



# Implementation of Directly Observed Therapy (DOTS) in Haiti using Geo-localization to Improve Viral Suppression amongst children living with HIV

Sophia Charles <sup>1</sup> MD, Elektra Carras-Terzian <sup>1</sup> MPH, Johane R. Mesidor <sup>1</sup> MD, Lucgardy Germain <sup>1</sup> BSc,  
Davidson Adrien <sup>1</sup> BSc, Pierre Robentz Cassion <sup>1</sup> BSc, Nat Segaren<sup>1</sup> MD MPH MBA MS, Tessa Lewis <sup>1</sup> MA

## BACKGROUND

As adherence to HIV Antiretroviral Therapy (ARVs) remains the most significant burden and common cause of unsuppressed viral load in children and adolescents living with HIV (C/ALHIV), community-based solutions targeting these populations combined with psycho-social support are needed. In lower-middle-income countries, like Haiti, with limited access to health centers due to long distances and socio-economic barriers, strategies such as Direct Observed Therapy (DOTS), to boost ARV adherence for HIV positive clients, should be considered. The Caris Foundation has worked in Haiti since 2008 supporting families directly and indirectly affected by HIV. It became evident during this time that there are many barriers preventing a client from remaining adherent to their ARVs. DOTS is one efficient way to show whether adherence is the main reason for a detectable viral load or whether a client is becoming resistant to their medication and therefore needs to change ARV regimen.

## OBJECTIVE

The primary objective of adopting the DOTS strategy for children under 15 years of age with a detectable viral load is to achieve viral suppression. If a child is virally suppressed, they can live a long, healthy life and have a much lower chance of transmitting the virus to someone else. DOTS is also a way to educate the parents/tutors/children on Self-Administered Therapy (SAT) for long-term compliance after a child is discharged from the program. It also serves as a way to observe the turn-around time (TAT) from DOTS enrollment to viral load suppression as well as analyzing the factors determining the improvement in the effectiveness of ARV treatment.

## METHODOLOGY

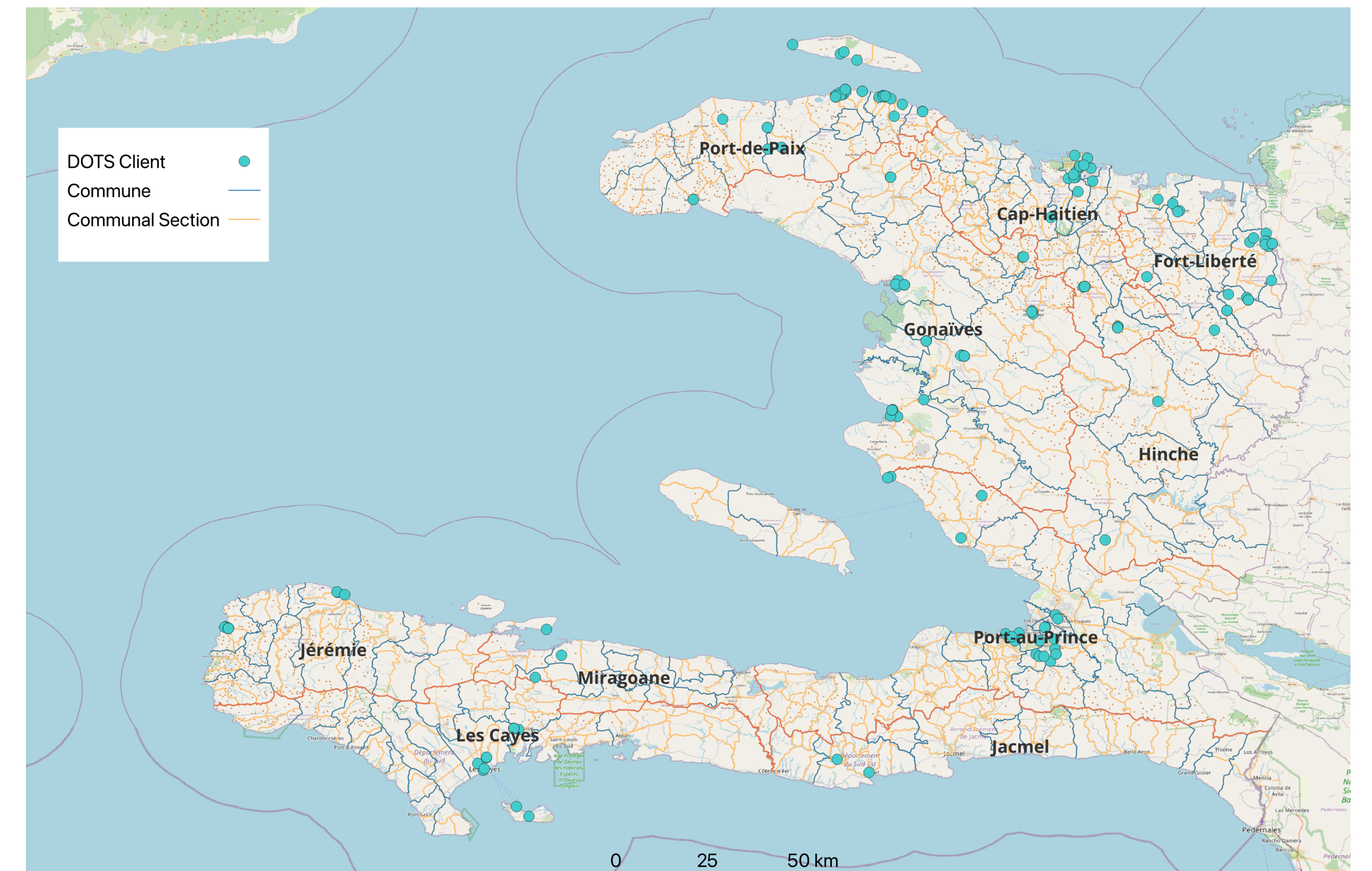
A multicenter retrospective cohort study was conducted on HIV positive children under 15 years of age on ARVs (Integrase Inhibitor/Protease Inhibitor). To be eligible for the study, the client had to have been on ARVs for at least 3-6 months depending on the regimen and with a viral load of over 1000 copies/ml, in health centers across Haiti. From a total of 35 clinical sites, 260 children were selected for the DOTS strategy, from which 209 were enrolled into this study.

Clients were monitored via phone call or through daily in-person visits by a field agent or an HIV positive ‘mother mentor’ over a three month period. This period was extended if a client does not reach viral suppression after the first 3 months and they then move into ‘phase two’ in which they are given a further 3 months before re-taking the viral load test. Phone calls were used in the event that a client didn’t feel comfortable with the daily visits due to stigma of HIV or in some cases, the area where a client lived was deemed too unsafe for in-person visits. A mobile open-source smartphone app ‘Commcare’ was used, which enables GPS data to geo-localize the selected beneficiaries and records longitudinal data. Viral load was used as a measurement tool to assess effectiveness. Virologic response was quantified and Kaplan Meier curves were used to assess differences in viral suppression. Significant association between outcome (viral suppression) and independent variables which include age group, sex, viral load at entry, were carried out using the Cox model.

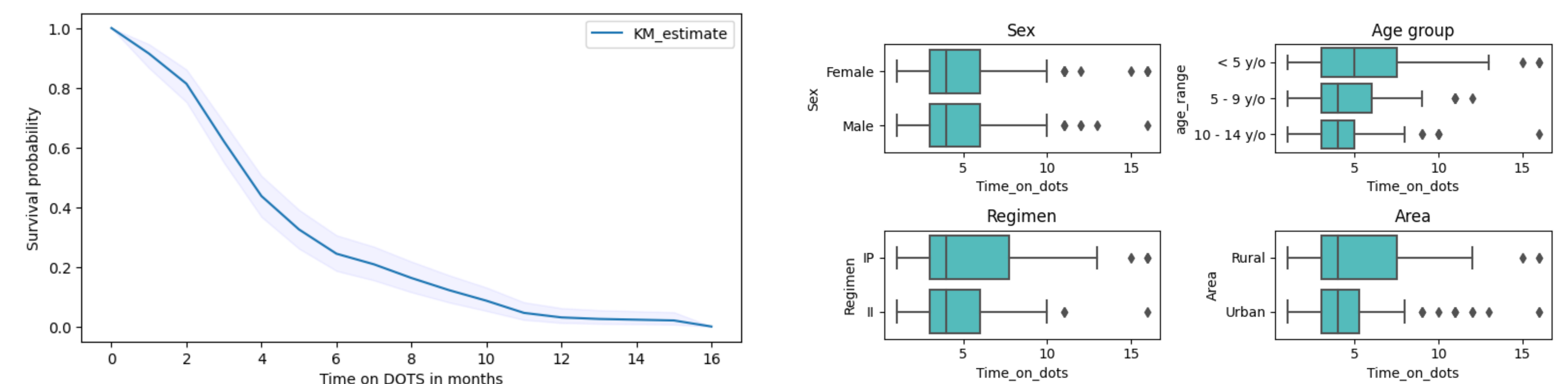
P value < 0.05 was considered a significant association. 209 participants with a mean age of 6.1 years and a median viral load 4.2 log<sub>10</sub> copies/ml were registered.

## RESULTS/FINDINGS

Characteristics	Value
Study participants (Total)	209
Age in years ( mean, range)	6.3 (0-14)
Baseline Viral load in log <sub>10</sub> copies/ml (median, range)	4.2 (3.0-6.3)
# of years in treatment before being enrolled in DOTS	3.1
Age	
< 5 years	88 (42%)
5-9 years	71 (34%)
10-14 years	50 (24%)
Sex	
F	113 (54%)
M	96 (46%)
Area	
Urban	116 (56%)
Rural	93 (44%)
Regimen	
IP (LPV/r)	125 (60%)
II (DTG)	84 (40%)
Type of DOTS	
Calls	98 (47%)
Visits	111 (53%)



Viral load	Total	TAT	Rate of Suppression
	(N=209)	(4.4 months)	(94% (197/209))
1,000 to < 10,000 copies/ml	44% (91/209)	4	99 % ( 90/91)
10,000 to < 100,000 copies/ml	37% (78/209)	4.4	95% ( 74/78)
100,000 copies/ml and more	19% (40/209)	5	83% (33/40)



## LESSONS LEARNED

DOTS via visits or telephone assistance for ARV adherence (TAA) was widely accepted in the various geographic regions in which the study was conducted. TAA is seen as a feasible option especially in resource-limited settings with high levels of socio-political instability. It was observed that a client with a lower detectable viral load (1,000-10,000copies/ml) had a significantly higher chance of reaching viral suppression vs clients with higher viral loads (>100,000 copies/ml). DOTS also identifies those who have become resistant to their ARVs and can therefore return to their physician and take the steps to potentially change ARV regimen in order to become virally suppressed.

## CONCLUSION

This study indicates that DOTS-based adherence support is an effective way to improve suppression among pediatric clients on ARVs. The overall viral suppression rate among HIV positive children on DOTS (94%) almost meets the 95% target of UNAIDS. Future studies could be conducted to include other aspects and community support such as psycho-social and nutritional assistance, to understand more reasons for the refusal of DOTS and/or non-adherence.

**ACKNOWLEDGEMENTS:** Caris Foundation International, USAID Haiti, MOH Haiti