Elizabeth Glaser Pediatric AIDS Foundation

Until no child has AIDS.

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

P Tchendjou, S Lekeumo, T Binde, E Akwo, AC Bissek, G Dongmo, J Cohn, E Sacks, C Kengne, A Amougou, V Nzima

Context : HIV/AIDS in Cameroon

- Population in 2017: 24,253,757
- HIV prevalence: 4.3% (5.6% among women)
- Treatment for All implemented as of 2016
- Adults and children on ART by Dec. 2017: 253,715 (76% ART coverage), including 8,727 children (18% ART coverage)
- PMTCT program in 4,721 facilities
  - HIV prevalence among pregnant women: 3.9%
  - 6-8 week mother-to-child transmission (MTCT) rate reported nationwide in 2017: 5%
  - HIV-positive women receiving ART by Dec. 2016: 75.6%
  - HIV-exposed infants tested for HIV within 2 months of age:
    - ✓ Programmatic: 97% (but 48.2% in population)

Background on EID

- Literature review from 26 countries, including 25 African countries, shows that HIV positivity varies among settings/entry point in the facility (Cohn et al, 2017)

- In Cameroon
  - The majority of EID samples are collected at PMTCT entry points and analyzed at referral laboratories using real-time PCR machines
  - Several risk factors for HIV MTCT have been previously described, including lack of maternal ART and mixed breast and formula feeding
  - To reach the first 90: must maximize PMTCT, but also locate children in non-PMTCT entry points

Background on Point-of-Care EID Project

- The Unitaid/EGPAF project introduced point-of-care (POC) for EID in nine countries

- Starting in December 2016 in Cameroon, testing was introduced at various entry points in the same health facility

- This provided an opportunity to describe HIV positivity rates at non-PMTCT entry points and to assess associated risk factors

Methodology: Data collection

- Cross-sectional study covering 58 facilities enrolled in urban, semi urban and rural settings
  - 5 national hospitals
  - 2 regional hospitals
  - 5 district hospitals
  - 46 integrated facilities

- Clinical history of the mother-baby pair, or assessment of the mother's HIV status, were used as eligibility criteria for EID testing of infants

- Patient-level data were collected using a validated lab request form

Methodology: Study Sites

In each facility, all health care entry points were categorized as either a PMTCT entry point or a non-PMTCT entry point

Category	Services / Entry point
PMTCT entry points	Care and treatment unit at health district (UPEC) / PMTCT
	Expanded Program of Immunization (EPI)
	Maternity
	Antenatal care (ANC) services
Non-PMTCT entry points	Pediatric Wards
	Emergency
	Others (e.g. minor surgery, malnutrition wards, sickle cell wards)
	Outpatient (OPD)
	TB clinic
	Laboratory

Methodology: Data Analysis

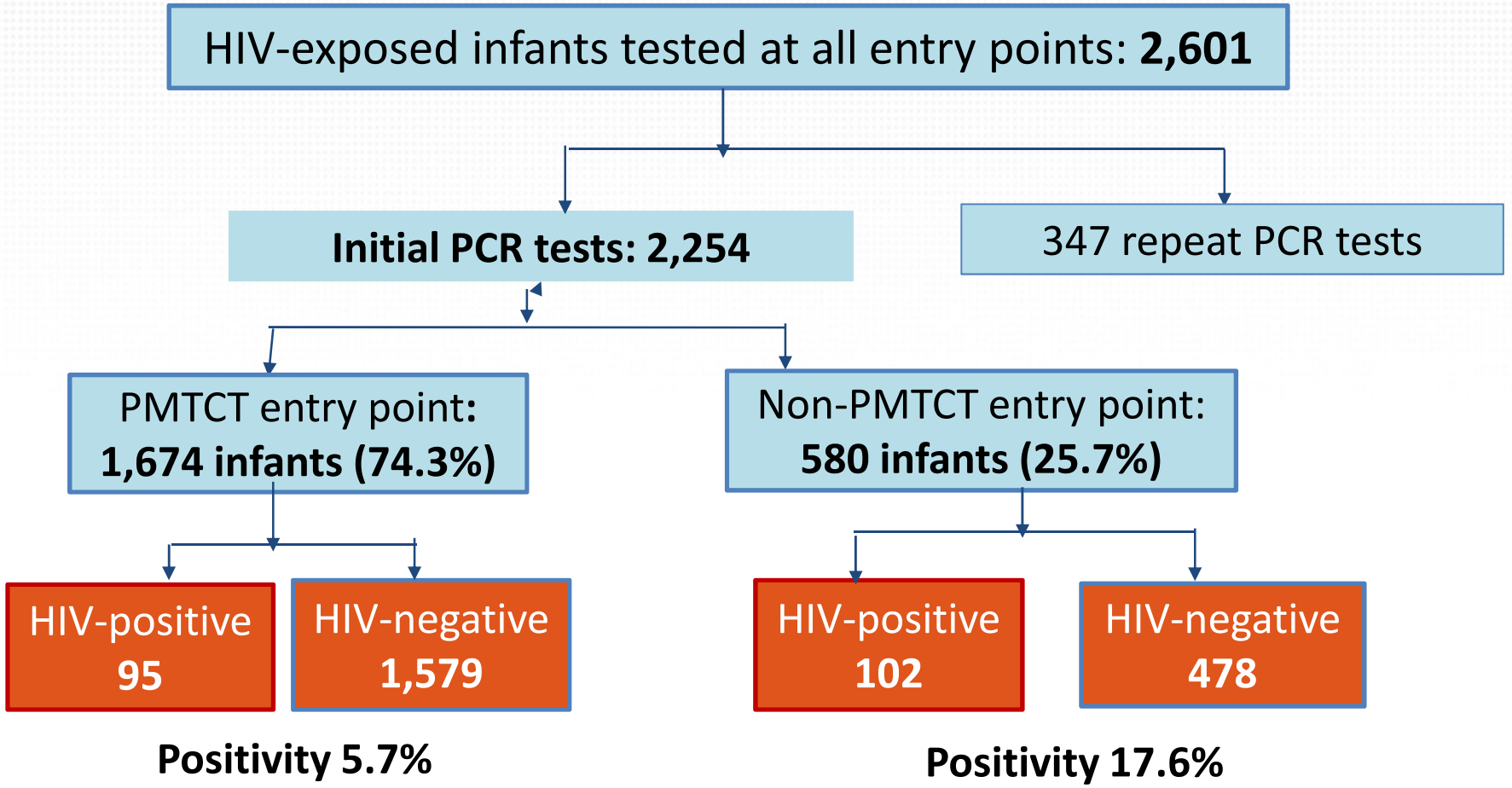
- Descriptive analysis was performed with the risk of being HIV-positive at an entry point considered as a dependent variable.
- Exploratory variables were age, sex, region, mode of delivery, breastfeeding at birth, current feeding mode, and ARV received by the child.
- For categorical variables, bivariate analyses were done using the Chi-Square test or Fisher test when appropriate.
- Factors associated with risk of being HIV-positive at an entry point were studied using a multivariable logistic regression model.

Elizabeth Glaser Pediatric AIDS Foundation

Until no child has AIDS.

Results

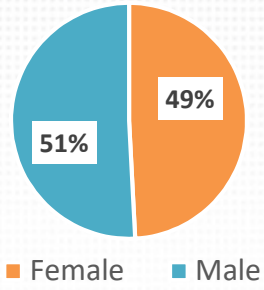
Positivity by PMTCT vs non-PMTCT entry points



Demographics characteristics of children with initial PCR

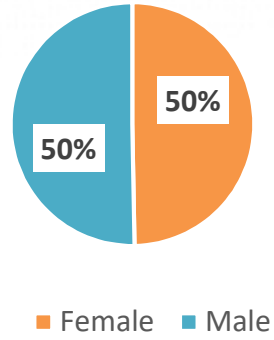
All children at first PCR (n=2,254)

Median age: 7.00 weeks IQI: [6.29;13.57]



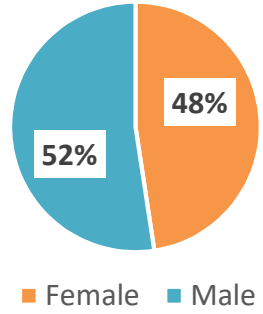
Children received at PMTCT entry point (n=1,674)

Median age: 6.71 weeks IQI: [6.29;9.86]



Children received at non-PMTCT entry point (n=580)

Median age: 11.29 weeks IQI: [6.57;29.64]



POC PCR Positivity by Testing Entry Point

Entry points	Infants tested	Proportion with positive POC PCR
PMTCT entry points	**1,674**	**5.7%**
Care and treatment / PMTCT	1,097	7.0%
EPI	323	2.8%
Maternity	146	3.4%
ANC	108	3.7%
Non-PMTCT entry points	**580**	**17.6%**
Pediatric Ward	310	15.2%
OPD	146	19.2%
Other (e.g. minor surgery, malnutrition wards, sickle cell wards)	78	14.1%
Emergency	23	52.2%
Lab	18	16.7%
TB Clinic	5	20.0%
Total	**2,254**	**8.7%**

Risk factors for HIV infection in children (n=2,254)

Characteristics	Modalities	Number tested	Number of HIV+ (%)	Unadjusted OR [95% CI]	Adjusted OR [95% CI]	p-value
Region	Centre	1103	106 (9.6%)	1	1	
	Littoral	581	42 (7.2%)	0.77[0.50-1.07]	1.19[0.76-1.86]	0.427
	North-West	286	33 (11.5%)	1.22[0.81-1.85]	1.48[0.83-2.53]	0.144
	South-West	284	16 (5.6%)	0.56[0.32-0.96]	0.84[0.62-1.25]	0.500
Entry Point	PMTCT entry point	1674	95 (5.7%)	1	1	
	Non PMTCT entry point	580	102 (17.6%)	3.54[2.63-4.77]	1.92[1.33-2.77]	0.001
Age at testing	0-2 months	1240	31 (2.5%)	1	1	
	2-8 months	696	84 (12.1%)	5.35[3.50-8.17]	2.88[1.81-4.57]	0.001
	9-18 months	318	82 (25.8%)	13.55[8.76-20.95]	5.87[3.57-9.67]	0.001
Maternal ART initiation	Received	2,032	95 (4.7%)	1	1	
	No ART	198	97 (49.0%)	19.58[13.84-27.69]	9.57[6.32-14.49]	0.001
	Unknown (not documented)	24	5 (20.8%)	5.36[1.96-14.67]	3.26[1.04-10.17]	0.041
Delivery Mode	Cesarean	290	10 (3.4%)	1	1	
	Vaginal	1964	187 (9.5%)	2.95[1.54-5.63]	2.68[1.29-5.58]	0.008
Breastfeed at birth	No	632	33 (5.2%)	1	1	
	Yes	1622	164 (10.1%)	2.04[1.38-3.00]	1.47[0.80-2.72]	0.210
Feeding Mode	Exclusive feeding	1233	63 (5.1%)	1	1	
	Formula feeding	751	54 (7.2%)	1.43[0.98-2.09]	1.41[0.79-2.52]	0.234
	Mixed feeding	270	80 (29.6%)	7.82[5.43-11.25]	2.42[1.53-3.81]	0.001

Discussion

- This study shows that the **MTCT rate cannot be accurately measured when only focusing on infants being tested through the PMTCT program**:
  - More than half of the infants identified as HIV-positive were tested in non-PMTCT entry point.

- **Traditional risk factors** (mixed feeding, no ART initiation, vaginal.) are significantly associated with increased positivity rates. These suggest necessity of cohort monitoring approaches.

- Based on the results from the POC-EID project, the addition of POC EID to conventional EID testing **may increase the identification of HIV-positive children from various entry points who can then be linked to Care and treatment.**

Acknowledgements

- Ministry of Health in Cameroon with various departments: DSF; DLM; DROS
- National AIDS Control Committee Cameroon
- Unitaid for funding and supporting the POC-EID project
- The management of Various Health facilities involved and their Staffs
- Field staff of EGPAF
- Study Participants

République du Cameroun
Ministère de la Santé Publique