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Research Article

Achieving Elimination of Vertical Transmission of HIV in Jamaica

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Abstract

Background and Purpose: Jamaica is an upper middle-income developing Caribbean island-nation, population 2.8 million, with a generalized and mixed HIV epidemic. We report progress towards achieving international validation standards for the elimination of vertical transmission of HIV and syphilis in Jamaica during 2013 through 2015.

Methods: The vertical elimination cascade which was initially established in 2002 was continued by ensuring pregnant women attended for antenatal care, had "opt-out" counseling and testing for HIV/syphilis, treatment of syphilis in community clinics, referring HIV+ women to "High Risk" antenatal hospital-based clinics and to research nurses who coordinated their care and documented the outcomes, commencing antiretroviral therapy (ART), delivering women with HIV and/or syphilis in hospitals, offering ART-prophylaxis and full replacement feeds to HIV-exposed infants, testing them with DNA/RNA PCR by four to six months using dry blood spots and evaluating and treating babies for congenital syphilis.

Results: During 2013, 2014 and 2015, these initiatives resulted in vertical HIV transmission rate of 3%, 1% and 1% respectively (the elimination target is < 2%). Incidence of HIV in infants is 0.3, 0.1 and 0.1 per 1,000 live births respectively, (meeting the elimination target of < 0.3per 1,000). The incidence of congenital syphilis was 0.7, 0.7 and 0.8 per 1,000 live births, respectively, (the elimination target is < 0.5/1,000). Success factors included strong healthcare systems linked to outcomes-based, implementation and basic science research, prevention of mother to child transmission program was integrated into routine Maternal and Child Health; development of the National Family Planning Board – Sexual Health Agency; strong political will, commitment and funding; inter-sectoral academic-public-private collaboration and oversight; "point of care" rapid testing and treatment for HIV and syphilis; national education campaigns; health systems strengthening; monitoring and evaluation programs; barrier contraceptives during pregnancy and breastfeeding; implementing "Option B+" with ART's continued for life in the mother; civil society engagement and island-wide training and practice in the validation standards.

Conclusions: While Jamaica has achieved the vertical transmission elimination targets for HIV, more effective strategies are needed to document the similar international standards for syphilis.

SYNOPSIS

Jamaica is an upper middle-income developing Caribbean island-nation of population 2.8 million, with a generalized HIV epidemic. During 2013, 2014 and 2015, the vertical transmission rate for HIV was 3%, 1% and 1% respectively (the elimination target is ≤ 2%). Incidence of HIV in infants is 0.3, 0.1 and 0.1 per 1,000 live births respectively, (meeting the elimination target of <0.3per 1,000). The incidence of congenital syphilis was 0.7, 0.7 and 0.8 per 1,000 live births, respectively, (the elimination target is ≤ 0.5/1,000). While Jamaica has achieved the vertical transmission elimination targets for HIV, more effective strategies are needed to document the similar

BACKGROUND

Cuba, Thailand, Armenia, Belarus and Moldova have been

validated by the WHO for achieving the virtual elimination of mother to child transmission of HIV (eMTCT) [1-3]. Jamaica is an upper middle-income, developing, Caribbean island-nation, with a population of 2.8 Million [4]. An estimated 1.6% of the population in Jamaica is HIV positive, with stable rates in the last decade [5-8]. Like Thailand, Jamaica has a "generalized" HIV epidemic with high prevalence in men who have sex with men – 32%, sex workers – 4.9% and crack/cocaine users – 3.3% [9]. The epidemic is also "mixed" because 90% of cases are transmitted heterosexually and by bisexual men who have sex with men (MSM's) [6-9]. Jamaica's response to the HIV epidemic has matured significantly since the first case of AIDS was diagnosed in 1982, with a strong collaborative multi-sector response. The HIV antiretroviral drug treatment (ART) program began in 2004, with over 10,000 patients ever started on antiretroviral therapy (ART) in 2012. Jamaica has halted and reversed the spread of HIV, achieving Millennium Development Goal (MDG) [6].

Health care systems linked to research

It contributed to Thailand's victorious achievement of eMTCT [2]. A key success of Jamaica's HIV program is the prevention of mother to child transmission (pMTCT) [10-16]. Jamaica's programme commenced in July 2000, with a nevirapine demonstration project in Greater Kingston in pregnant women and their infants [12,13]. In 2001, a "Further Call to Action" was made to address the paediatric and perinatal HIV epidemic through joint collaboration with the University of the West Indies (UWI) and the Ministry of Health (MoH) [10]. With about 600 reported paediatric cases of HIV/AIDS, HIV being the leading cause of death in children aged less than five years and about 283 newly HIV-infected babies being anticipated to be born in Jamaica in 2003, zidovudine chemoprophylaxis in mothers and infants was commenced in the same region in September 2002 through a UWI and MoH collaboration [11]. This initiative, within one year of implementation significantly reduced mother to child HIV transmission from 30% to <5% (14). This programme was then expanded island-wide in 2005 through the Jamaica Perinatal, Pediatric and Adolescent HIV/AIDS Program (JaPPAAIDS) with strong collaborative outcomes-based, implementation and basic science research initiatives with international funding, training and support [10-22].

Integration of pMTCT into routine maternal and child health

It was a critical success factor for achieving eMTCT validation [1-3]. In Jamaica, interventions included implementing the eMTCT cascade island-wide, providing access to antenatal care, HIV counselling, testing and reporting in pregnancy and chemoprophylaxis with triple ART given to HIV positive pregnant women. The immediate referral of HIV-infected pregnant women from the peripheral feeder antenatal clinics to high risk antenatal clinics located at fifteen public "birthing" hospitals and the referral of their HIV-exposed babies to twelve paediatric sites, island-wide has markedly improved the success of the pMTCT HIV program. A core of ten highly trained and experienced research nurses coordinate the care of the women and their HIV-exposed/infected children and adolescents in the 15 obstetric hospitals and 12 paediatric sites, collaborating closely with the entire healthcare team of obstetricians, nurses, paediatricians, nutritionists, pharmacists, contact investigators, laboratory personnel and others [14-16]. This is coordinated by the JaPPAAIDS Program (which in addition to research nurses, also includes a research nurse coordinator, a data manager, data entry clerks, administrator and a program director) to ensure access to the interventions of the eMTCT cascade. Nevirapine is administered at birth and zidovudine from birth until four to six weeks of age to the non-breastfeeding infants, who also receive full infant replacement formula for free until age twelve months. Early infant diagnosis utilizing the dried blood spot testing by RNA/DNA polymerase chain reaction (PCR) which commenced in late 2009 and confirmatory HIV ELISA, has further facilitated diagnosis of all the exposed infants' HIV status by four to six months of age for early documentation of the effectiveness of appropriate interventions [14-16]. Comprehensive health care including public access to ART for the HIV infected woman, her children and her family, has significantly reduced HIV-attributable morbidity and mortality, island-wide [14-16]. The JaPPAAIDS team is trained, data are collected prospectively with standardised data extraction instruments which are then used to inform program outcomes and collaborative implementation and outcomes-based research [11,14-16].

In the pre-pMTCT era of 1986 to 2002, the MTCT transmission rate was 25%; during 2002 to 2005, in the pMTCT era, zidovudine and nevirapine reduced MTCT HIV to 10% [14,15]. Since 2006 to 2015, combination ART's (ie., zidovudine and lamivudine, with either nelfinavir, nevirapine, or lopinavir/ritonavir) have been used in the pregnant women, with pMTCT rates < 5% in 2007 (Table 1), trending gradually down to ≤ 2% by 2012 [14-16].

The prevention and control of syphilis

It has been a focus of the Ministry of Health for several decades. Control strategies involved the development and strengthening of contact investigation, syndromic management of genital ulcers, decentralization of Sexually Transmitted Infections (STI's) clinics which offered rapid tests for syphilis and HIV, improved monitoring of STI's, training of public and private clinicians and also increased prevention efforts. This resulted in a significant decline in the incidence of syphilis towards the late 1980s [23,24]. The prevention and control of syphilis in pregnancy, included early antenatal care for all women, universal syphilis screening (1st and 3rd trimester); prompt referral to the contact investigator; prevention of re-infection by treating all sexual partners; promotion of condom use during pregnancy, counseling all women on methods to prevent infection and

Footnotes

This work was presented "in part" to PAHO/WHO's Regional Validation Committee, viz:

1. **Christie CD**. Invited plenary speaker (PAHO/WHO/RVC). "Jamaica's invited perspective on the validation data and changes in collection tools, for the certification of elimination of MTCT HIV and Syphilis in Latin America and the Caribbean, after the experience in Cuba", Invited speaker and Consultant, Regional Validation Committee for Latin America and the Caribbean, PAHO, Washington DC, 13-14, Oct, 2015.
2. **Christie CD**. Invited Plenary Speaker (PAHO/WHO/RV Sub-Committee). "Elimination of vertical transmission of HIV and Syphilis in Jamaica". PAHO/WHO/WDC Pre-validation visit to Jamaica, on Tuesday, 8 December, 2015 at the PAHO/WHO Offices, UWI Mona Campus, Kingston, Jamaica.

Table 1: Preventing Vertical Transmission of HIV in Jamaica, 2005 through 2012.

	2005	2006	2007	2008	2009	2010*	2011	2012
# 1st ANC Attendance	28,651	28,446	22,478	29,119	30,076	26,697	27,985	33,378
No. of % HIV tested	(96%)	(95%)	(95%)	(>95%)				(99%)
Live Births STATIN	45,414	42,399	41,987	42,437	42,372	39,804	39,673	39,348
# HIV +VE Women delivered	401	442	358	623	440	432	417	445
% of women getting ARVs	74%	84%	84%	83.1%	84%	87%	85%	88% (391)
# of HEIs	407	433	362	620	439	419	413	432
# Infants getting PMTCT interventions	353 (87%)	403 (93%)	350 (97%)	608 (98%)	430 (98%)	408 (97%)	413 (100%)	422 (98%)
# HIV +VE Infants	35	40	17	25	12	19	10	8
+VE Infants via Breastfed Exposure	-	-	-	4	1	2	0	2
Transmission rate [≤2 %]	10%%	<10%	<5%	<4%	2.7%	4.6%	2.4%	1.9%
Incidence of MTCT of HIV/ 1000 live birth in population [≤ 0.3 per live 1000 births]	0.77	0.94	0.40	0.61	0.26	0.48	0.28	0.20

Source: Jamaica's Perinatal, Pediatric and Adolescent HIV/AIDS (JaPPAAIDS) Program (A collaborative initiative between the UWI and the Jamaican Ministry of Health since 2002)

prompt investigation on suspicion, since congenital syphilis is a Class I notifiable disease [23,24]. Testing and the recent implementation of reverse syphilis screening in antenatal clinics are now more accessible. Testing with a treponemal rapid test (SD Bioline syphilis) followed by a non-treponemal test (TRUST), if reactive, has further simplified management. This approach widens the net to capture recent and past untreated infections in a timely manner.

Launch of Jamaica's eMTCT of HIV and Syphilis program

Program was formally done in December 2012 to virtually eliminate vertical transmission of HIV and congenital syphilis by the year 2015 [26-29]. The program aimed to ensure that between 2013 and 2015 the rate of mother to child transmission (MTCT) for HIV is equal to, or below 2%, and the incidence is 0.3/1,000 live births; and the incidence rates of congenital syphilis are ≤ 0.5/1000 live births in Jamaica [26-29].

Political will, commitment and funding

Funding was important in the program for eMTCT validation [1-3]. To achieve the eMTCT goals, the process for the elimination cascade of perinatally acquired HIV and syphilis was continued [14-16]. The national guidelines for preventing vertical transmission of HIV and syphilis were continually implemented [30-33]. The WHO's 2014 standards on criteria and processes for validation and a collaborative document from PAHO and the UWI for implementation in 10 Caribbean countries, were adapted by the JaPPAAIDS Program, funded by the National Health Fund and supported by the eMTCT Oversight Committee for use in Jamaica [34]. The Global Fund for AIDS Tuberculosis and Malaria (GFATM) and the President's Emergency Plan for AIDS Relief (PEPFAR) continued to support the core National AIDS program.

Development of the national healthcare and laboratory systems

Systems were pivotal to achieving successful validation of eMTCT [1-3]. In Jamaica, eMTCT goals were achieved through the objectives of: 1) Support of integration of human immune deficiency virus (HIV) and sexually transmitted infections (STIs) in the Maternal, Neonatal and Child Health (MNCH) programs; 2) Building and sustaining laboratory capacity and a supportive environment (*viz*: medicines, vaccines, technology) for early detection, clinical management and patient monitoring for HIV, STI's and opportunistic infections to support the MNCH program; 3) Support for the integration of HIV/STI and sexual reproductive health programs and services; 4) Capacity strengthening of strategic information, knowledge management and training of the island's entire health-care force on HIV and other STI's in MNCH; 5) Capacity strengthening for elimination of mother to child transmission of HIV and syphilis [34].

National family planning board – sexual health agency

Among the main components of the program are the strengthening of the quality and expanding the coverage of maternal and child health services to sustain prevention of mother to child transmission (pMTCT) services, including reproductive health services, antenatal, intra-partum and postnatal care as well as, care of the newborn. Services for the prevention, treatment and care of syphilis and HIV were integrated. This has largely been facilitated through actions by the Ministry of Health (MoH) to expand the mandate of the National Family Planning Board (NFPB) from a strict focus on birth control education and services to the administration of integrated family planning, HIV and STI prevention programs and other sexual health matters. The entity has been re-named the "National Family Planning Board – Sexual Health Agency". The Ministry of Health retains responsibility for the maternal, neonatal and child health program along with HIV treatment, care and support which subsumes the eMTCT Program. There has also been increased focus on improvements in critical health systems' supports relating to laboratory capacity, procurement and maintenance services, by the MoH and partners.

Collaboration and international oversight

A multidisciplinary eMTCT Oversight Committee was

Table 2: Validation Indicators for Achieving Elimination of Vertical Transmission of HIV and Syphilis in Jamaica (2013, 2014 and 2015).

Impact Indicators:	Target	2013			2014			2015		
		%	Numerator	Denominator	%	Numerator	Denominator	%	Numerator	Denominator
1.1 MTCT rate of HIV cohort	<2%	3	11	405/92%	1	4	369/86%	1	5	377/83%
1.2 Annual rate of new paediatric HIV infections per 1000 live births by birth cohort	≤ 0.3	0.3	11	367,46[1]	0.1	4	37892[1]	0.1	5	37556[2]
1.3 Annual rate of congenital syphilis per 100 live births Key monitoring indicators:	≤ 0.5	0.7	25	367,46[1]	0.7	27	378,92[1]	0.8	28	37556[2]
1.4 Antenatal care coverage (at least one visit)	≥ 95%	92	33,642	367,46[1]	81.6	30826	37,89[2]	83	31,240	37556[2]
1.5 HIV testing coverage of pregnant women	≥ 95%	103	34,633	33,642	121	37354	30,826	118	36,704	31240
1.6 Syphilis testing coverage of pregnant women	≥ 95%	83	27793[3*]	33,642	114	35362	30,826	106	36,039	31240
1.7 ART coverage of HIV positive pregnant women	≥ 95%	89	404	454	93	396	428	90	411	459

Footnotes:
1. SOURCE: [1]Statistical Institute of Jamaica STATIN 'live births" SOURCE [2]Registrar General Department's; SOURCE [3] Ministry of Health Monthly Clinical Summary Report (MCSR) System; SOURCE [3*]Monthly Clinical Summary Report (MCSR) for the public obstetric hospitals, University Hospital of the West Indies and Private hospitals
2. All indicators include data from public obstetric hospitals, University Hospital of the West Indies and the six private hospitals (*viz*: all sites where babies are born).
3. In 1.1: The denominator to calculate mother to child transmission rates is total HIV exposed infants who were tested; this was recently changed by PAHO towards elimination initiative from total HIV-exposed infants born alive.
4. In 1.5 and 1.6: Testing coverage for HIV and syphilis maybe reported as > 100%, this relates to number of tests done in the entire population under surveillance. This means some women may have had more than one test, while others may not have been tested.
5. Mothers who tested HIV-negative in pregnancy and who were found to be HIV-positive sometime after delivery, whose infants who were also identified to be HIV-infected, from likely breast feeding, are accounted for differently.(Table 5)
6. Infants, whose mothers tested HIV-negative in pregnancy, who later acquired HIV postpartum from breastfeeding, are accounted for in Table 5.
7. HIV-Exposed infants who were not HIV-tested, are as follows:
a. Death: 2013-16/3.6%; 2014 - 15/3.5%; 2015 - 15/3.3%.
b. Lost to follow-up: 2013-34/7.8%; 2014 – 43/10%; 2015 – 38/8%.

Table 3: HIV and Syphilis tests done on the labour wards and postnatal wards from 2013 to 2015.

	2013	2014	2015	2016 1st Qrt.
No. of pregnant women tested for HIV on Lwd /PNWd	1290 (Victoria Jubilee and Spanish Town hospitals, only)	4,528	6,846	1,460
No. of pregnant women tested HIV positive on Lwd / PNWd	33	61	79	20
% of pregnant women tested for HIV positive on Lwd/PNWd	2.6%	1.4%	1.2%	1.4%
No. of pregnant women tested for SYPHILIS on Lwd/PNWd	N/A	3,685	6,221	1,326
No. of pregnant women tested SYPHILIS Reactive on Lwd/PNWd	N/A	123	150	25
% of pregnant women tested SYPHILIS Reactive on Lwd/PNWd	N/A	3.3%	2.4%	1.9%

established early in 2013 to guide the process. A rapid assessment of the status of the pMTCT Program was performed [35]. This resulted in improved practical training in point-of-care rapid testing, treatment of HIV and syphilis, supply chain management and protocol developments to support the new activities required of the labour ward staff. An Elimination Plan for a sustained eMTCT program was developed. The Committee provided technical advice for the revision of a comprehensive

Table 4: HIV-infected Mothers who did not get Antiretroviral Therapy (ART) before they delivered their infants during 2013 through 2015.

	2013	2014	2015
	#/%	#/%	#/%
HIV positive women who delivered	454	435	460
HIV positive women who delivered and got NO ART for PMTCT	48/11	32/7.4	47/10
ANC ATTENDANCE			
Attending ANC	18/38	17/53	20/43
Did not attend ANC	23/48	15/47	26/55
ANC attendance unknown	7/14	0	1/2
WHEN WAS MOTHER HIV TESTED			
HIV tested prior pregnancy	27/55	14/44	21/45
HIV tested during pregnancy	9/18	5/16	11/23
HIV tested after pregnancy-on the maternity unit	12/23	12/37	15/32
HIV tested_ period unknown	0/0	1/3	0
PREGNANCY OUTCOME			
Pregnancy outcome_ alive	48/100	31/97	45/96
Pregnancy outcome_ SB	0	1/3	2/4
HIV STATUS OF HEIs			
Infant HIV status_ positive	7/15	1/3	2/6
Infant HIV status_ negative	27/56	24/78	33/75
Infant HIV status_ unknown/LTFU	11/23	5/16	8/18
Infant HIV status_ unknown/dead	3/6	1/3	0
Infant HIV status_ tested but results O/S + NYT	0	0	0

Footnotes: Excluded from this table are eight (8) women who were diagnosed with HIV after pregnancy in the community. All eight (8) women tested negative for HIV in their pregnancy.
2. In 2013 there were five (5) such women who were tested positive 8-23 months after delivery and had two HIV-positive and three HIV-negative infants. In 2014 there were three (3) such women diagnosed as HIV-positive 2 – 16 months after delivery and had three HIV-positive infants (one died). These babies likely obtained HIV by breast feeding. These mother-infant pairs are accounted for differently.(Table 5)

Table 5: Characteristics of HIV-infected mothers and their HIV-infected infants born 2013 to 2015.

Demographic and PMTCT Indicators	Mom HIV positive in pregnancy (N=20)	Mom HIV-negative in pregnancy then becoming HIV positive after delivery (breast feeding N=5	TOTAL N=25
Age of mothers Range; mean (years)	16 – 39; 27 years	25 – 35; 29.5	16 – 39; 27.5
No. of children mothers have alive	0 – 7; 3	0 – 5; 3	0 – 7 Mean 3
ANC- YES	18 (90%)	5 (100%)	23(92%)
ANC- NO	2(10%)	0	2(8%)
HIV status known Labor ward staff prior delivery	16(80%) tested HIV positive with 9[56%] known HIV positive prior pregnancy	5 (100%) (tested HIV negative 25, 28, 20, 19 weeks gestation +1 also at delivery and 1 UNK)	21/64%
HIV +ve status known after delivery	4/20% (Delivery day, 1day, 3days and 15 weeks postpartum when child was admitted at BHC - 3rd trimester positive results came after she delivered.)	5/100% (tested positive 0.75, 3,1.25, 11.5 and 23.3 months after delivery)	9/56%
Mom ARV - yes	9/45%	0	9/36%
Mom ARV - no	11/55%	5/100%	14/64%
Infant-ARV	17/85%	0	17/68%
B/Feeding - yes	4/20%	5/100%	9/36%
B/Feeding – NO/UNK	6/10 (80%)	0/0	6/24%
PCR 6-8 weeks	7/35%	1/20%	8/32%
PCR >8 weeks	13/65%	4/80%	17/68%
Child's age range at 1st PCR test	1 to 4.75 months Mean 2.6 months	2 to 23.3 months Mean 9.1 months	1 – 23.3 months Mean 4 months
Sex of infants	9M+11F	3M+2F	12M+13F
Infant death	5/25% (died age 3 to 4.75 months, average 4.2 months)	1/20% (died at about 4 months old)	6/24%

Footnotes: The factors surrounding the women who were HIV-negative in pregnancy and the transfer of HIV to their children thereafter, (suggesting breast feeding transmission) includes:
1. Tested positive in subsequent pregnancy almost 2 years after previous delivery
2. Possible unprotected sex during pregnancy, after pregnancy and while breastfeeding for those mothers who initially tested HIV-negative in pregnancy.
3. Diagnosed 3 weeks after as she had to visit a healthcare facility for a vaginal infection.
4. Sex worker who did a routine test 2 months after delivery and same was positive.
Mother diagnosed after child was diagnosed HIV-positive at almost one year of age.

Table 6: Anti Retroviral Therapy in HIV+ Jamaican Children & Adolescents in JaPPAAIDS Clinics through December, 2015.

	Island-wide	Greater Kingston
Total Cohort in Care	505	311 / 62%
CDC Category	N/%	N/%
N	25 / 5	5/1%
A	130 / 26	71 / 23
B	135 / 27	65 / 21
C	215 / 42	170 / 55
Total No. on HAART (per modified WHO guidelines)	467 / 93	290 / 93
Age ≤ 12 years on ART	232/ 50	123/ 42
Age > 12 years old on ART	235 / 50	167 / 58
1st line HAART	320 / 69	199 / 69
2nd line HAART	143 / 30	88 / 30
3rd line HAART/ Salvage Therapy	4 / 1	3/1%

data management system including defined indicators, improved efficiency in data collection, reporting and dissemination. The Committee provided inputs and approved revised program priorities, operational guidelines and capacity building plans to address gaps in service delivery. A rapid assessment of the eMTCT syphilis program was also commissioned by the NFPB [36]. The recommendations and the revised algorithm for the management of the syphilis sero-positive pregnant woman and her infant were implemented.

RESULTS

In implementing the eMTCT Cascade, the results of validation indicators for achieving the standards for the vertical transmission of HIV and syphilis in Jamaica during 2013 through 2015 are shown (Table 2). Uptake of HIV and syphilis testing is also reported for those who presented on the labour ward without a test result in their medical records (Table 3). HIV-infected mothers who did not get ART before they delivered their infants is also displayed for the similar reporting three-year period (Table 4). Characteristics of HIV-infected mothers and their HIV-infected infants (including from breastfeeding transmission) during 2013 to 2015 are displayed (Table 5).

In respect of the validation indicators, MTCT rate of HIV cohort was 3% in 2013 and 1% for the last two years of 2014 and 2015, respectively; (the elimination target is <2%) (Table 2). The annual rate of new pediatric HIV infections per 1000 live births by birth cohort was 0.3 per 1000 live births in 2013 and 0.1 for the last two years of 2013 and 2014, respectively; (the elimination target is 0.3) (Table 2). Annual rate of congenital syphilis per 1000 live births was 0.7 in 2013 and 2014, respectively and 0.8 in 2015 (the elimination target is <0.5) (Table 2).

The JaPPAAIDS program has identified the majority of infected children who acquired HIV vertically [11,14-16]. The majority of these 500 children (93%) are currently on ART's, with reduced HIV-attributable morbidity and mortality, decreased hospitalizations and improved survival and quality of life (Table 6, Figure 1). Over half are "aging-up" into adolescence and young adults, most of whom are maintained in treatment and care in adolescent clinics in two public sites (University Hospital of the West Indies and Cornwall Regional Hospital).

DISCUSSION

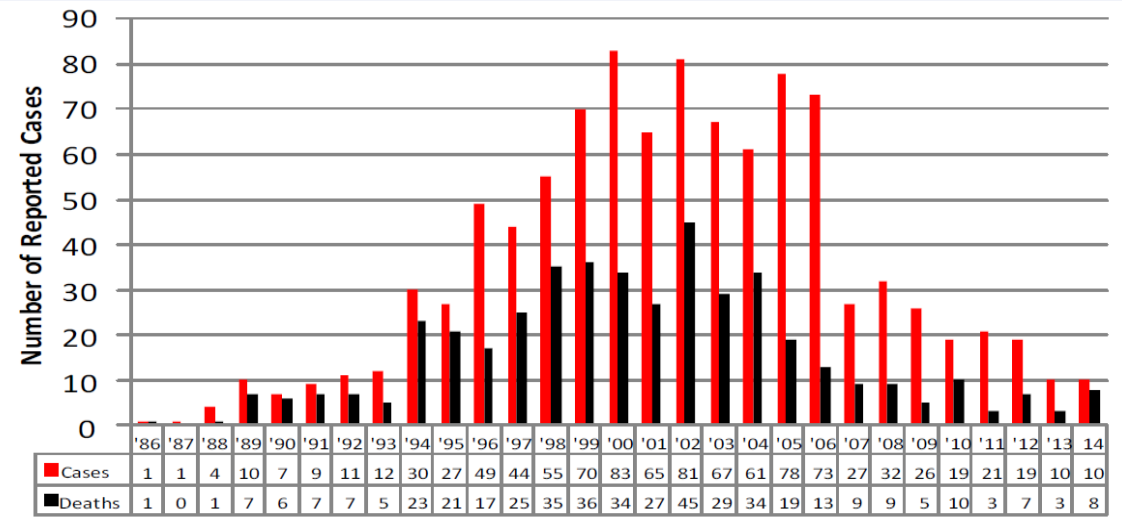
Jamaica, has implemented a robust program to virtually eliminate mother to child transmission of HIV and Syphilis. Jamaica has been trending towards HIV vertical transmission elimination targets of ≤ 2% since 2012 and incidence of <0.3per 1000 live births for new infant HIV infections since 2011 [16]. While clinically apparent congenital syphilis is rare, the validation of treatment of the syphilis-infected women is more challenging.

Cooperation and Collaboration: The program has reaped eMTCT HIV success by removing remaining challenges in service delivery, reporting and in strengthening critical partnerships. The Government of Jamaica's decision to support the elimination initiative through Jamaica's National Health Fund (NHF) facilitated cooperation among the NHF, the Ministry of Health and University of the West Indies for administrative and clinical support for JaPPAAIDS. This partnership, with clear directives for the roadmap towards elimination, also facilitated the establishment of an Oversight Committee. This structure brought together partners internal to the public health sector, private birthing facilities, physicians, laboratories, civil society and other key international stakeholders to improve coordination of efforts.

"Point of care" rapid testing for HIV and syphilis was another critical success. This was initiated on the labor wards for those mothers who do not have a test result readily available in their hospital chart. This was proposed as the last opportunity to reach all women delivering in hospitals to optimize the offering of ART's, or penicillin to mothers with HIV, or syphilis and their babies, with prompt reporting and contact tracing. This important element of the program has resulted in increased maternal uptake of ART's from 84-88% for the preceding seven-year period to 89%-93% for the reporting period of 2013-2015. Tighter implementation of the labor ward initiative is still needed to ensure adequate and consistent documentation, point of care testing before the woman delivers, use of dual test kits for HIV and syphilis and prompt administration of ART's and penicillin. Recurrent training is needed to ensure that new staff are updated on the procedures.

National education campaigns for health care workers were continually implemented island-wide throughout the period, in the academic, public and private sectors, including the laboratories. This factor contributed to the eMTCT success in other countries [1-3].

A robust Monitoring and Evaluation System with an eMTCT database, website and data management system was developed in Jamaica, as in other countries which achieved eMTCT validation [1-3]. Barrier contraceptives to prevent STI's have been implemented for women throughout pregnancy with the addition of a hormonal contraceptive (eg., injection, pill) for dual contraception postpartum [2]. This should also reduce postpartum HIV-transmission to the infant from breast milk, for mothers testing HIV-negative during pregnancy, who developed HIV-infection postpartum and are therefore at risk for breast milk transmission. Contact tracing of mother's sexual partners is another best practice for success of Jamaica's eMTCT program.



	'86	'87	'88	'89	'90	'91	'92	'93	'94	'95	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	14
Cases	1	1	4	10	7	9	11	12	30	27	49	44	55	70	83	65	81	67	61	78	73	27	32	26	19	21	19	10	10
Deaths	1	0	1	7	6	7	7	5	23	21	17	25	35	36	34	27	45	29	34	19	13	9	9	5	10	3	7	3	8

Figure 1 Paediatric AIDS cases and Deaths reported annually in Jamaica, 1986 - 2014
Footnote: Age range from zero to nine (0-9) years
eMTCT HIV Manuscript, Drafted by Celia DC Christie, 23 April, 2016, Revised Jan and Feb, 2017, working May

"Option B+" has now been implemented in Jamaica, as in Thailand [2]. This requires ART being given to the HIV-infected mother through to postpartum and continued for life, with continued provision of infant replacement feeds as an alternative to breastfeeding. Clear advice is now given and implemented for full infant replacement feeding. There is an advanced National Breast-feeding policy which outlines exceptions for HIV-positive mothers, who may wish to breastfeed. Option B+ should further reduce vertical transmission among HIV-infected repeat pregnancies (which approaches 40%) and from HIV-infected women to their partners. However this requires maternal adherence to ART postpartum, surveillance and repeat testing to identify HIV-infected infants during the prolonged period of potential breastfeeding (up to two years) and smooth transition of mother's care from antenatal to adult HIV clinic postpartum. Success will be anticipated with health systems strengthening, provision of psychosocial and counseling services and reduced pill burden for ART (eg., co-formulated single pill) to improve adherence.

Another initiative is the efficient and prompt identification of the infant to enable testing to identify HIV infection status, to facilitate pMTCT interventions. Improved tracking has markedly reduced HIV-exposed babies who have been lost to follow-up.

Civil society and Non-Governmental Organizational engagement are critical to achieving successful validation [1-3]. The "Mentor Mom" and "Eve for Life" partnerships with the Jamaican MoH have mitigated the impact of the epidemic on young mothers living with HIV at the health institution and community level [37-40]. The program provides comprehensive information and training in sexual reproductive health and rights including HIV, life skills, advocacy, voluntary counseling and testing, group education, peer education and case management to groups of mothers living with HIV, aged 14 to 24 years. Once qualified to provide mentorship, the young mothers are assigned to select health facilities, under the guidance of a pMTCT research nurse in the JaPPAAIDS program and "Mentor Mom" Coordinator. "Eve for Life" has collaborated with MoH since 2011 "to strengthen referrals and linkage to treatment, care and support for young HIV-infected mothers".

Challenges now include the need for improved programs to address stigma and discrimination in the health sector, inconsistent primary prevention and active investigation of STI's, as well as the education and testing of male partners. Challenges with achieving the validation for elimination of congenital syphilis relate mainly to compilation of maternal records from the community clinics and the intermittent regional stock-out of benzathine penicillin in Latin America and The Caribbean, due to reduction in manufacturing. Targeted funding is also needed to support the elimination program long-term, to ensure that these results are sustained.

Jamaica has presented two draft validation documents for consideration to PAHO/WHO's Regional Validation Committee, upon their invitation. Island-wide training and practice in the validation standards and procedures were then completed, modeling Cuba's experience [1]. This was followed by a three-day, PAHO/WHO pre-validation mission.

In Jamaica, collaborative work is now continuing to further strengthen the health system to ensure that all mothers, their babies and families are served in accordance with international standards, as we all continue to strive for improved collaborative performance on all the eMTCT process indicators.

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"birthing" sites, all labour wards and the six private hospitals in the country. Pediatricians, obstetricians, family practitioners, registered nurses, nurse midwives, family planning and public health nurses, social workers, contact investigators, laboratory technicians, nutritionists, psychologists, information technology personnel, adherence counselors, administrators, the "Mentor Moms", "Eve for Life" and other civil society are among some of the various professionals involved in the program. Jamaica's National Health Fund provided core funding for JaPPAAIDS to implement the eMTCT initiative, augmented by CHAI, UNICEF, UNAIDS, PAHO and other partners.

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