

**Title:** HIV mother-to-child transmission in Cameroon: Early infant diagnosis positivity rates by entry point and key risk factors

**Authors:** Tchendjou P, Lekeumo S, Binde T, et al

**Background:** Prevention of mother-to-child transmission (PMTCT) programs aimed at reducing pediatric HIV infections are frequently assessed by the MTCT rate collected from PMTCT entry points, but this misses positivity rates in other entry points. Using the opportunity of the introduction of point of care early infant diagnosis (POC EID) in Cameroon, we extended infant HIV testing to several new entry points of health facilities. We assessed HIV positivity by entry point and other key risk factors.

**Methods:** A cross-sectional study nested within the POC EID project implemented in four priority regions was conducted in 58 health facilities of varying levels. Clinical history of the mother-baby pair or assessment of HIV status of the mother were used as eligibility criteria of infants. In each health facility, all healthcare entry points were considered and categorized as either a PMTCT entry point or a non-PMTCT entry point. Eligible infants presenting to these facilities between December 2016 and December 2017 were tested by POC EID. Variables including demographics, antiretroviral use, and breastfeeding history were extracted from the EID request form. Data were analyzed using multivariate analysis with backward elimination ( $p > 0.20$ ).

**Results:** Overall, 2,254 HIV-exposed infants were tested using POC EID as first HIV diagnosis. The sex ratio was 1.03 and the median age at blood sample collection was 7.3 weeks (IQR [6.3;19.0]). The main entry points were PMTCT (48.7%), immunization unit (14.3%), Pediatric ward (13.8%). Out Patients Department (6.5%) and maternity ward (6.5%). Of the 2,254 infants tested, 8.7% (197/2,254) were HIV-positive. This rate varied according to entry points (outpatient department, 19.2%; emergency/pediatric ward, 17.7%; PMTCT/antiretroviral treatment (ART), 5.7%; and maternity/antenatal care, 3.5%). In univariate analysis, positive cases were more likely to be found at non-PMTCT entry point, among females, and infants delivered to HIV-positive women who received incomplete ARVs for PMTCT. In multivariate analysis, risk of being HIV-positive was higher when the infant was found at non-PMTCT entry point (OR:2.09; 95%CI: 1.47-2.99;  $p < 0.001$ ), was on mixed feeding mode (OR: 3.74; 95%CI: 2.43-3.47;  $p < 0.001$ ).

**Conclusion:** Less than half of the yield (47.0%) came from PMTCT as an entry point. EID positivity rates were highest in non-PMTCT entry points and for HIV-exposed infants who had key risk factors for transmission. Strengthening testing in non-PMTCT entry points and more closely tracking these rates may efficiently help to address missed opportunities of PMTCT programs and link more children into ART care.

**Table 1:** Distribution of the positivity rate in regards with final variables

	Number tested	Frequency (%)	Positivity rate (%)	P-value
<b>Region</b>				
Centre	1103	48.9	9.6	0.026
Littoral	581	25.8	7.2	
North-West	286	12.7	11.5	
South-West	284	12.6	5.6	
<b>Sex</b>				
Male	1146	49.2	7.8	0.056
Female	1108	50.8	9.7	
<b>Entry Point</b>				
PMTCT entry point	1674	74.3	5.7	0.000
Other entry point	580	25.7	17.6	
<b>Mode of delivery</b>				
Caesarean	290	12.9	3.4	0.000
Normal	1964	87.1	9.5	
<b>ART started period</b>				
Not on ART	198	8.8	49.0	0.000
After delivery	113	5.0	30.1	
During delivery	26	1.2	11.5	
During pregnancy	711	31.5	4.1	
Before pregnancy	1182	52.4	2.5	
Unknown	24	1.1	20.8	
<b>Breastfed at birth</b>				
Yes	1622	72.0	10.1	0.000
No	632	28.0	5.2	
<b>Current feeding mode</b>				
Exclusive breastfeeding	1233	54.7	5.1	0.000
Formula feeding	751	33.3	7.2	
Mixed feeding	270	12.0	29.6	
<b>Infant on NVP</b>				
Yes	1941	86.1	3.5	0.000
No	313	13.9	41.5	
<b>Infant on Cotrim</b>				
Yes	1273	56.5	8.2	0.193
No	981	43.5	9.4	
All	1888	-	8.5%	