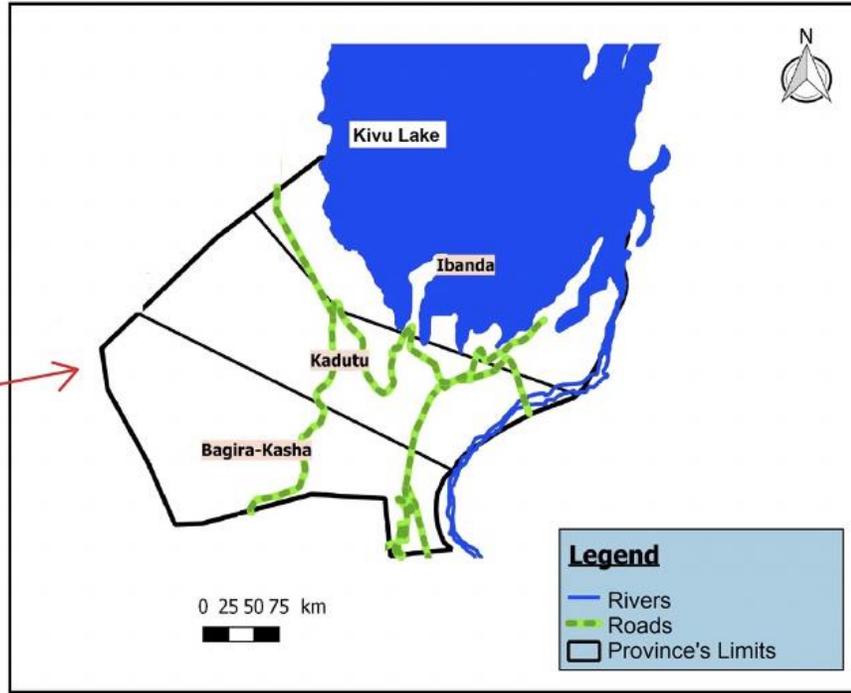
BV with mobiluncus



Candida



In DRC however, there is an enormous lack of data on these conditions, hampering further efforts to reduce the burden of neonatal mortality.



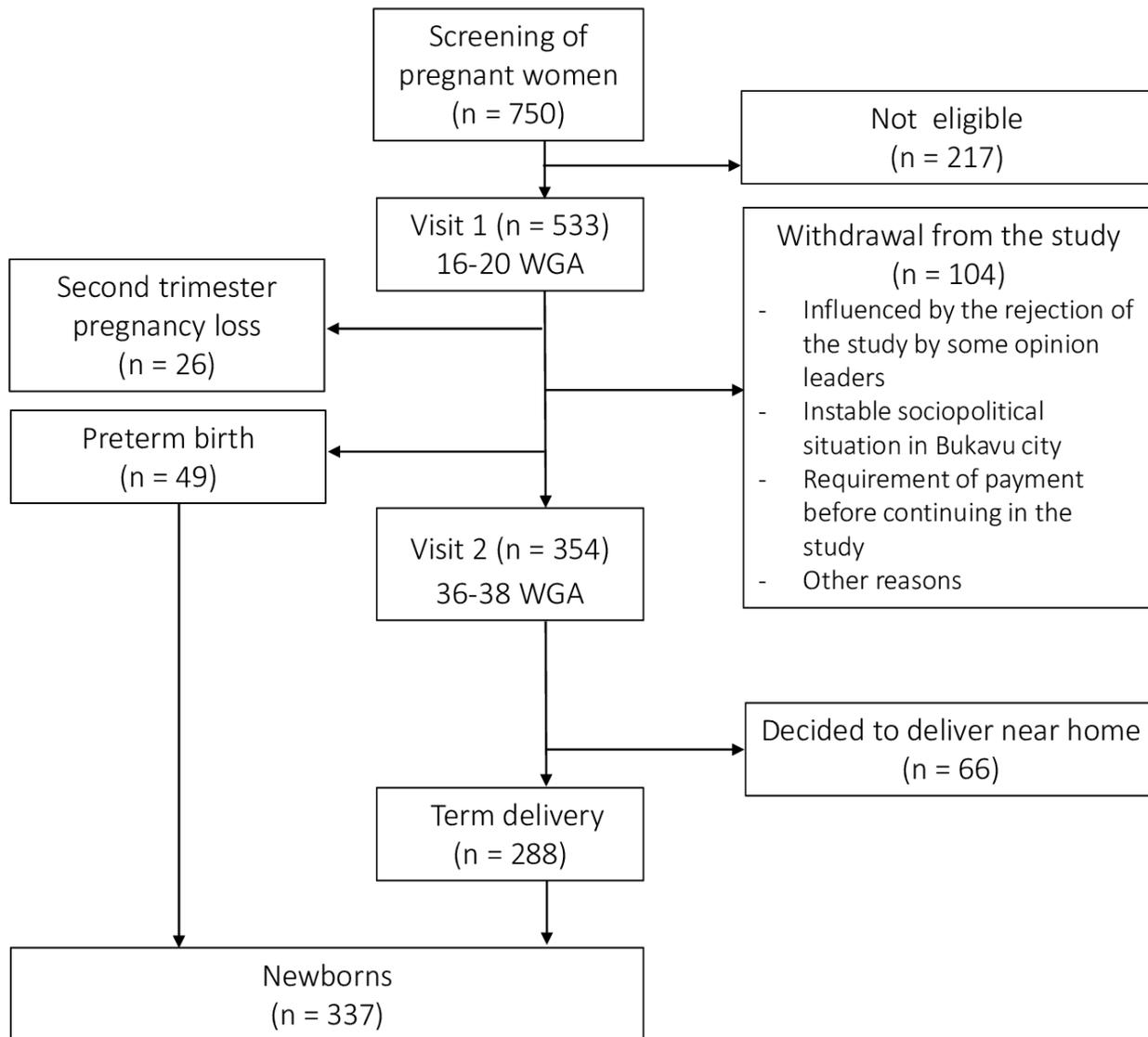
- Multidisciplinary team
- Bukavu city ;an unstable sociopolitical post conflict area

South-Kivu Province



Source: ERSP/UCB_2019

Mulinganya G., Oct 2019



In a **first prospective observational study**, a total of **533** pregnant women in the second trimester of pregnancy were followed until delivery at the Provincial Referral Hospital of Bukavu.

Nugent scoring of Gram-stained vaginal smears was used for BV diagnosis.

Species-specific qPCRs assays targeting markers of a healthy and disturbed VM, and of the most prevalent pathogens causing EOS (ie., *Klebsiella pneumoniae* (KP) and *Enterobacter cloacae* complex (ECC)) were used for detection and quantification of the VM.

660 neonates admitted in NICU of HPGRB during the study period



150 of 660 (22.7%) neonates with pEOS



61 of 150 (40.7%) neonates with pEOS had a positive hemoculture of which an isolate was subcultured at HPGRB



50# of 61 isolates subcultured at HPGRB could be regrown at LBR

In a ***second observational study***, of all neonates with possible EOS who were ***admitted in the first 72 hours of life***, we collected ***blood for hemoculture*** before the beginning of antibiotic therapy and blood sample ***four times after for serial CRP*** measurement with an in-house assay. Isolates were ***identified by MALDI-TOF MS*** and the ***antibiotic susceptibility*** patterns were determined using ***standard methods***, both at Ghent University.

Findings

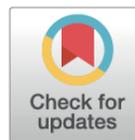
- ✓ The prevalences of second-trimester vaginal carriage of **BV**, **Candida**, **ECC** and **KP** were **26.3 %**, **28.1%**, **42%** and **12.1%**, respectively.
- ✓ BV was independently associated with both **low birth weight** and **preterm babies with low birth weight**.
- ✓ VCC was associated with **PTB** and the association was a function of the concentration of vaginal *Candida*.
- ✓ **EOS signs** such as fever, abnormal general state and abnormal lung examination were associated with **KP vaginal carriage**.

RESEARCH ARTICLE

Prevalence, risk factors and adverse pregnancy outcomes of second trimester bacterial vaginosis among pregnant women in Bukavu, Democratic Republic of the Congo

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The most prevalent EOS pathogens were ECC (42%), KP (18%) and *Serratia marcescens* (12%) with high resistance to the WHO recommended antibiotic regimen.

Clinical Infectious Diseases

MAJOR ARTICLE



Etiology of Early-Onset Neonatal Sepsis and Antibiotic Resistance in Bukavu, Democratic Republic of the Congo

Guy M. Mulinganya,^{1,2,3} Maud Claeys,³ Serge Z. Balolebwami,^{2,4} Bertrand A. Bamuleke,^{2,5} Jules I. Mongane,¹ Jerina Boelens,⁶ Joris Delanghe,⁶ Daniel De Vos,⁷ Richard M. Kambale,^{2,4} Ghislain B. Maheshe,^{2,5} Guy M. Mateso,^{2,5} Ghislain B. Bisimwa,^{2,8} Espoir B. Malembaka,^{2,8} Mario Vaneechoutte,⁹ Piet Cools,⁹ and Steven Callens³

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The in-house CRP assay has several advantages due to its potential accessibility, rapidity, low cost (less than 10 euros for >300 CRP quantitative tests) and it can be realized with common equipment used in many health facilities.

Guy Mulinganya, Serge Balolebwami, Serge Zigabe, Jules Mongane, Isia Nianci, Adrien Burume, Erick Hendwa, Freddy Kampara, Ghislain Maheshe, Antoine Sadiki Kishabongo, Ghislain Bisimwa, Piet Cools, Marijn Speeckaert, Steven Callens and Joris Delanghe*

Evaluation of a turbidimetric C-reactive protein assay to monitor early-onset neonatal sepsis in South Kivu (Democratic Republic of the Congo)

10.1515/clinchem-2020-0300

https://doi.org/10.1515/clinchem-2020-0300

Conclusion

- ✓ Implementing affordable screening of BV and VCC in antenatal care should be considered in resource limited setting.
- ✓ Guidelines of WHO should be revised in order to list first line antibiotic treatment that include the most prevalent bacterial causes of EOS.
- ✓ Second line treatment should be made available at low cost.
- ✓ Rapid diagnostic tests for EOS have the potential to reduce neonatal death, implementations studies be undertaken.



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Super Lacus Ac Montes Splendens

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Thank you