

Paediatric and Perinatal HIV/AIDS in Jamaica An International Leadership Initiative, 2002–2007

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ABSTRACT

Background: Paediatric and Perinatal HIV/AIDS remain significant health challenges in the Caribbean where the HIV seroprevalence is second only to Sub-Saharan Africa.

Method: We describe a collaborative approach to the prevention, treatment and care of HIV in pregnant women, infants and children in Jamaica. A team of academic and government healthcare personnel collaborated to address the paediatric and perinatal HIV epidemic in Greater Kingston as a model for Jamaica (population 2.6 million, HIV seroprevalence 1.5%). A five-point plan was utilized and included leadership and training, preventing mother-to-child transmission (pMTCT), treatment and care of women, infants and children, outcomes-based research and local, regional and international outreach.

Results: A core group of paediatric/perinatal HIV professionals were trained, including paediatricians, obstetricians, public health practitioners, nurses, microbiologists, data managers, information technology personnel and students to serve Greater Kingston (birth cohort 20 000). During September 2002 to August 2007, over 69 793 pregnant women presented for antenatal care. During these five years, significant improvements occurred in uptake of voluntary counselling (40% to 91%) and HIV-testing (53% to 102%). Eight hundred and eighty-three women tested HIV-positive with seroprevalence rates of 1–2% each year. The use of modified short course zidovudine or nevirapine in the first three years significantly reduced mother-to-child transmission (MTCT) of HIV from 29% to 6% (RR 0.27; 95% CI – 0.10, 0.68). During 2005 to 2007 using maternal highly active antiretroviral therapy (HAART) with zidovudine and lamivudine with either nevirapine, nelfinavir or lopinavir/ritonavir and infant zidovudine and nevirapine, MTCT was further reduced to an estimated 1.6% in Greater Kingston and 4.75% islandwide. In five years, we evaluated 1570 children in four-weekly paediatric infectious diseases clinics in Kingston, St Andrew and St Catherine and in six rural outreach sites throughout Jamaica; 24% (377) had HIV/AIDS and 76% (1193) were HIV-exposed. Among the infected children, 79% (299 of 377) initiated HAART, resulting in reduced HIV-attributable childhood morbidity and mortality islandwide. An outcomes-based research programme was successfully implemented.

Conclusion: Working collaboratively, our mission of pMTCT of HIV and improving the quality of life for families living and affected by HIV/AIDS in Jamaica is being achieved.

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VIH/SIDA Pediátrico y Perinatal en Jamaica Iniciativa de Liderazgo Internacional, 2002–2007

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RESUMEN

Antecedentes: El VIH/SIDA pediátrico y el perinatal continúan siendo retos significativos para la salud en el Caribe, donde la seroprevalencia de VIH ocupa el segundo lugar tras el África Subsahariana.

Método: Se describe un enfoque colaborativo para tratamiento, prevención y cuidado de embarazadas, bebés y niños en Jamaica. Un equipo de personal académico y gubernamental vinculados a la salud, colaboraron para abordar la epidemia de VIH pediátrico y perinatal en Greater Kingston, como modelo para Jamaica (población de 2.6 millones, 1.5% seroprevalencia VIH). Se utilizó un plan de cinco puntos que incluyó liderazgo y entrenamiento, prevención de la transmisión madre a hijo (PTMAH), tratamiento y cuidado de mujeres, bebés y niños, investigaciones basadas en resultados, y outreach local, regional e internacional.

Resultados: Un grupo básico de profesionales del VIH pediátrico/perinatal, que incluía peditras, obstetras, trabajadores de la salud, enfermeras, microbiólogos, administradores de datos, así como personal y estudiantes de la tecnología de la información, fue entrenado para servir en Greater Kingston (cohorte de nacimiento 20 000). De septiembre de 2002 hasta Agosto de 2007, más de 69 793 embarazadas se presentaron para recibir atención prenatal. Durante estos cinco años, tuvieron lugar mejoras significativas en cuanto a la recepción de asesoramiento (40% to 91%) y pruebas (53% to 102%) de VIH voluntarios. Ochocientos ochenta y tres mujeres resultaron VIH positivas en las pruebas, con tasas de seroprevalencia de 1–2% cada año. El uso de un ciclo corto modificado de zidovudina o nevirapina en los primeros tres años, redujo la transmisión madre a hijo (TMAH) de VIH significativamente de 29% a 6% (RR 0.27; 95% CI – 0.10, 0.68). Durante el 2005 hasta 2007, usando terapia antiretroviral altamente activa (TARAA) materna, con zidovudina y lamivudina con nevirapina, nelfinavir o lopinavir/ritonavir y nevirapina y zidovudina para niños, la TMAH se redujo a un estimado de 1.6 % en Greater Kingston y a .75% a lo largo de la isla. En cinco años, evaluamos 1570 niños en cuatro clínicas infecciosas pediátricas semanales en Kingston, Saint Andrew y Saint Catherine, así como en seis otros lugares destinados al servicio comunitario (outreach) por toda Jamaica; 24% (377) tenían VIH/SIDA y 76% (1193) estaba expuestos al VIH. Entre los niños infectados, 79% (299 de 377) iniciaron el TARAA, lo que trajo como resultado una reducción de la mortalidad y la morbilidad infantil atribuible al VIH, en todo el país. Se implementó exitosamente un programa de investigación basado en resultados.

Conclusión: Trabajando en colaboración, estamos logrando nuestra misión de prevenir la TMAH del VIH, y mejorar la calidad de vida de las familias que viven afectadas por el VIH/SIDA en Jamaica.

BACKGROUND

Worldwide, 2.3 million (1.7 to 3.5 million) children aged less than 15 years were living with HIV in 2006 mainly through mother to child acquisition during pregnancy, delivery or from breast feeding (1). Of these, 540 000 (420 000 to 670 000) were newly infected in 2006 (1). The Caribbean remains second to Sub-Saharan Africa in world HIV prevalence (1). However, several successful outcomes have been reported from Latin America and the Caribbean in recent years, particularly through the NISDI Paediatric and

Perinatal HIV Study Group sponsored by the United States' National Institutes of Health (1–8). Significant gains have also been made in several other Caribbean islands because of the impact of mother to child transmission preventive programmes, general protective measures and public access to antiretroviral drugs in these populations (1, 9–17). However, paediatric and perinatal HIV/AIDS remain a significant health challenge in some Caribbean countries (1,18).

Jamaica is a middle developing island with population of 2.6 million (gross national income – US \$3480 in 2006)

where a total of 11 739 AIDS cases were reported between January 1982 and December 2006 and 840 (7%) paediatric cases were documented since the first case report in 1986 (19–23). The predominant mode of HIV transmission in Jamaica is heterosexual and the epidemic is generalized (19–21). Perinatal prevalence islandwide approaches 1.6% with high prevalence pockets existing in Kingston and other metropolitan regions (19–23).

PURPOSE

In 2002, a team of academic and government healthcare personnel collaborated to address the paediatric and perinatal HIV/AIDS epidemic in Kingston, St Andrew and St Catherine (annual birth cohort 20 000) as a model for Jamaica (total birth cohort 50 000). This was accomplished with an International Leadership Award from the Elizabeth Glaser Paediatric AIDS Foundation, collaborating with the University of the West Indies and the Jamaican Ministry of Health. A five-point plan was implemented. The initiative aimed to provide leadership, mentoring and training of a core group of healthcare professionals to serve Kingston, St Andrew and St Catherine as a model for Jamaica; develop and implement a unified programme to prevention of mother-to-child transmission of HIV (pMTCT of HIV) and provide maternal care; establish a unified programme to treat and care for HIV-exposed infants and HIV-infected infants, children and adolescents; build research capacity and implement a strong outcomes-based agenda and finally, to expand the programme throughout Jamaica while collaborating locally, regionally and internationally.

The methods for this five-point leadership initiative and initial outcomes of the first year of the programme have been described (24–36). We report herein the five-year outcomes of this leadership initiative from September 2002 to August 2007 (24–68).

OUTCOMES

Leadership and training, 2002–2007: The first objective comprised leadership and training of a core group of paediatric and perinatal HIV professionals to serve Kingston and St Catherine and to be a model for the rest of Jamaica (24). They included paediatricians, obstetricians, public health practitioners, residents in training, nurses, medical students, microbiologists, data management and information technology personnel. The healthcare team was the Kingston Paediatric and Perinatal HIV/AIDS Programme (KPAIDS), a strong collaboration between The University of the West Indies and the Ministry of Health, Jamaica, which was well-established and functioned since September 2002 (24). Designated healthcare teams continued providing care for pregnant women with HIV/AIDS with a research nurse as case manager in several sites islandwide. Academically and professionally, we have continued to educate through collaborative didactic teaching sessions, and attendance and participation at various local, regional and international

conferences. Collaborative training of diverse healthcare providers and students continued during 2002 to 2007, through didactic lectures, symposia, clinical training and preceptorships. Two faculty members in paediatrics and obstetrics and gynaecology completed NIH-sponsored summer fellowships from the International Society for Infectious Diseases in Washington and California, USA. Over 50 persons were mentored in research and publications. There were five visiting international university students who successfully completed summer research internships (31, 50, 57). Other highlights included two, one-day minisymposia on Paediatric and Perinatal HIV/AIDS in Jamaica in 2003 and 2005. Team members participated in the 15th, 16th, and 17th International AIDS Conferences in Thailand, Canada and Mexico City, the 3rd and 4th International AIDS Society Conferences in Brazil and Australia, Infectious Diseases Society of America annual conference, National Institutes of Health (NIH) Office of AIDS Advisory Council, Office of AIDS Research, International HIV/AIDS Research Planning Workshops (2005–2008), National Institutes of Child Health and Human Development research meetings for observational cohorts of Paediatric and Perinatal HIV/AIDS, Annual “Think Tanks” of the Elizabeth Glaser Paediatric AIDS Foundation (2002–2007), several local and regional conferences and as the Davenport Cook Lecturer in International Child Health at Yale University School of Medicine (68).

Preventing mother-to-child transmission of HIV, 2002–2007

The second objective comprised implementation of a pMTCT of HIV programme (22, 24, 25). In collaboration with the Ministry of Health, Jamaica, we aimed to test over 30 000 women in three years through this programme. KPAIDS continued collaboration with 42 feeder antenatal clinics in Kingston, St Andrew and St Catherine and at high risk obstetric clinics at the Victoria Jubilee Maternity Hospital, Spanish Town Hospital and University Hospital of the West Indies. From September 2002 to 2005, HIV-infected pregnant women and their babies were offered zidovudine or nevirapine prophylaxis. Through the National AIDS programme since late 2006, most HIV-infected pregnant women islandwide received highly active anti-retroviral therapy (HAART) after the first trimester with zidovudine and lamivudine (Combivir™) and nelfinavir, or nevirapine or lopinavir/ritonavir chemoprophylaxis while their infants received nevirapine and zidovudine. The HIV status of these infants, a primarily non-breastfeeding population, was determined by RNA PCR methodology with confirmatory HIV ELISA at 12 to 18 months (69, 70). Research nurse managers from KPAIDS worked closely with the obstetricians and supported these patients through counselling, treatment and care to ensure their compliance with the protocol. Since 2006, lymphocyte subsets and HIV viral loads were used to evaluate the clinical and

immunological stages of HIV/AIDS and to guide clinical, immunological and virological response to HAART.

During September 2002 to August 2005, in the era of zidovudine/nevirapine for pMTCT prophylaxis, 43 931 women presented for antenatal care to 42 antenatal clinics in Greater Kingston, St Andrew and St Catherine (Fig. 1).

Kingston was 6% (5/82) for mother-child pairs enrolled in the programme as compared to 29% (21/72) for those not enrolled in the programme (RR 0.27; 95% CI 0.10, 0.68). This reflected a significant 73% reduction in rates due to the intervention between both groups and a combined MTCT rate of 16% (26/154).

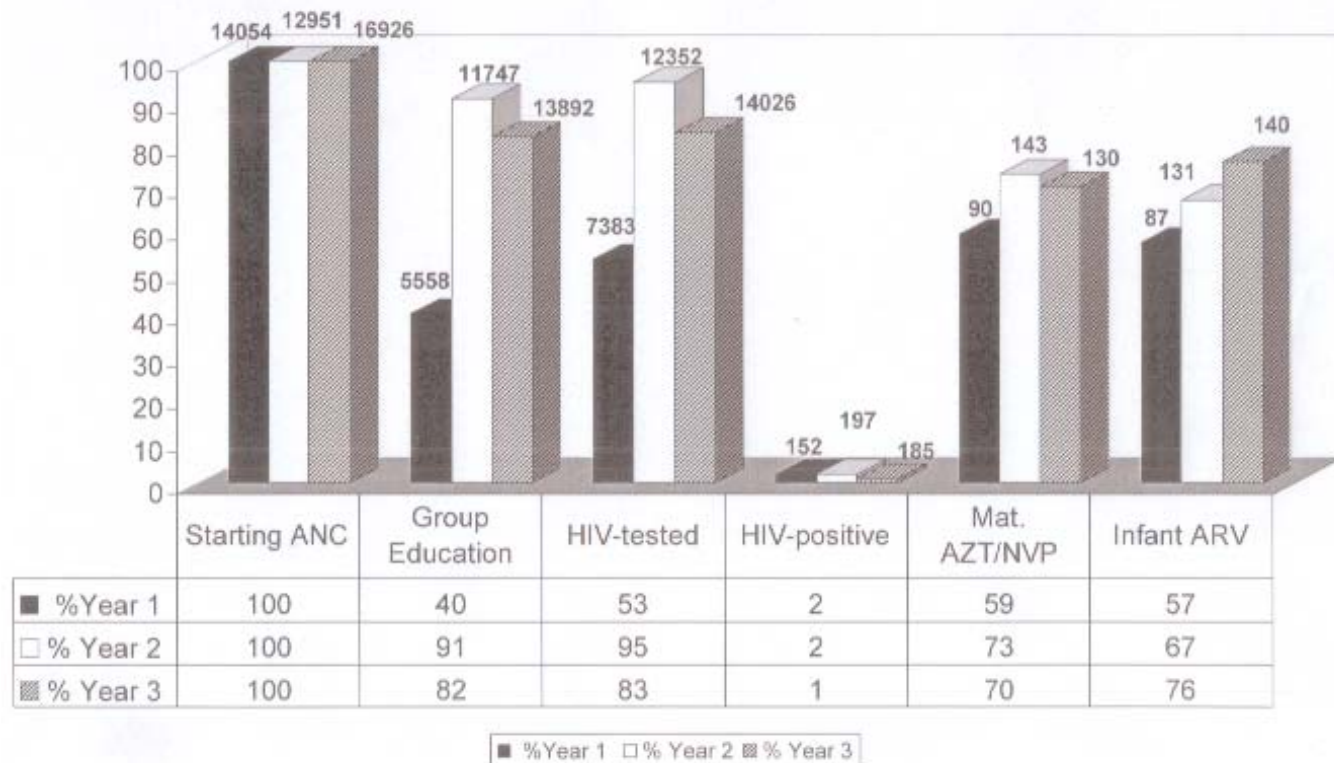


Fig. 1: Efficacy of VCT and ARV prophylaxis in 42 antenatal clinics in Greater Kingston, Jamaica. September 1, 2002 – September 31, 2005; 3 years total.

During the three-year period, improvements occurred in uptake of voluntary counselling (from 40%, to 91%, to 82%) and HIV-testing [from 53%, to 95%, to 83%] (Fig. 1). Five hundred and thirty-four women tested HIV-positive, with seroprevalence rates of 2%, 2% and 1% each year (Fig. 1). These women were managed during pregnancy in three high-risk clinics at the Victoria Jubilee Maternity Hospital, University Hospital of the West Indies and Spanish Town Hospital. The MTCT rate was estimated in infants aged 12–15 months in Greater Kingston, using the public health approach of a modified short course zidovudine regimen or nevirapine. Uptake of zidovudine/nevirapine was 59%, 73% and 70% for the three years, respectively. The estimated MTCT rate in primarily non-breastfed infants aged 12–18 months who had HIV status confirmed by an ELISA test for the Elizabeth Glaser Sponsored programme in Greater

In the era of maternal HAART for pMTCT in Greater Kingston, 25 862 women presented for antenatal care during the two-year period of October 2005 to September 2007 (Fig. 2). Group education was achieved by 83% and 72% in these years. About 102% were HIV-tested in both years, as a few women may have had more than one HIV-positive test in the same pregnancy. HIV seroprevalence was 1% each year. Maternal HAART increased from 71% to 98% while maternal zidovudine/nevirapine declined from 46% to 3% during the period. Infant ARV chemoprophylaxis with nevirapine and/or zidovudine was 101% and 103% both years. Possible explanation for pMTCT rates > 100% in mothers and infants included known HIV-positive repeat pregnancies which may have been unbooked, late presenters and late notification of maternal test results.

Rates of pMTCT were evaluated in the era of HAART for pMTCT in Greater Kingston. Thirty-seven consecutively

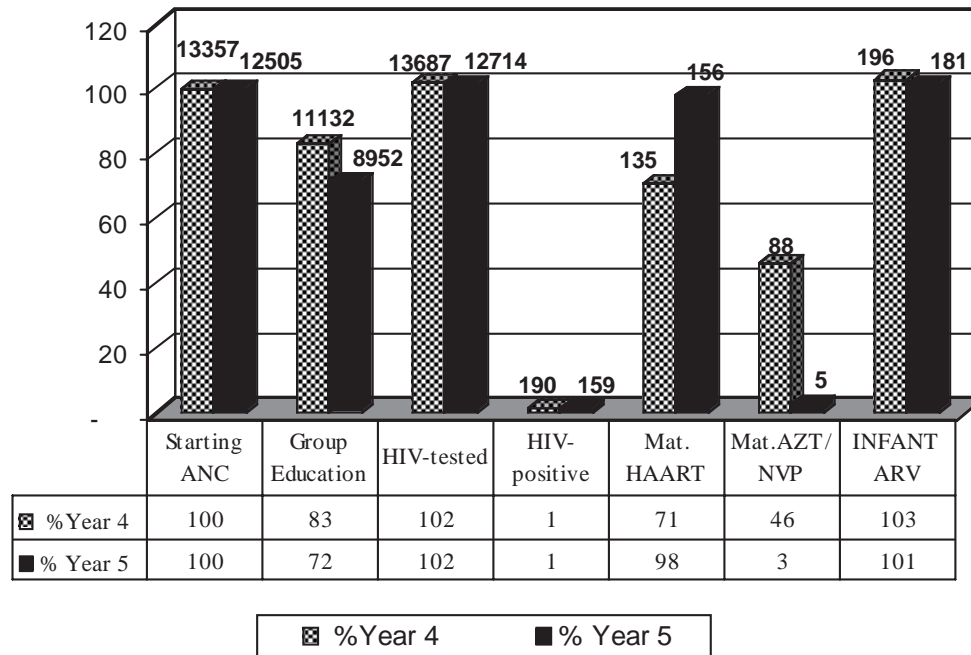


Fig. 2: Efficacy of VCT and HAART in 42 antenatal clinics in Greater Kingston, Jamaica, October 1, 2005 – September 31, 2007.

enrolled women during 2005–2006 received Combivir™ (zidovudine/lamivudine) and nelfinavir for chemoprophylaxis and were followed prospectively at the Victoria Jubilee Maternity Hospital by KPAIDS. These women delivered two stillborn infants. The 35 viable infants received zidovudine and nevirapine and were not breastfed; there was one infant who was HIV-positive by PCR, giving a MTCT rate of 2.8%. During 2007, HAART decreased MTCT to 1.55% (with 3 of 193 PCR tests positive) in infants who were enrolled in KPAIDS. The last case of MTCT with diagnosed paediatric AIDS was made in April 2007 from the KPAIDS programme which operates in Greater Kingston, St Andrew and St Catherine.

Islandwide, in the pre-pMTCT era of 1986 to 2002, HIV seroprevalence in pregnancy was estimated at 0.5% to 1.5% and MTCT rate was 25% (58). During 2002 to 2005, in the pMTCT era, zidovudine and nevirapine reduced islandwide MTCT to 10% (58). Since 2006, HAART (*ie* zidovudine and lamivudine with either nelfinavir or nevirapine) was being used for chemoprophylaxis which targeted about 90% of HIV-infected pregnant women islandwide (19). During 2007, in the era of HAART for chemoprophylaxis, the islandwide pMTCT rate was estimated at 4.75% (with 19/400 qualitative RNA PCR's positive) among infants born to HIV-infected mothers. Since late 2007, through the National AIDS Programme, maternal zidovudine 300 mg/lamivudine 150 mg (combivir™) plus lopinavir 133 mg/ritonavir 33 mg (kaletra™) were commenced islandwide in pregnant HIV-infected women, to prevent MTCT. HIV-exposed infants received nevirapine *stat* and zidovudine for four weeks (69, 70). Breastfeeding of these infants is

strongly discouraged and full replacement feeds are administered. HIV PCR testing is performed twice before six months, with follow-up HIV ELISA at 12–15 months. This programme is expected to further pMTCT throughout Jamaica to the internationally accepted goals of 1–2%.

Paediatric HIV/AIDS treatment and care, 2002–2007

The third objective comprised establishing and leading unified parallel programmes at the four major children's centres in Kingston and St Andrew, and St Catherine for identifying and treating HIV-exposed and HIV-infected infants, children and adolescents, as a model for the rest of the island. Orphaned and vulnerable children (OVCs) with HIV/AIDS who resided in three residential children's homes (orphanages) were also managed by the KPAIDS team. Outcomes of the first year of this programme were reported (24, 26–30). During 2002 to 2007, unified parallel programmes for identifying and treating these children in this region were strengthened. HIV-exposed infants received nevirapine at birth and zidovudine for 4 weeks. Trimethoprim for *Pneumocystis jirovecii* (PCP) prophylaxis, immunizations by national protocols, evaluation of HIV status by RNA PCR and follow-up ELISA testing at 12–18 months as well as full replacement feeds continued. Infants were regularly followed at infectious disease clinics by collaborative multidisciplinary teams, using a predefined protocol at the University Hospital of the West Indies, Spanish Town Hospital, Bustamante Hospital for Children and Comprehensive Health Centre, who implemented protocol-driven case management. Outcome measures included infants' growth, general health, adherence to antiretroviral

and PCP prophylaxis, immunization and nutrition and outcomes documented in a unique collaborative database. Similarly, HIV-infected infants, children and adolescents were followed using protocol-driven guidelines (24, 27–29). During 2002–2007, lymphocyte subsets, HIV viral loads and public access to antiretroviral drugs were made available through a grant from the Global Fund.

During the five-year period of September 2002 to September 2007, 954 paediatric patients (691, 72% HIV-exposed and 263, 28% HIV-infected) were evaluated in four weekly paediatric infectious diseases clinics in Greater Kingston; 52% (136 of 263) of children with HIV/AIDS had CDC category C or severe HIV/AIDS and 84% (222 of 263) of the HIV-infected infants, children and adolescents were commenced on highly active antiretroviral therapy (Table 1). At least 19% (180/954) of the HIV-infected and affected cohort were orphans or had lost one parent. As shown, there was a significant reduction in HIV-attributable morbidity and

mortality throughout this period, with 3.7% (36/954) HIV-attributable mortality overall.

The KPAIDS team members regularly visited and collaborated to establish and maintain several rural outreach sites in Montego Bay (Cornwall Regional Hospital), Mandeville, May Pen, St Ann's Bay, Savanna-la-mar and Black River with local healthcare providers during January 2004 to 2007 (Table 2). Teaching and clinical training of multi-disciplinary members of the healthcare team occurred through "on the ground" preceptorships and patient co-management consultations and discussions. Six hundred and sixteen children were evaluated collaboratively through this programme and 81% (502) were HIV-exposed. Among the 114 children with HIV/AIDS, 68% (77) were commenced on highly active antiretroviral therapy, with only 1.8% (11/616) reported deaths within this cohort, however, these clinics were established after public access to HAART.

Table 1: HIV-infected and HIV-exposed children in Greater Kingston, Jamaica, September 1, 2002 to October. 31, 2007, 5 years total

	UHWI	STH	BHC	CHC	Total
Total	238	309	140	267	954
HIV-exposed	101	275	64	251	691 (72.4%)
HIV+/AIDS	137	34	76	16	263 (27.6%)
N – Asymptomatic	3	0	1	1	5
A – Mildly symptomatic	43	13	10	6	72
B – Moderately symptomatic	18	6	21	5	50
C – Severe symptomatic	73	15	44	4	136
HAART	120	19	74	9	222 (84%)
*Death < 2 yrs./> 2 yrs.	3/9	7/0	9/4	3/1	22/14 (3.7%)
*Orphaned (mother/father/both parents)	98	28	38	16	180 (18.9%)

* Percentage from entire cohort

Death % from total cohort = 3.7 (36/954); Death % from total HIV-infected cohort = 13.7%

Key:

UHWI – University Hospital of the West Indies; STH – Spanish Town Hospital
 BHC – Bustamante Hospital for Children; CHC – Comprehensive Health Centre
 Greater Kingston – Kingston, St Andrew and St Catherine, in Jamaica

Table 2: HIV-infected and HIV-exposed children in outreach clinics, Jamaica

	Cornwall Regional Hospital May 2004 – Oct 2007	Savannah- la-mar Hospital Oct 2005 – Oct. 2007	St Ann's Bay Hospital May 2004 – Oct 07	Mandeville Regional Hospital April 2005 – Oct 2007	May Pen Hospital April 2005 – Oct 2007	Black River Hospital Oct 2007	Total
Total	281	89	139	51	50	6	616
HIV-exposed	220	82	117	38	39	6	502
HIV+ / AIDS	61	7	22	13	11	0	114 (18.5%)
N – Asymptomatic	1	4	2	0	4	0	11
A – Mildly symptomatic	23	1	5	3	2	0	34
B – Moderate	16	1	2	3	0	0	22
C – Severe	21	1	13	7	5	0	47
HAART	43	3	17	10	4	0	77 (68%)
Death < 2 yrs / > 2 yrs.	1/1	0	2/0	3/2	1/1	0/0	11 (1.8%)

Death % from total cohort = 1.8%

Islandwide, 79% (299/377) of children with HIV/AIDS were on treatment with HAART in KPAIDS sites, as of October 31, 2008 (Table 3). Among these, 85% (255) were

impact of the pMTCT programme. The relative increase in 2005 (n = 78) and 2006 (n = 71) was mainly explained by surveillance bias, with increased case finding of mostly older

Table 3: Children with HIV/AIDS, aged 0 – 21 years on HAART enrolled in KPAIDS sites throughout Jamaica and those on 1st, 2nd, 3rd line therapy through October 31, 2007

Treatment sites	Total No. of Children on HAART	Children on 1 st Line therapy	Children on 2 nd Line therapy	Children on 3 rd Line therapy
University Hospital	120	92	26	2
Bustamante Children's	74	68	6	0
Comprehensive Health Centre	9	9	0	0
Spanish Town Hosp	19	19	0	0
Mandeville (MRH)	10	9	1	0
May Pen (MPRH)	4	4	0	0
Black River, St Elizabeth	0	0	0	0
Cornwall Regional	43	35	7	1
Savannah-la-mar	3	3	0	0
St Ann's Bay	17	15	2	0
TOTAL	299	255	41	3
Total HAART/HIV/AIDS	302/377 (79%)			

HAART – Highly active antiretroviral therapy

KPAIDS – Kingston Paediatric and Perinatal HIV/AIDS Programme

on first line therapy, 14% (41) were on second line therapy and 1% (3) were on salvage therapy.

Since the first case of Paediatric AIDS was identified at the University Hospital of the West Indies in 1986 (23), a total of 884 paediatric HIV/AIDS cases have been reported up to December 2007 in national database, with 388 (43%) reported deaths (Fig. 3). The fall in nationally reported cases during 2003 (n = 67) and 2004 (n = 61) reflected the positive

children who were missed perinatally, long-term “healthy” non-progressors with mostly adenopathy and skin lesions, now being identified by astutely trained paediatricians in our programme (58). Recent trends in mortality rates have also fallen significantly (18% – 13/73 in 2006 and 20% – 9/44 in 2007) reflecting the impact of HAART in prolonging and improving quality of life in HIV-infected children (Fig. 3).

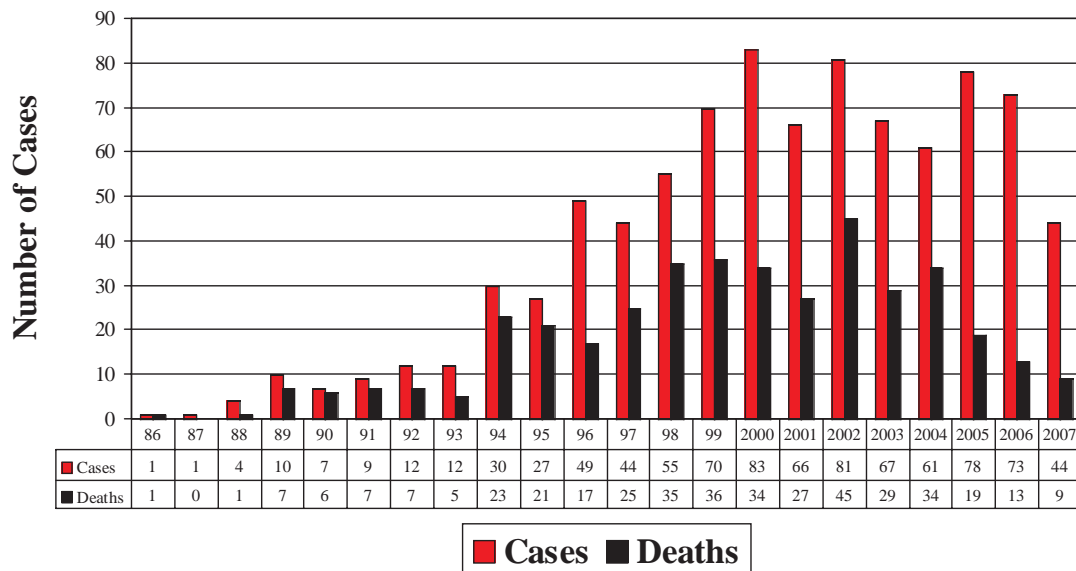


Fig. 3: Reported paediatric AIDS cases and deaths (1986–2007) – Ministry of Health, Jamaica.

Outcomes Research, 2002–2007

The fourth objective comprised peer-reviewed outcomes-based research in preparation for commencing interventional studies. The KPAIDS team built its outcomes-based research capacity and implemented the infrastructure for participation in clinical trials. The first year's work of this team was recently published in a dedicated issue of the *West Indian Medical Journal* (24–36). In this issue of the Journal, the collaborative efforts of the team are again emphasized (37–56). Professor Figueroa, Director of Jamaica's National AIDS Programme, anchors the issue with an update of HIV/AIDS in the Caribbean (37). Christie *et al* reports on the highlights of the effectiveness of the programme in reducing MTCT of HIV/AIDS and improving morbidity and mortality of children with HIV/AIDS while strengthening collaboration, research as well as local, regional and international outreach (38). Johnson *et al* showed that HAART-based pMTCT regimens in pregnant women gave the best outcomes for the mother (39). Pierre *et al* showed that uptake of HAART was significantly associated with reduced mortality, hospitalizations and infectious diseases morbidity in HIV-infected children and adolescents (40). White *et al* reported that adherence to HAART in children was 86% overall and correlated with immune reconstitution while non-adherence was significantly associated with older age of child, missing clinic appointments and nausea (41). Pryce *et al* commented that first line antiretroviral drugs were generally safe and well-tolerated in Jamaican children with few serious adverse events (42). Steel-Duncan *et al* described a 17% incidence of urinary tract infections in HIV-infected children, primarily with *E coli*, *Streptococcus gp D* and *Klebsiella pneumoniae* and emphasized the occurrence of indinavir-associated haematuria and HIV nephropathy (43). Barrett *et al* reported the absence of opportunistic intestinal parasites in institutionalized, HIV-infected, immune-reconstituted children who were receiving cotrimoxazole prophylaxis (44). Harrison *et al* reported on the "healthy" population of adolescent slow-progressors who acquired HIV by MTCT and stressed the importance of implementing healthy lifestyle behaviours (45). Evans-Gilbert *et al* reported that HAART reduced the mortality and prolonged survival for HIV-infected children who were rapid-progressors, had AIDS-defining illnesses and were orphans (46).

Moore *et al* proved that voluntary counselling and testing was an important intervention that enabled an improvement in the awareness, prevention and control of HIV in Jamaican pregnant women, with trained nurses as the counsellors (47). Among psychosocial studies, Weller *et al* reported the negative emotional experiences that HIV-infected women experienced in the perinatal period and recommended appropriate training of religious leaders and health-care providers to better respond to these psychosocial needs (48). Hylton-Kong *et al* compared quantitative outputs of contact investigation, such as time to interview, percentage of

contacts located and tested in urban and rural settings (49). Pilgrim *et al* showed that the majority of HIV-positive adolescents are cared for by family, despite knowledge of the adolescent's status and in the face of potential stigma (50). An invited article from the National AIDS Programme by Harvey *et al* detailed evaluation of adherence to HAART in adults who were unemployed, poor and with limited education, recommending the implementation of educational methods aimed at low literacy HIV-infected populations (51).

Among case series, Singh-Minott *et al* commented on public health, clinical and laboratory challenges in successfully managing a child with HIV/AIDS and isoniazid-resistant *M tuberculosis* with widespread dissemination (52). Dunkley-Thompson *et al* reported a series of infants with immune reconstitution following HAART and BCG vaccination with adenitis (53). Lowe *et al* stated the intensified psychological impact when HIV infection resulted from sexual assault as opposed to other methods of transmission and conveyed the positive role of psychosocial interventions (54).

Billings discussed the potential dangers of unsafe tattooing practices and suggested guidelines for regulating the tattooing industry in Jamaica (55). The specially-invited and final article by Brissett and Griffiths-Irving reported on increasing the awareness of HIV/AIDS in Jamaican children through a novel strategy of implementing an islandwide debating competition in the schools (56).

Awards and Honours

These research articles demonstrate that KPAIDS team garnered experience in outcomes-based research relating to HIV/AIDS in women, infants, children and adolescents. The KPAIDS won the Principal's Research Award for Most Outstanding Research Project in the Faculty of Medical Sciences of the University of the West Indies for 2006. This work also contributed to the award of the University Vice Chancellor's Award for Excellence in Research for the year 2008. These paediatric and perinatal HIV research initiatives along with the experience gained in the recent rotavirus vaccine mega-trial (which enrolled 1805 subjects from Jamaica and which won the Lancet's Paper of the Year Award for 2006 for the best original medical research worldwide) has placed this team in good stead for participation in HIV clinical trials of drugs and vaccines (71–76). A KPAIDS team member was also elected to the Governing Council for the International AIDS Society representing Latin America and the Caribbean.

Outreach and Collaboration, 2002–2007: The fifth and final objective comprised programme expansion throughout Jamaica, as well as, collaboration, regionally and internationally. The first year's collaborative accomplishments were reported. Since then, our strongest collaborator has remained the Jamaican Ministry of Health. KPAIDS established several outreach sites for the treatment of HIV-exposed and

HIV-infected infants, children and adolescents in several regional hospital sites (Tables 2 and 3). We also continued collaboration regionally and internationally. The Bill Clinton Foundation augmented our paediatric HIV/AIDS initiatives through the Ministry of Health and KPAIDS to improve infant diagnostics and mobilize access to paediatric HAART. The KPAIDS Programme negotiated a subcontract with the WESTAT/National Institutes of Child Health and Human Development and joined their Paediatric and Perinatal HIV/AIDS Observational Research Cohorts in Latin America and the Caribbean (N01-HD-3-3345). We collaborated with Harvard University for over five years to evaluate the HIV specific neonatal immune responses as a basis for an appropriate neonatal HIV vaccine (36, 63–65). This collaboration recently received external research funding from awards to Dr Margaret A Feeney from the Elizabeth Glaser Paediatric AIDS Foundation, the Jeweler's for Children of America and the United States' National Institutes of Health (1R01AI068497-01A2). The Global Fund for AIDS, TB and Malaria's continued support to Jamaica's Paediatric and Perinatal HIV/AIDS programme providing antiretroviral drugs and diagnostics, including immunological tests, HIV viral loads and infant PCRs to year 2013.

Advocacy: International advocacy has been performed by KPAIDS programme at several levels. One of our HIV-infected mother-child pairs, participated in several speaker forums on many international forefronts. These included a unique United States Congressional Briefing and press conference, sponsored by Senators Hillary Clinton and Richard Lugar in the Senate Building on Capitol Hill in 2006 (66). Another was a Jeweler's for Children of America Gala and Awards Banquet in Las Vegas, USA, with over 2200 participants in 2007 (65). This nine-year old patient was also the youngest delegate and speaker at the Commonwealth Health Ministers' Conference in Geneva, Switzerland, in 2007. Finally, KPAIDS actively participated at a "Commitment to Children" press briefing on a World AIDS Day luncheon, on Capitol Hill, in 2004 (67).

Challenges, Opportunities and Successes

The challenges and opportunities that the programme has encountered are discussed (24–56). The greatest challenge continues to be the socio-economic factors that fuel the epidemic in Jamaica. We must address the psychosocial issues of orphans and vulnerable children, women and their families. Repeat pregnancies (30–40%), continued stigma and discrimination and the lack of empowerment of vulnerable women and their families deserve special mention (61). The lack of socio-economic and vocational opportunities create an uncertain future for orphaned and vulnerable children who are institutionalized; on attaining the age of 18 years they are required to leave these homes, inadequately prepared to take their place in society. Better programmes must be developed to enable a more successful transition of

these HIV-infected children into adolescence and adulthood. This provides a unique opportunity to fully embrace these issues in daily interactions with the women and address the education of children who are wards of the state. Physical factors, such as demographics and trying to locate known infected patients and HIV-exposed infants who are lost to follow-up and also to identify newly infected mothers and children who live in remote areas of the country continue to be problematic. Follow-up programmes must be ensured for all HIV-exposed infants to enable appropriate HIV diagnosis and treatment. We still need to provide access to all for initiatives to pMTCT of HIV/AIDS, especially the "late presenters". This could be accomplished by ensuring universal access to voluntary counselling, testing and chemoprophylaxis to late presenters on the labour ward. Identification of the "missed population" of perinatally HIV-infected, "healthy" adolescent "slow progressors" continues to be challenging (58). These relatively healthy teens may be ignorant of their status, becoming sexually active and should be identified to facilitate appropriate treatment and care. Unavailability of appropriate paediatric drug formulations is an issue that must also be addressed although this challenge is not unique to Jamaica (76). This is a pressing issue to address considering the increased population of children and adolescents who now require second line antiretrovirals and salvage therapy.

Notwithstanding, the Paediatric and Perinatal HIV/AIDS Leadership Initiative in the Greater Kingston metropolitan region of Jamaica achieved its objectives and implemented a successful five-point plan. This comprised leadership, mentoring and training of a large diverse team of healthcare professionals, including paediatricians, nurses and obstetricians who care for HIV-infected pregnant women, infants, children and families as a model for Jamaica. A programme for pMTCT of HIV and maternal care was implemented. The greatest success has been the marked decline in new cases of infected infants because of a successful pMTCT programme which included PCR testing in infancy in Greater Kingston and also throughout the island. A strong collaborative programme was implemented for paediatric treatment and care with increased public access to HAART with improved safety profile and acceptable adherence rates and subsequent immune-reconstitution. This led to improved growth, significantly reduced hospitalizations, infection-related morbidity and mortality in the children. A successful outcomes-based research programme was implemented (24–64). Collaboration and outreach was achieved, locally, regionally and internationally. Working together, the team's mission of pMTCT of HIV/AIDS and improving the quality of life for those already living and affected by HIV/AIDS is being achieved throughout Jamaica.

The ultimate goals include the elimination of MTCT HIV in Jamaica, with no new cases of paediatric HIV/AIDS, the successful transition of the current cohort of infected children into adult care and treatment and a future for them

that includes leading normal lives by completing college education and/or vocational training, obtaining gainful employment, having their own families, owning their own homes and becoming contributing members of the society.

Finally, we remain sincerely grateful and appreciative to Elizabeth Glaser Paediatric AIDS Foundation (EGPAF) for the unique opportunity to serve Jamaica while joining them in achieving their mission of “*preventing and eliminating the spread of HIV/AIDS through innovative research programmes, collaborative training initiatives, expansive advocacy efforts and rapidly-expanding international programmes.*”

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