
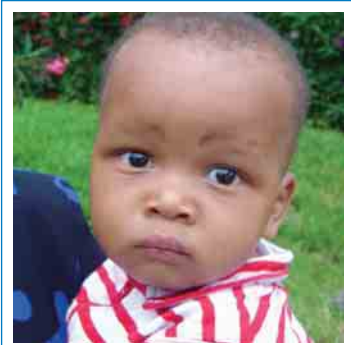





Selected Abstracts on Pediatric HIV/AIDS



from the
XV International AIDS Conference
Bangkok, Thailand

July 11–16, 2004



Prepared by the Quality Assurance Project,
University Research Co., LLC (QAP/URC)

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INTRODUCTION

The XV International AIDS Conference (IAC), held in Bangkok, Thailand, July 11-16, 2004, produced abstracts of work related to children, including adolescents, infected with HIV and AIDS. The area of treatment and care of pediatric HIV/AIDS is still in early development and not well understood in the context of limited-resource settings. QAP has created a compilation of selected abstracts for the USAID Quality Assurance Project in order to add to the understanding of the emerging problem by providing evidence and insights from programs and organizations working in this field, to facilitate further research, and to provide a basis for future policy and program development. Although these abstracts have each been assigned to one thematic category, many also address other aspects. The reader may find abstracts relevant to a particular area of interest listed under a different theme; the table of contents will assist in finding other abstracts of potential interest.

The abstracts are the intellectual property of the International AIDS Society (IAS) and are reproduced here solely to enhance access to relevant information about pediatric AIDS. Readers are encouraged to visit the IAC website at <http://www.aids2004.org>, where all conference abstracts are available for review.

These abstracts, along with other sources of information, are being utilized to prepare an issues paper on experiences in treatment and care of HIV/AIDS in resource-limited settings, especially in the developing world. We request, therefore, that you send comments and suggestions to: Stephen Kinoti, Senior Quality Assurance Officer (e-mail: skinoti@urc-chs.com).

Acknowledgements: This compilation was prepared by Stephen Kinoti, M.D., Senior Quality Assurance Advisor, and Marie Hoffman, Quality Analyst/Intern. The Quality Assurance Project (QAP) is funded by the U.S. Agency for International Development (USAID), under Contract Number GPH-C-00-00004-00.

Diagnosis of Pediatric HIV/AIDS

Intervention and solutions modeled by an NGO for the HIV/AIDS epidemic in the Colombian Caribbean

By: *G B D Garcia Burgos¹, M B V Manjarrés¹, L V M Larrotta¹, N C D Noriega¹, F S Fragozo¹, Y T G Yancen¹, H L A Haag², M C Mora²*

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Issues: A comprehensive health service in the Caribbean Region of Colombia covers less than 35% of the population whose basic needs are unmet. The existence of HIV prevention programs is low. Early diagnosis is not considered a priority. Both sexual and mother to child transmissions of HIV are important avenues by which the epidemic is spreading.

Description: The François Xavier Bagnoud Foundation in Colombia has been providing access to comprehensive care and treatment (including nutritional, medical, and psychosocial) for HIV infected children and psychosocial support for their families in Barranquilla and surrounding areas since 1995. FXB Colombia also conducts workshops for adolescents, pregnant women, and the community at large on HIV prevention. Additionally, FXB Colombia conducts regular training workshops for health care providers in the diagnosis, care, treatment and support of HIV infected children. From July 2002 to June 2003, 1,796 members from the community received counseling and education on HIV prevention. Two hundred and sixty two health care providers were trained on the management of HIV pediatric patients and HIV pregnant mothers. 59 children living with HIV/AIDS received direct care, treatment and support at the Foundation and 57 families benefited from the program.

Lesson Learned: Programs such as those implemented by FXB Colombia are in great demand in other areas of the Colombian Caribbean and should target those who are most vulnerable to HIV, namely women and children. **Recommendations:** In order to limit the spread of HIV in the Colombian Caribbean, government officials should have the political will to commit more resources to fight the spread of HIV among the general population and to offer access to care and treatment to those already infected and affected by this epidemic.

Impact of early diagnosis and free access to HAART for perinatally acquired AIDS, Sao Paulo, Brazil

By: *L H Matida¹, J E Moncau², R C M Succi², D Barreira³, A O Kalichman¹, L F Marcopito²*

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³National Program of STD/AIDS, Brasilia, Brazil

Introduction: Sao Paulo (SP) was the first State of Brazil to have a program for STD/AIDS (1983). This program provide universal access to free assistance, including prevention, diagnosis and treatment (HAART) for AIDS patients. SP State have the largest number of pediatric AIDS cases in Brazil. This study examined changes in a representative sample of perinatally acquired AIDS cases of SP State. Methods: Cohort analytical study with secondary data.

Setting: State of SP, Brazil. Entered the study: 855 children (younger than 13 years) with AIDS listed in the State AIDS registry with year of diagnosis between 1983 and 1998. Medical record reviews: between May 2000 and January 2002, to established dates of access to diagnosis and treatment; 192 children were right-censored. Statistical methods: Kaplan Meier and Cox.

Results: The median time from birth until diagnosis decreased from 52,6 months for those born in 1983 and earlier, to 4,7 months for those born in 1998 ($p=0,0000$). Median survival time was 92,3 months (IC 95%: 75,9 – 131,8 months) between the children with access to HAART and 75% of children diagnosed in 1997 and 1998 were still alive after 4 years of follow-up.

Conclusion: In Sao Paulo State, the improvement in diagnosis and treatment facilities have made a great difference in the survival of children with perinatally acquired AIDS.

Pro-Viral HIV-1 DNA PCR test for HIV Diagnosis in Infants

By: *A R Enzama, P Mugenyi, C Kityo*

Joint Clinical Research Centre, Kampala, Uganda

Background; The diagnosis of HIV-1 infection in neonates born to sero positive mothers presents two major dilemmas; the presence of maternal antibodies that preclude the use of serological tests, and the difficulty or impossibility of obtaining large volumes of blood for culture.

Objectives; To evaluate a reliable method that uses small volumes of whole blood to diagnose HIV-1 in infants, as a surrogate serological test. To monitor the rate of Pediatric sero-conversion due to breastfeeding.

Method; Between July 2001 and January 2003 whole blood samples drawn from babies at birth, week 4, week 6, month 3 and month 6 were tested at the Joint clinical Research Centre Laboratories. Two aliquots of cell pellet were prepared from 200ul of blood from each draw and plasma separated for storage. Qualitative HIV-1 DNA PCR was performed on one pellet at each visit to determine the presence of HIV-1 Pro-viral DNA. Where there was a positive DNA test the second pellet was assayed in duplicate and if still positive RNA PCR was done on the stored plasma to determine the viral load. If the viral load was above 400 copies/ml, HIV-1 ELISA was performed on the respective plasma to determine the presence of antibodies to HIV due to active immunity.

Result A negative DNA test at birth meant the baby was not HIV infected. A Positive DNA test with negative ELISA and Viral load <400 copies/ml indicated HIV infection. Subsequent DNA tests were used to determine sero-conversion.

HIV-1 infection of human brain-derived neural progenitor cells

By: *D M P Lawrence, L Schwartz, P Seth, L Durham, E O Major, M Nunn*

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Background: HIV-1 infected adults and children may develop CNS disease, but clinical and pathologic manifestations differ. Microglial cells are productively infected in both, but up to 20% of pediatric subcortical astrocytes may also contain virus, a finding not reported in adults. To investigate this observation, we examined archival HIV-1 pediatric brain, and tested infection of neural progenitors and progenitor-derived astrocytes in a unique culture system derived from human fetal brain. **Methods:** Periventricular tissue was tested for HIV-1 mRNA by in situ hybridization, and for p24 and nestin expression by immunohistochemistry. Cultures of undifferentiated nestin (+) progenitors and progenitor-derived GFAP (+) astrocytes were infected with HIV-1 strains IIIB and PNL4-3, or transfected with pNL4-3 DNA. Supernatant p24 was measured by ELISA. Immunofluorescence for GFAP, nestin and p24 was assessed by confocal

microscopy. p24 production was determined in infected progenitors and astrocytes, cells exposed to TNF-alpha, and in astrocytes differentiated from progenitors immediately after transfection.

Results: Regional colocalization of HIV-1 mRNA and p24 protein with nestin was seen in periventricular tissue. Neural progenitors in culture were successfully infected, or transfected with HIV-1. Differentiation of transfected progenitors towards an astrocytic phenotype increased virus production 5--fold. TNF-alpha stimulated virus production in both populations. **Conclusions:** Nestin-rich periventricular tissue may harbor HIV-1. In vitro studies support the possibility that human neural progenitor cells can be infected with HIV-1. Differentiation into an astrocytic phenotype is associated with higher viral titer, as is stimulation with TNF-alpha. Progenitor cells may be an additional reservoir of HIV-1 in the pediatric brain.

Is Total Lymphocyte count a good predictor of CD4 count in HIV infected children?

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Background: Total lymphocyte count (TLC) has been proposed as an alternative to CD4 counts in resource-constrained settings. However, most reported studies are in adults and its utility in pediatric age group has not been documented. Our aim was to study the sensitivity and specificity of this approach in classifying HIV-infected children into immune categories for clinical management.

Methods: Blood samples were collected from HIV-infected children under follow up at the Institute of Child Health and Tuberculosis Research Centre, Chennai. Total lymphocyte count was measured using an automated hematology counter and CD4 counts by flow cytometry. ROC curves were plotted and appropriate cut-offs determined for CD4 counts of <200 cells/mm³ and <500 cells/mm³ in children of age group 6–12 years and for CD4 counts <500 cells/mm³ and <1000 cells/mm³ in children of age groups 1–5 years based on sensitivity, specificity, PPV and NPV. Regression analysis was also done to predict CD4 count from the TLC. Both methods were compared with direct measurement of CD4 counts.

Results: The Pearson's correlation coefficient for TLC and CD4 count in children of age group 1–5 years was 0.571 (p<0.01) and in age group 6–12 years it was 0.747 (p<0.01). The appropriate TLC cut-offs for CD4 values of 200 cells/mm³ and 500 cells/mm³ in age group 6–12 years were 2400 cells/mm³ and 3000 cells/mm³ respectively. In the age group of 1–5 years, the appropriate TLC cut-offs for CD4 counts of 500 cells/mm³ and 1000 cells/mm³ were 3800 cells/mm³ and 4700 cells/mm³. Only about half the subjects were placed under the correct immune category by either of the methods.

Conclusion: Even though the correlation between TLC and CD4 counts is good, TLC is not a perfect surrogate marker for CD4 counts, in HIV-infected children and results in considerable misclassification. Better methods are required for young children.

Non-AIDS HIV-related symptoms

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Background: The incidence of pediatric AIDS has declined dramatically nationwide due to potent combination antiretroviral treatment and reduction of perinatal HIV transmission. We report on trends in non-AIDS HIV-related symptoms (HSXs) among HIV-infected children and adolescents reported to the Pediatric Spectrum of HIV Disease (PSD) project. **Methods:** CDC has collected data on pediatric HIV infection since 1989 as part of PSD. Data are collected from 6 sites nationally on standardized forms at baseline when a child is evaluated for HIV and then prospectively every 6 months for the occurrence of 31 HSXs. Only one occurrence of each HSX type is counted for every 6 month period in this analysis. **Results:** Of the 31 HSXs examined, 9 accounted for 83% of the total symptoms reported from 1990-2001: anemia, recurrent oral candidiasis, dermatitis, recurrent otitis media, splenomegaly, failure to thrive, failure to progress (each 5-9%), hepatomegaly (10%) and lymphadenopathy (26%). The proportion of HIV-infected children with HSXs declined 38% (87% to 54%) between 1994 and 2001 compared to an increase of 2% (85% to 87%) between 1990 and 1994. Mean number of HSXs per child for both those with and without AIDS declined from a high of 5.1 in 1993 to 1.7 in 2001.

	Year								
	'90	'92	'94	'96	'97	'98	'99	'00	'01
No. Children:	1167	1882	2467	2523	2402	2331	2226	2172	2101
No. with HSXs:	994	1612	2143	1983	1801	1544	1480	1272	1136
(%)	(85)	(86)	(87)	(79)	(75)	(66)	(66)	(59)	(54)
Mean # HSXs per child:									
AIDS	6.8	6.6	6.9	5.0	4.1	3.0	2.8	2.2	1.9
Non-AIDS	3.3	3.6	3.6	2.6	2.3	1.8	1.7	1.4	1.2
Total	4.9	4.7	4.8	3.5	2.9	2.2	2.1	2.1	1.7

All HSXs declined over time except lymphadenopathy which occurred in 44% of those with HSXs in 1990 and 43% in 2001. **Conclusions:** The occurrence of HIV-related non-AIDS HSXs declined after 1994 most likely due to combination therapy. The greatest decline was seen after 1997 when highly active combination treatment was introduced and the decline continued through 2001. It is important to continue monitoring the incidence of HSXs as this population ages into adolescence to determine whether these trends change with adolescents perhaps becoming less adherent to treatment.

Successful enrollment of infants and children with HIV in the MTCT-Plus Initiative

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MTCT-Plus Initiative at Columbia University Mailman School of Public Health, New York, United States

Background: Development of programs that provide HIV care for HIV-infected persons in less developed countries (LDC) is a key global priority. However, few programs have addressed the needs of infants and children. **Methods:** The MTCT-Plus Initiative established 12 programs in 8 African countries & in Thailand. Programs enroll HIV-infected index women (IW) identified through programs for prevention of mother to child transmission (pMTCT) & their children and partners in family-focused care. HIV exposed infants of IW, siblings and pediatric household

members (HM) are eligible for enrollment. Pediatric care includes standardized protocols for early infant diagnosis (EDx), PCP prophylaxis, CD4 monitoring, antiretroviral therapy (ART), TB diagnosis and management, adherence & psychosocial support. EDx with DNA/RNA PCR aims to identify infected infants in first months of life. ART eligibility includes: CD4<20% for infants, <15% for children > 12 months, failure-to-thrive, AIDS and severe complications.

Results: 634 children were enrolled from Feb to Nov 2003: 581 infants, 49 siblings, 4 HM. 48/581 exposed infants have been confirmed with HIV. Of 98 infected children: 12% asymptomatic, 30% WHO I/CDC A, 30% WHO II/CDC B, 28% WHO III/CDC C; 30% have no immune suppression (CDC1), 31% moderate (CDC2), 39% advanced (CDC3). 35 infected children currently receive ART & 94% were reported to have taken all doses within the previous 7 days. 49% of all children receive PCP prophylaxis. Eight infants have died, none known to be infected. **Conclusions:** MTCT-Plus has successfully enrolled HIV-exposed and infected children in a family-focused care and treatment program. Early infant diagnosis, comprehensive HIV care and ART are feasible, despite the complexity, in LCD.

Estimation of the Rate of Mother To Child Transmission of HIV in Nigeria

By: *R A Audu¹, O B Salu¹, A Z Musa¹, J Onyewuche¹, E O Funso-Adebayo¹, E O Iroha², V C Ezeaka², I M O Adetifa², B Okoeguale³, E O Idigbe¹*

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Background: Definitive diagnosis of HIV infection in infants <18 months of age who were born to HIV-infected mothers is still posing some difficulty in Nigeria and other developing countries. Within this age definitive diagnosis can only be carried out by antigen based techniques which are indeed not available in these developing countries. This has resulted in the absence of authoritative data on the rate of mother-to-child transmission in these countries, Nigeria inclusive. The present pilot study was therefore carried out to generate some information on the rate of mother to child transmission in Nigeria using the PCR technique. **Methods:** Plasma samples were obtained from 68 children of both sexes less than 18 months of age and who were born to HIV infected mothers. The samples were collected from two pediatric departments, in Lagos and in Benin. The presence HIV I RNA in each of the samples, was determined using the Amplicor Monitor V.1.5 technique (Roche Diagnostics). **Results:** Data showed that HIV-I RNA was detected in 15 of the 68 samples tested. This gave an HIV-I RNA detection rate of 22%.

Conclusion: The overall data indicated that only 22% of the children tested had transmission of the virus from their mothers. The 22% transmission rate recorded in this study is close to the range of 25 to 35% that has been reported in several developed and a few developing countries. A more nationwide study will still be needed to actually determine the National mother to child transmission rate in Nigeria.

HIV notification policies to encourage testing and decrease discrimination

By: *C M Schocken*

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Issues: Voluntary Counseling and Testing (VCT) programs are rapidly expanding. While the benefits of VCT are widely known, there are potential downsides. As VCT becomes more available, employers are able to test employees or job applicants, schools can test students or applicants, and religious leaders opt to test members before performing marriages or other rituals. This information may be used to prevent people living with HIV/AIDS from participating fully in

civic life.

Description: This paper will review country approaches to HIV testing confidentiality issues. It will review policies and guidelines adopted by various countries, as well as recommendations made by NGOs, academic institutions, and international organizations. Rwanda, which is developing a national policy on the use of HIV test results, will be used as a case study. The paper takes a primarily legal approach in discussing national policies, but will consider the sociological, political, economic and civil rights implications of these policies.

Lessons Learned: Comparing policies and approaches across different countries and regions will show the best policies for HIV test notification. This includes finding ways to prevent discrimination, while making sure that testing is available and encouraged. Some ideas discussed in the paper are: providing HIV test results orally versus on paper, preventing test results from leaving the health center; specific issues related to couples counseling and pediatric HIV cases; and limited situations where employers, care-givers or others may need to have access to test results.

Recommendations: The paper makes recommendations on the best policies to mediate the tension between encouraging testing and ensuring that tests are not used to discriminate. It recommends that national or local government policies be implemented and monitored for compliance.

Perinatal HIV Infection can be reasonably excluded at three months of age with HIV-1

DNA PCR in NYC

By: *R Murphy¹, V Peters¹, B Gill¹, K Dominguez², P Thomas¹, J Weedon¹, K L Liu¹, E Handelsman³*

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Background: The 1999 CDC HIV surveillance case definition requires at least two negative virologic HIV tests (e.g. DNA PCR) of which one is done at > 4 months of age, and no positive results, to exclude infection in HIV-exposed infants. We examined the negative predictive value (NPV) of DNA PCR tests and the positive predictive value (PPV) of the first DNA PCR test among definitively uninfected (DUI) and definitively HIV-infected (DI) infants during different intervals in the first 4 months of life. The PPV and NPV assist in ruling in or out disease, respectively.

Methods: Data were abstracted from medical records of infants born 1997-2001 from 22 NYC sites in CDC's Pediatric HIV/AIDS Surveillance and the Pediatric Spectrum of HIV Disease Projects. We included DUI children with at least one DNA PCR test in three time periods after birth (0-42, 43-120 and >120 days) and all DI children with a test in the first 42 days. The gold standard for infection was the 1999 CDC definition.

Results: There were 1,815 perinatally HIV-exposed infants (231 DI and 1,584 DUI) of whom 101 DI and 694 DUI infants had PCRs in the defined time periods.

Age at DNA PCR Test	True Negative	False Negative	NPV (%)	95% C.I.	True Positive	False Positive	PPV (%)	95% C.I.
≤42 days	694	47	93.7	92.5-94.8	80	0	100.0	97.0-100
43-120 days	694	11	98.4	97.2-99.6	21	1	95.5	89.7-100
>120 days	694	0	100.0	98.8-100	—	1	—	—

NPV increased with each subsequent time interval and was 100% at greater than 120 days. Although 58 false negatives occurred in the first two time intervals prior to 120 days, none occurred after 74 days of life. PPV was 95.5-100% in the first two time intervals with one of two false positive tests occurring as late as the third time interval (greater than 120 days). All 101 DI children tested positive by 120 days.

Conclusion: Because no DI infants had a negative DNA PCR test after 74 days it would have been possible to rule out HIV in all exposed uninfected children with a negative DNA PCR at >3 months of life. The current CDC case definition requiring at least one of the two negative DNA PCR tests to be conducted at >4 months should be re-evaluated.

Pediatric HIV-screening at the level of an African district hospital: An exploratory study

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Background: Phlebotomy and HIV-testing in children at the district hospital level remain complicated in many aspects. Alternative tests and strategies would facilitate optimization of care and scaling up of antiretroviral therapy. **Methods:** Venous and capillar phlebotomies were performed on 941 Congolese children, aged 1 month to 12 years old, for a cross-sectional study. 153 of these children were below 18 months old versus 788 children above 18 months. HIV-prevalence rate was 4,68%. PCR and EIA were used as references and confirmed by viral loads (range: 3,28 -7,19 log copies/ml) in case of HIV-infection. **Results:** The algorithm for children above 18 months, using serial rapid tests (determine, instant screen and unigold) on capillar blood stored in EDTA-tubes, had a sensitivity of 100% (95%CI: 88,97-100%) and a specificity of 100% (95%CI: 99,50-100%). The sensitivity of the hypersensitive p-24 Ag-test was 92,31% (95%CI:66,69-98,63%) and 100% (95%CI:56,55-100%) when performed on venous plasma (n=150) versus capillar plasma stored on filter paper (n=87). The specificity was 100% in both cases (95%CI:97,27-100% and 95%CI: 95,52-100% respectively). No needle stick injuries were reported. 89,65% of the children below 18 months and 94,42% of the older children could be correctly diagnosed with only one determine test. **Conclusion:** An algorithm of rapid tests performed on capillar blood provided equivalent results to serial EIA. Use of glucolets instead of syringes and needles may reduce pain and the risk of needle stick injuries at a comparable cost. The results suggest that the hypersensitive p-24 Ag-test can be performed with plasma obtained by finger prick and stored on filter paper. This could simplify transport of samples and facilitate future research, as blood for PCR can be stored on the same card. Although this study population had low HIV-prevalence, the results point to under-utilized opportunities to exclude pediatric HIV.

A pediatric and perinatal HIV/AIDS leadership initiative in Greater Kingston, Jamaica - funded by an international leadership award from the Elizabeth Glaser Pediatric AIDS Foundation, 1-ILA-11-01 (CDCC)

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Background: In Jamaica 1-2% of pregnant women are HIV-positive; 876 HIV-positive pregnant women will deliver and at least 283 newly infected HIV-infected infants will be born this year; HIV/AIDS is now the leading cause of death in children aged 1-4 years. **Methods:** We describe a

collaborative "Town and Gown" program to address the pediatric and perinatal HIV epidemic in Kingston. A team of academic and government healthcare personnel, comprising pediatricians, obstetricians, public health practitioners, nurses, microbiologists, data management and information technology personnel collaborated to address this public health emergency using protocol-driven methods.

Results: A five-point plan is being implemented. This comprised leadership and training of a core group of pediatric/perinatal HIV professionals to serve Kingston and be a model for the rest of Jamaica. We are preventing mother-to-child transmission of HIV/AIDS by counseling and HIV-testing women in the antenatal clinics and the three major maternity centers, giving AZT to HIV+ pregnant women beginning at 28 weeks gestation, throughout labor and to the HIV-exposed infants for the first six weeks of life. We have developed and implemented a unified parallel program for identifying the HIV-infected infant and delivering pediatric HIV care at the three major pediatric centers. We are HIV-testing about 30,000 pregnant women, identifying 600 HIV-exposed babies and preventing 140 pediatric HIV infections in three years. We are building research capacity which emphasizes a strong outcomes-based research agenda. This includes pMTCT, natural history of pediatric HIV, initiation of anti-retroviral therapy, adherence to therapy, cost-effectiveness of interventions and implementation of clinical trials. We are collaborating locally, regionally and internationally.

Conclusion: Together, we can continue to achieve our mission of reducing mother-to-child transmission of HIV/AIDS, while improving the quality of life for those women, children and families who are already living and affected by HIV/AIDS.

ARV Treatment of Children with HIV/AIDS: Dose, Adherence, and Tolerance

Antiretroviral therapy for children in Thailand

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Background: HIV-infected children in Thailand have limited access to care and treatment. A replicable model for providing antiretroviral therapy (ART) within hospitals is required to provide holistic care to these children. We describe our experience with initiating such an approach in a provincial hospital in Thailand.

Methods: Pediatric ART was integrated within out-patient services of the hospital. The main aspects of this approach included extensive counseling as well as adherence support for children and caretakers through nurses and PLWAs who also made regular home visits and used child friendly tools. Special attention was paid to the diagnosis and treatment of opportunistic infections before starting antiretroviral drugs. Antiretroviral drugs were prescribed by using a standardised drug dosage table based on body weight. Clinical and laboratory parameters were monitored for treatment response.

Results: Forty-four children (aged 1-14 years) started antiretroviral therapy over a period of 15 months. Of these individuals, 31 (70 percent) were treatment naïve. Median CD4 percentages were 4.5, 15 and 25 and median viral load 5.00, 2.15 and 0 log at 0, 6, 12 months of therapy. Body weight and haemoglobin increased. Adherence was more than 95 percent by various assessments. Tuberculosis was the most common single opportunistic infection (25 percent) and contributed to the main clinical challenge of immune reconstitution. Five children died, all had tuberculosis.

Conclusions: Our preliminary experience suggests that ART is feasible when integrated within an existing pediatric out-patient department which is supported by a health care team and PLWAs. Continuous support of adherence was the main challenge for treatment success.

A less expensive HIV-1 viral load assay for use in the resource-limited countries and its application in a clinical cohort

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Background: HIV viral load is a necessary patient monitoring test during treatment of infection. Unfortunately, its cost is still prohibitive for HIV infected patients with limited income.

Objective: To develop a less expensive assay to measure HIV viral load for using in resource-limited countries.

Methods: A new system to measure HIV viral load was developed using PCR-based technology. RNA extracted from serum samples obtained from HIV infected subjects was used as the template. The assay readout was generated using real-time PCR instrumentation and fluorescent-labelled probes on the gag region. A standard curve was generated using positive controls of known HIV RNA in various concentrations. The magnitude of amplification from the patient samples was calculated for viral load by comparing the fluorescent signal to the standard curve. The new assay has been applied as a monitoring measure in a cohort of antiretroviral therapy in 45 HIV infected children.

Results: One tube with one step of procedure including reverse transcription and amplification was successfully developed. It can accurately measure the HIV viral load from the serum sample between 105 and 1,000,000 copies/mL. The coefficient of variation to measure viral concentrations at 250, 500, 1,000, 10,000, 100,000 and 1,000,000 copies/mL were 12%, 7.4%, 10.1%, 3.9% 1.7% and 1.6% respectively. The sensitivity, specificity, positive and negative predictive values were 92.3%, 100%, 100% and 75% respectively. This new system provided the important consideration for the pediatrician during follow up of their patients in the cohort especially when determining change of therapy. The cost per sample is about 20 US\$ which is about 4 times less expensive than the available commercial kits sold in Thailand. Conclusion: The new HIV-1 viral load measurement system was developed. This system was reliable and more affordable than current commercial methods.

Absolute neutrophil counts (ANC) in HIV-exposed and unexposed infants in Chitungwiza, Zimbabwe

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Background: The evaluation of hematologic abnormalities due to antiretroviral prophylaxis is critical to the success of MTCT clinical trials in Africa. Ethnic neutropenia has been reported in African infants, thereby rendering normal hematologic parameters derived from Caucasian infants inappropriate for grading neutropenia. The aim of this study is to determine if ethnic neutropenia is prevalent in Zimbabwe, and whether intrapartum/neonatal single-dose nevirapine (NVP) has an effect on absolute neutrophil count (ANC). **Methods:** The study was conducted at two clinics in Zimbabwe. 200 HIV-unexposed and 70 HIV-exposed infants were evaluated at birth, 10 days, 6 weeks, 3 and 4 months of life. All HIV-positive women, and all HIV-exposed infants received single dose NVP. A physical exam and full blood count were performed at each visit. Infants with concurrent viral or bacterial infection were excluded from analysis. **Results:** The following table illustrates the mean ANC values in Zimbabwean infants (HIV-exposed and un-exposed) and in Caucasian infants (controls).

Mean ANC (/nl)	Zimbabwean HIV-unexposed	Zimbabwean HIV-exposed	Caucasian Controls*	P Value (HIV-unexposed vs controls)
Day 1	6.24 (N=127)	6.16 (N=52)	11.5	p < .05
Day 10	2.50 (N=149)	2.68 (N=62)	5.5	p < .05
6 wks	1.86 (N=145)	1.87 (N=46)	3.8	p < .05
3 mo	1.70 (N=124)	1.44 (N=48)	3.8	p < .05
4 mo	1.57 (N=123)	1.48 (N=43)	3.8	p < .05

*reference (Oski Textbook of Pediatrics)

Conclusions: Ethnic neutropenia exists in Zimbabwean infants, and should be taken into account during evaluation of low ANC values in HIV-exposed infants receiving NVP prophylaxis. The mean ANC values of HIV-exposed and unexposed infants do not differ significantly. Exposure to NVP prophylaxis does not appear to have an effect on ANC values during early infancy.

The pediatric AIDS severity score (PASS): A multidimensional AIDS severity adjustment for pediatric HIV infection

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Background: A staging system predictive of severity for perinatally HIV-infected children is needed for clinical and research purposes, particularly in resource-poor settings.

Methods: A Pediatric AIDS Severity Score (PASS) was developed using baseline sociodemographic, clinical, immunologic, and functional measures obtained from 1178 perinatally HIV-infected children enrolled into a prospective cohort study, (PACTG 219). PASS was then validated among 952 perinatally HIV-infected children enrolled in other PACTG research studies at the same sites. Survival estimates and Hazard Ratios (HR) were obtained using the Kaplan Meier method and proportional hazards models, respectively. The most predictive models were determined using Harrell's "C" statistic.

Results: Overall survival was 95% and 90% at one and two years of follow-up, respectively. The most comprehensive model for predicting mortality, termed the "Full" Pediatric AIDS Severity Score (FULL PASS), included CD4% less than 15 (HR=4.9), CDC category C (HR=2.8), a low (<70) or invalid neuropsychological score (HR=2.4), a general health rating of less than 5 (HR=2.6) and an elevated symptoms score (HR=3.3). These determinants were highly predictive of mortality (C statistic = 0.850). For resource limited settings, a Simple PASS model was developed using the same cohort, which included CD4% less than 15 (HR=5.5), CDC category C (HR=3.2) and weight less than the 10th percentile (HR=1.7). These determinants were also highly predictive of mortality (C statistic = 0.831) using a separate validation data set.

Conclusions: PASS will be helpful in assessing the effectiveness of ART among children with HIV infection, particularly when randomized clinical trials are not possible due to ethical concerns. [The authors thank the PACTG 219 Study Team for their collaboration.]

Training multidisciplinary teams to assess and support adherence: The Columbia University MTCT-Plus Experience

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Issues: The Columbia University MTCT-Plus Initiative provides HIV/AIDS care and treatment to women and families in resource-poor settings. More than 400 multidisciplinary team members in 8 countries have been trained to provide family-focused HIV/AIDS primary care, OI prophylaxis, and ART to adults and children. Adherence assessment and support is an integral part of these services and a major focus of program training.

Description: MTCT-Plus provides on-site competency-based training to multidisciplinary teams. The theme of adherence runs through multiple training activities, but is highlighted in four specific modules, each of which includes slide sets, case studies, and relevant program forms.

"*Adherence to Care*" emphasizes the systems that need to be in place to support continuity care - appointments, medical records, interdisciplinary communication - as well as the need for patient education, counseling and support. "*Adherence to Treatment*" focuses on the assessment and enhancement of medication-taking with specific attention to antiretroviral therapy. "*Pediatric Adherence*" addresses issues specific to the treatment of infants and children, and "*Antiretroviral Therapy: Coordinating Care and Support*" is a wholly case-based module that encourages multidisciplinary teams to work together to improve adherence and patient outcomes.

Lessons learned: Adherence is more than taking antiretroviral therapy. Distinguishing adherence to care from adherence to treatment is an effective way to approach training on this topic. Similarly, a formal distinction between adherence assessment and adherence support is helpful to trainees. The Columbia University MTCT-Plus training materials have been field-tested in 8 countries and may be helpful to other HIV/AIDS care programs.

Recommendations: MTCT-Plus training materials are available in English, French, Spanish and Portuguese from mtctplus@columbia.edu.

Estimated CD4% by cyflow comparable to estimated CD4% by facscount

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Background: CyFlow SLGreen 2P is an affordable alternative method for absolute CD4 counting. Unfortunately a 2 parameter (FL & SSC) CyFlow does not provide CD4 percentage (CD4%), the preferred measure in pediatric PLWHA. Conventional reference methods determine CD4% using 3 or 4 different monoclonal antibodies. In Cambodia, the only CD4 count method accessible for ART projects in May 2003 was a Facscount. This instrument only determines the absolute CD4 count, but Institut Pasteur du Cambodge (IP) provides an approximate CD4%. We compare CD4% derived from the absolute CD4 count by Cyflow and a haematology analyser, with the CD4% provided by IP. **Methods:** Method 1 used a Cyflow and an Abbott Cell Dyn 1400 system to provide the absolute CD4 count and the total mononuclears. $CD4\% = CD4 / \text{total mononuclears} \times 100$. Method 2 in IP used a total lymphocyte count (TLC) from (i) total WBC count using Micros 60® (ABX®) then (ii) a microscopic differential count, and absolute CD4 count from Facscount. $CD4\% = CD4 / TLC \times 100$. We calculated the correlation between the two methods and the limits of agreement using the Bland-Altman analysis. **Results:** The agreement between CD4% obtained with the dual platform Cyflow and the Facscount is good ($r=0.961$). The mean difference is small (-0.68%) with 95% CI between -1.14% to -0.216%. **Conclusions:** CD4% as determined by the use of a dual platform Cyflow and a haematology counter which cannot discriminate between lymphocytes and monocytes, provides an acceptable alternative for the only CD4% method available in Cambodia. It may not be completely accurate, but both indirect methods give similar results. Expanding the CyFlow instrument with an extra scatter detector can be considered, as to obtain the TLC and the total CD4 count from the same instrument to calculate the CD4% in an indirect way. It would be useful to compare this dual platform CD4% with the CD4% from a Facscalibur which is considered the real standard of CD4%.

Characteristics of somatic development in HIV infected children (preliminary communication)

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Background. HIV infection influences somatic development. The introducing of HAART demonstrated clinical, immunological and survival benefits, but also problems with metabolic

abnormalities and/or lipodystrophy occurred. The aim was to present anthropometric measurements and to evaluate somatic development of HIV infected children.

Materials and methods. 18 anthropometric traits were measured in 25 vertically HIV-infected children (9 girls and 16 boys) aged 2 - 12 years. All the children were treated with HAART. Unified anthropometric methods and standard equipment according to Martin and Saller were used. Three indices related to the body segments proportion, upper arm muscle and upper arm fat tissue areas according to Frisancho were calculated. Selected traits and indices allowed to evaluate the level of somatic development, body proportions, nutritional status and the type of subcutaneous fat tissue distribution. Percentile charts were used and the z-score transformation of individual data was made using the reference data provided in the Department of Development of Children and Youth, for the normal Warsaw population. Z-score transformation was made in order to eliminate age and sex specific differences.

Results. Significant individual variability of somatic development was, but in most of the children all analysed traits and indices such as body height, body segments proportions, nutritional status and the distribution of subcutaneous fat tissue did not differ from the normal range observed in the population of healthy children. In 6/25 children body height below 3-rd percentile was observed, including one boy with severe height deficit (-3,6 SD). Central type of subcutaneous fat distribution was observed in 2 children.

Conclusions. Significant percentage of HIV infected children represented body height deficit and various developmental disorders, but somatic development of most of examined children did not differ from the normal population.

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Availability and palatability of antiretroviral formulations appropriate for paediatric patients in Thailand

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Issues: Thailand, an estimated 700,000 people are living with HIV/AIDS. Approximately 20,000 children aged 15 and less requiring ART. The treatment regimen for paediatric patients should mirror those of adults at all level care. This is currently difficult because of the lack of appropriate paediatric formulations. Clinical trials of ARV agents in HIV-infected children and the development of drug formulations appropriate for administration to children have often been delayed until after the development of adult formulations have been completed and/or the drug has been approved for use among infected adults. However, the paucity of paediatric specific data cannot deter the treatment of paediatric patients.

Description: Government Pharmaceutical Organization (GPO), Thailand, is a state enterprise under Ministry of Public Health(MOPH). Its function is to manufacture and supply of pharmaceuticals and other medical products, to support health services activities of MOPH throughout the country. As of December 2003, there are 6 ARV drugs approved for use in paediatric patients e.g. zidovudine syrup 10 mg/ml, didanosine buffered oral powder 30 and 60 mg, stavudine for oral solution 1 mg/ml and 5 mg/ml, nevirapine oral suspension 10 mg/ml, lamivudine syrup 10 mg/ml and nelfinavir tablet 250 mg.

Lessons learned: There are unique considerations needed for AIDS paediatric patients. They include the changes in pharmacokinetic parameters with age caused by the continuing

development and maturation of organ systems involved in drug metabolism and clearance. Special consideration also associated with adherence to ART.

Recommendations: To maximize therapeutic options for HIV-infected paediatric patients throughout the course of their infection, drug formulations should facilitate the development of palatable, easy-to-take fixed dose combination ARV drugs as treatment options for children. MedGenMed. 2004 Jul 11;6(3):B10133 [eJIAS. 2004 Jul 11;1(1):B10133]

Lipodystrophy syndrome in human immunodeficiency virus- HIV-1 infected children in the era of highly active antiretroviral therapy –HAART

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Background: Highly active antiretroviral therapy (HAART) slows the progression of HIV disease and lowers mortality and morbidity. Many adult reports have described the lipodystrophy syndrome, peripheral fat wasting (atrophy), central fat accumulation and/ or metabolic abnormalities. Few data are available concerning lipodystrophy in children. The aim of this study was to determine the prevalence of lipodystrophy in our cohort of HIV-1 infected children treated with HAART and to evaluate factors associated with development of lipodystrophy. Patients & Methods: 95 Sub-Saharan African patients (48 female) aged 3-17 years (mean 9.4) attended between November 2002-03. Patients were measured for weight, height, circumferences and skinfold thicknesses. Body Mass Index (BMI) was calculated and measurements converted to z-scores using British (1995) and Dutch (1996) references. A lipodystrophy index was created as the sum of subscapular skinfold, waist circumference and BMI z-scores.

Results: Patients were in CDC category A 26%, B 49%, C 24%, and immune category 1 60%, 2 38%, 3 2%. 68% were receiving HAART and of these, 63% were receiving a protease inhibitor (PI) and 68% D4T (Stavudine). Z-scores were generally abnormal (see table):

The lipodystrophy index was strongly and independently correlated with age negatively ($p=0.03$), and mid-arm ($p=0.0001$), calf ($p=0.007$) and biceps ($p=0.0001$) z-scores positively. Adjusted for these the index was significantly positively associated with the duration of D4T treatment ($p=0.003$), but not HAART or PI.

Conclusion: HIV infected children appear to show abnormal fat distribution. Central fat deposition with relative limb wasting are most strongly associated with duration of D4T treatment.

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Nursing intervention in the Kingston pediatric and perinatal HIV program in Jamaica. Funded by the Elizabeth Glaser pediatric AIDS foundation international Leadership Award 1-ILA-11-01 (to CDCC)

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Background: In Jamaica, 1 -2% of all pregnant women are infected with HIV and it is now one of the leading causes of death in children 1 – 4 years. This paper highlights the nursing

interventions as a key feature in the ongoing development and success of a prevention of mother-to-child HIV transmission (pMTCT) program in a resource-limited setting.

Method: In the Kingston Pediatric and Perinatal HIV/AIDS Program, the nurses and midwives were carefully selected and then trained in the management of pMTCT of HIV/AIDS, HIV/AIDS, Voluntary Counseling and Testing and the identification and nursing management of pediatric and perinatal HIV/AIDS. The sites of the program include three large maternity centers and four pediatric centers, with several feeder clinics for pregnant women. A nurse coordinator supervises the interventions at each site. A multidisciplinary team follows protocol-driven management for the care of pregnant HIV-positive women and children. There is strong collaboration with the Jamaican government and other agencies.

Results: The nursing interventions have served to: 1. Sensitize and encourage other health care workers in the care person living with HIV/AIDS. 2. Sensitize persons in the community about the disease. 3. Improve the comfort level of women and families with accessing health care. 4. Enable prospective data collection for program assessment and research purposes. 5. Enhance multidisciplinary collaboration to widen the scope of patient care and prevent duplication of services.

Conclusion: Nursing intervention is a vital part of a pMTCT program, however, ongoing education and training of the entire healthcare team needs to be continued in order to strengthen the program. It is our hope that in the near future, much of what is done in the Kingston Pediatric and Perinatal HIV/AIDS Program will become integrated in the nursing management of maternal and child health nationally.

Understanding barriers to adherence to antiretroviral therapy in Thai children

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Issues: Strict adherence to ARV is essential in all HIV-infected patients. When treating HIV children and assessing their adherence in specific populations, though, it is cultural and social differences must be acknowledged.

Description: The majority of HIV-infected Thai children have lost at least one, if not both parents to AIDS, and their current caregiver is often a grandmother or aunt who may not be aware of the child's condition. Even if caregivers do know a child's HIV status, they usually fear discrimination and have not disclosed to the child, family and/or friends. In cases where a child's HIV+ status has been disclosed in Thailand, many children have been asked to leave schools and even rejected treatment from hospitals. Most children, therefore, do not know why they are taking ARV, making the task of adhering to ARV even more difficult.

Lessons learned: Without disclosing to other parties, caregivers must often assume full responsibility of caring for an HIV-infected child. This can often be too much for one person to handle, especially when he/she must also maintain a job and take care of other family members. Therefore, caregiver scheduling conflicts can often lead to non-adherence.

When treating HIV-infected Thai children, medical personnel must be sensitive to patient and caregiver concerns and lifestyles. Therefore, addressing social and psychosocial factors in addition to physical symptoms is a vital aspect of HIV patient care in Thailand.

Recommendations: In recent years, public education about HIV/AIDS has become more prevalent in Thailand, but fear and discrimination surrounding AIDS still prevail. Therefore, it is important to develop methods of assessing and improving adherence to ARV that are catered to

Thai children. Such measures should appreciate the low prevalence of disclosure and the psychosocial burden that caregivers and children must consequently carry.

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Health worker experiences of caring for children with HIV/AIDS in district hospitals in South Africa

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Background: Despite the growing burden of HIV, few studies have looked closely at service level human resource implications and health worker experiences of providing HIV care. This study aimed to understand the experiences and views of health personnel providing care to paediatric HIV inpatients at hospital level regarding the extent of the HIV problem, resources available and workload and working environment impact.

Methods:

Because regular survey methods tend not to elicit an in-depth understanding of health worker experiences, a focus group approach was used. Focus group discussions (FGDs) were held with doctors and nurses caring for children and hospital managers in eight hospitals in two provinces in South Africa. During the FGDs, particular attention was paid to group dynamics (i.e. interaction between the different professional categories) and to non-verbal behaviour among participants. The FGDs were tape recorded, with the participants' informed consent, and analysed using content analysis.

Results:

The FGDs provided unique insights into the thinking of health workers carrying a high HIV care burden. Among the concerns to emerge were the double burden of caring for children while being directly affected and infected by HIV/AIDS; the lack of care guidelines; government not acting swiftly in providing ARVs; insufficient resources allocated to addressing the HIV/AIDS problem and the out-crowding of HIV-negative and/or undiagnosed children. What emerged further within the groups was the reliance of health workers on non-formalized psychosocial support structures in dealing with the strain of providing HIV care.

Conclusions:

This study highlights critical human resource issues that need attention, in particular on what the needs of carers are. The findings have important implications for success of the newly announced policy on the provision of ARVs to HIV positive children. Care for the carers requires urgent attention. How to address the out-crowding of HIV-negative and/or undiagnosed children is an area for future research.

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Inpatient care of children with HIV/AIDS in district hospitals in South Africa

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Background: Although guidelines for the management of HIV/AIDS have been widely developed and implemented, little is known about how these guidelines are used in field settings. This study, undertaken in 8 district hospitals in South Africa, aimed to determine the gap between the care recommended in national guidelines for children with HIV/AIDS, and the care which they received whilst in hospital. A flow chart illustrating the steps of care was developed in order to identify the points at which children failed to receive care as recommended in the guidelines (or 'leaked' from the chain of care). This provided information with which to improve guideline adherence; an important task given the government's commitment to introducing anti-retroviral therapy (ART).

Methods:

The study posed a number of methodological and ethical challenges including the need to minimise the Hawthorne effect and to ensure that poor practice, where this was identified, was corrected. Methods included a survey of the hospitals' capacity to provide HIV/AIDS care, a cross-sectional study of 95 paediatric inpatients, a retrospective record review and interviews with caregivers.

Results:

The study highlighted a number of positive features, including adequacy of available infrastructure (such as drugs and laboratory services), good access to VCT services and suitable staff attitudes. Caregivers of 86% of children, whom the researchers assessed as requiring an HIV test, had been offered testing; 81% of those offered testing had accepted. Assessment of care revealed significant shortcomings, with leakages of between 4% and 92% for components of general and HIV-specific care.

Conclusion:

Provision of care to children with HIV/AIDS is a complex task. This study highlights the need to ensure that introduction of ART is used as an opportunity to improve all aspects of care at hospital, PHC and community levels. Audit and/or other quality assurance mechanisms also need to be strengthened.

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The Effects of Highly Active Antiretroviral Therapy (HAART) on neuropsychological functioning in Thai Children with HIV Disease

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Background: CNS dysfunction has been documented in symptomatic HIV-infected children. One of the manifestations includes deficits in various domains of cognitive function. The results of studies on the success of HAART in preventing neuropsychological decline have been mixed. This study is the first in Thailand to evaluate the short-term effect of HAART on the neuropsychological functioning of children with HIV disease.

Methods:

Between March-December 2003, 16 vertically HIV-infected symptomatic children were evaluated for neuropsychological functioning at baseline and after 4 months of HAART. All children were previously untreated and started HAART with 2NRTI + NVP or EFV. A computerised testbattery (Amsterdam Neuropsychological Tasks Program) was administered including measures of memory, attention, motor function and logical reasoning. In addition, CD4% and viral load were obtained.

Results:

16 children between 4 to 12 years (median=7.1); CDC A (n=6), CDC B (n=8), CDC C (n=2), pre-HAART median CD4% was 5% (n=16) and median VL log was 5.32 (n=9). After 4 months on HAART, median CD4% at wk 12 and wk 24 were 14% (n=12) and 13% (n=15) respectively. Median VL at wk 24 was 1.7 log (n=9). Significant difference was found after 4 months of HAART in information processing speed ($p<0.05$), sustained attention ($p=0.05$), visuospatial processing ($p<0.05$). No significant improvements were noted in motor control, short-term memory and logical reasoning.

Conclusions:

A significant rise in CD4% and drop in VL was found after 4 months of HAART. Half of the tests showed an improvement in neuropsychological function, which may be due to direct HAART effect on the neurological system and/or improved overall treatment outcome after HAART. Despite the limited number of children these results are encouraging and warrant further research.

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The MTCT-Plus Initiative: developing a model of care and treatment attentive to the needs of infants and children in low resource countries

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Issues: There is great interest in rapid scale-up of antiretroviral therapy (ART) in less-developed countries (LDC). However, little attention has been paid to the special care and treatment needs of infants and children. **Description:** The MTCT-Plus Initiative established 12 programs in 8 African countries & Thailand. The Initiative was developed to address the long-term health needs of HIV-infected women identified through mother-to-child transmission prevention programs. Early in program development the decision was made to include children, partners and household members of the index women in a family-focused model of care. Pediatric care includes: early infant diagnosis (Edx), comprehensive HIV primary care including ART, PCP prophylaxis, central procurement of ART, and focus on non-clinical supportive issues (disclosure, mental health, adherence). EDx aims to identify infected infants at high risk early for disease progression. Exposed infants with negative EDx remain in care until testing antibody negative. Standardized protocols for ART eligibility, monitoring, failure are used across sites. ART regimens are chosen in accordance with local guidelines and administered using MTCT-Plus dosing guide. **Lessons Learned:** From Feb. to Nov. 2003, 634 infants and children were enrolled, 581 of index pregnancy, 49 siblings, 4 household members: 98 are HIV-infected including 48 of index pregnancies. 28% of infected children are diagnosed with AIDS and/or severe immune suppression. 35 children have begun ARV therapy. 74% of infected and 48% of exposed children

receive PCP prophylaxis. Referral to support services occurred for 395 children.

Recommendations: Comprehensive HIV care and treatment for infants and children can be successfully integrated into family-focused HIV programs.

Improving the quality of care for HIV infected children in Africa through networking

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Issues: Over 75% of children living with HIV/AIDS in the world are in Sub Saharan Africa. With coverage of services for prevention of mother to child transmission (PMTCT) ranging from 0-50%, the numbers of HIV-infected children in Sub Saharan Africa continues to grow. The majority of infected/affected children in Africa have no access to care. Despite explicit guidelines from WHO/UNAIDS and near universal use in developed countries, usage of cotrimoxazole for prophylaxis against opportunistic infections in children was only 1% in Africa in 2001. Training in the care of HIV-infected children is weak throughout the region. **Description:** The African Network for the Care of Children Affected by HIV/AIDS (ANECCA), comprised of researchers, pediatricians, nurses and other clinicians, was formed in 2001 to improve the quality of care provided to children in Africa. Consisting of health professionals from 12 African countries, ANECCA members disseminate information and advocate for improved quality of care for children. **Lessons learnt:** ANECCA activities have resulted in improved care for HIV exposed and infected children in East Africa. Within 6 months of a workshop on Early Diagnosis and Care of HIV-infected Children, followed by widespread dissemination of an advocacy statement, 8 PMTCT programs in 4 countries began providing cotrimoxazole prophylaxis to HIV exposed children. A job-aid to assist primary health care workers to counsel mothers on infant feeding for PMTCT has been produced. A handbook on care of HIV-infected children in Africa, produced by the network members, will be launched in Bangkok in July. **Recommendations:** Quality of care for children affected by AIDS and for people living with AIDS in general can be quickly improved through networking by utilizing locally-available resources. * The ANECCA secretariat at the Regional Centre for Quality of Health Care in Kampala is supported by USAID REDSO-ESA.

Family care model: A preferred option for HIV/AIDS management in a resource poor setting

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Issues: Majority of paediatric HIV/AIDS patients seen in Princess Marina Hospital (PMH)

Gaborone are vertically infected. Usually one or both parents are infected and only the mother is aware of the problem because disclosure is difficult. Nondisclosure compromises adherence and weakens intra-family support and care. Presently, when family members qualify for HIV treatment they are seen in different clinics on different days by different health care providers; imposing additional strain on family time, economic resources and social activities. In training institutions like PMH this model is inefficient and complicated for training and cannot be easily devolved to peripheral hospitals lacking the requisite personnel to run separate clinics for adult and children. Combined clinic type provides the most appropriate training model. For reasons of efficiency, appropriateness, cost effectiveness and potential to promote better treatment outcomes through enhanced intra-family support, the family clinic model was proposed.

Description: Aim: To improve health care provision to HIV/AIDS patients

Objectives: To develop a model clinic for families

To evaluate:

Its acceptability to patients and health care personnel

Its impact on stigma and adherence

Its feasibility and effectiveness as a training model.

The 80 families studied were infected children and caregivers, either on treatment or treatment naïve. A family unit was defined as one or more infected children and their caregivers in a household.

Lessons learned: All families preferred this model as it helped them cope with the problem together reducing stigma, improving intra-family bonding and adherence to treatment. Health care personnel from the periphery found it an easier learning model because pediatric and adult HIV/AIDS and related issues were discussed in one setting. The model was inexpensive to initiate because there was no duplication of facilities.

Recommendation: Although useful lessons were learned, there is need for a proper study to evaluate these variables.

Pediatric HIV care, use of anti-retrovirals in a resource limited setting

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ISSUES: Kenya is moving from the era focused almost exclusively on HIV prevention and education to the use of HAART for HIV/AIDS. We approach this with the advantage of having a predominantly ARV-naïve pediatric population. However there are limited providers and few care systems with the training or experience in carrying out the task of administering anti-retrovirals to children successfully. Sudden access to ARV's in unprepared, overworked hands could quickly create drug resistance. We describe our structures, protocols, experiences and challenges in caring for children in resource poor settings of western Kenya. **DESCRIPTION:** We are currently taking care of 347 HIV exposed and infected children in 2 sites in western Kenya since 2002. Guided by the Academic Model for the Prevention And Treatment of HIV/AIDS (AMPATH), we have in less than 2 years scaled up from seeing a couple of children to hundreds without compromising standards. Daily out-patient clinics are supervised by 4 consultant pediatricians and run chiefly by trained clinical officers who see on average upto 20 patients a day. The working team trains students and other providers, researches to answer concerns and tries to be a model of good care. The HIV infected children receive OI prophylaxis, are assessed for ARV's and started on them if eligible and adherence assessment satisfactory. 40

children are on ARV's. Experiences include good adherence and response, few drug side effects, excellent provider coping mechanisms, multidisciplinary care. Challenges include the need to focus on the child, generic drugs, overworked providers and resources for the orphaned.

LESSONS LEARNED: Numbers will increase; we need to be prepared. Adherence, toxicities and follow-up are not as dramatic and there is need for continuing support, with a pragmatic approach in rural areas. IYCF and focus on family is needed. Scaling up, resistance to ARV's, health workers' changed roll should be anticipated. **RECOMMENDATIONS:** With more planning and training, it is possible to have successful pediatric HIV care in Kenya.

An effective model for developing countries to provide HAART for HIV+ children

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Issues: It is very difficult to achieve HAART therapy treatment outcomes for children, especially in limited resource countries. The team work technique can be applied to other teams in any area with HIV/AIDS problems similar to Thailand. **Descriptions:** In February 2002, eight children started HAART therapy through cooperation between ACCESS a Thai NGO and Chiang-rai hospital. The number of children receiving HAART has increased gradually. To date we are supporting families taking care of 125 HIV+ children on HAART with adherence of more than 95%. **Key processes** are: 1. Organize an ARV clinic system to provide comprehensive care. 2. Team meetings before, between and after starting HAART in each group of children. 3. Transfer information of each child and family between parties in the team. 4. Training PLWHA groups and networks, about home visit technique and how to support and care for the children and their family. 5. Working together on the ARV clinic day, to provide counseling, decrease stress pill counting, check adherence by nurses, physical check-ups by pediatrician, make support group meetings for caregivers and children, in and out of the hospital, help the children and family to practice preparing weekly drugs using a pill box & pill cutter. **Lesson learnt:** Eleven children have died and two have stopped taking drugs. The rest of the 125 children continue taking drugs with more than 95 % adherence. **Recommendations:** - Transfer the team work model to other areas to be used by PLWHA groups and networks. - Effective HAART therapy can be given to every infected child. - Children & Families: should clearly understand about HAART - Other family members and other caregivers should understand and accept the treatment. - An effective model for taking care of HIV+ children should be set up with the cooperation between medical staff, social workers and PLWHA groups in limited resource countries.

Toy's Library: an experience to increase the compliance to antiretroviral therapy in HIV-infected children

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Issues: In Bahia, Brazil, there are about 500 children/adolescents living with HIV/AIDS. We have seen among this population some problems related to HIV/AIDS, as well as some barriers to compliance to ARV therapy: parents/relatives dependence, misunderstanding of the disease and the need to be treated, besides the own disease's restrictions to children's life. **Description:** We have established a special setting for care of these children in the BAHia's state AIDS referral

center (CREAIDS)- the Toy's Library- containing toys, books, games, and a variety of attractive materials for children and teenagers. The patients are supervised by a team of specialized professionals (psychologist, art therapist, pediatrician) that use several artistic expressions to deal with the disease problems and to promote the elaboration and resolution of their consequences on the routine of this population. They use theater, music, painting, telling stories and other techniques, in order to better reach these goals. In the first 3 months over 100 patients attended the Toy's Library. They were invited to come in a bi-weekly basis, in sessions of 45 minutes each. In each session they are stimulated to talk about hiding feelings, and their expression, to decrease the psychological tension and to improve the familiar integration. Sometimes parents/relatives are also involved in the activities, to better accomplish these aims. **Lessons learned:** After beginning this project we could note a dramatic increase in the frequency of visits to the pediatrician, by both, parents/relatives and children. They refer a decrease in the barriers to a good compliance to ARV drugs, and to come to the referral center. **Recommendations:** In our experience, the creation of a Toy's Library in an AIDS referral center was associated with an improvement in drug compliance, and decrease of absenteeism to pediatrician visits in a pediatric/teenagers population.

Antiretroviral therapy in low resources countries: determining treatment regimens for adults, pregnant women and children in the MTCT-Plus Initiative

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Issues: Rapid scale-up of antiretroviral treatment (ART) in low resources countries (LRC) is a global imperative. Identifying feasible and sustainable ART regimens for adults and children requires consideration of multiple complex issues. **Description:** MTCT-Plus Initiative established 12 programs Africa and Thailand. Programs enroll HIV-infected women in pMTCT programs as well as their partners and children and implement a standardized care program including ART for eligible participants. First- and second-line ART regimens for adults and children are determined for each site. **Lessons Learned:** Multiple considerations guided choices of ART regimens: cost, cold chain requirements, toxicity, pill burden, regimen sequencing. Since the program aims to enroll women of child bearing years, toxicity to the fetus is germane: for example, Efavirenz (EFV) wasn't chosen as first-line treatment for women secondary to potential teratogenic effects. Additionally combination D4T/ddI was avoided. Treatment for children was complicated by limited pediatric formulations, poor palatability/tolerability of many formulations, unknown pharmacokinetics for several medications. For example, dosing hasn't been determined for EFV in children <10 kg. Weight- and age-related dosing of pediatric medications also distinguishes adult and pediatric treatment. Treatment of women and children with single dose nevirapine (NVP) for pMTCT raised concern about the development of resistance and potential decreased efficacy of NVP-based therapeutic regimens. First-line regimens at most sites were NNRTI-based followed by PI regimens for second-line treatment. New scientific data and new medications/formulations continue to inform decision-making within the Initiative. **Recommendations:** The need to balance multiple considerations when choosing ART regimens in low resource setting will be discussed and illustrated based on experiences within the MTCT-Plus Initiative.

How can MTCT-Plus program help establish HIV care in the hospital?

By: *A Tangsathapornpong, A Kamudhamas, A Apisarnthanarak, K Junloy
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Issues: MTCT-Plus program is designed to promote wellness and to improve health care for HIV-infected mothers and their families. Before Thammasat University Hospital started MTCT-Plus program in February 2003, we only had given antiretroviral drugs for prevention of maternal to child transmission. After MTCT-Plus program started, we have offered more effective and holistic care to the whole families including the communities.

Description: Our MTCT-Plus team consists of an infectious disease physician, a pediatrician, an obstetrician, nurses, pharmacists, social workers, and health promoters. The team was established in the hospital according to its primary health policy of holistic approach for HIV-infected patients. Our activities includes a weekly HIV clinic followed by a session for team discussion and evaluation of patient-care problems, a monthly conference for MTCT-Plus team, home visit and health promotion programs in community, HIV peer group meeting for the patients to exchange their experiences and enrich their mental health, and finally a 24-hour hotline for patient education and counseling.

Lessons learned: MTCT-Plus program helps facilitate HIV care in our hospital by organizing more holistic approach, enhancing patient education, and improving patients' faithful participation. In terms of working personnel, MTCT-Plus program promotes personal knowledge, develops teamwork, and improves management skills for health care providers.

Recommendations: MTCT-Plus program is beneficial for the caring of HIV-patients and should be further applied to other hospitals.

A holistic approach to pediatric HIV/AIDS: an experience from Uganda, East Africa

By: *P Banura, N P Dunigan, G A Johnson, L Nakandi
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ISSUES: Provision of adequate healthcare and good nutrition play major roles in the management of HIV/AIDS in children. In Africa, in general, and particularly in Masaka, malnutrition and childhood infections constitute major health problems. The situation is made even worse when these children are orphaned as result of HIV/AIDS. The management of these children therefore goes beyond just the provision of standard medical care. Psychosocial support and rehabilitation are imperative in this approach. This may appear quite basic, however, the health of these children is seen to improve, as observed from indicators like weight gain and reduced intercurrent illnesses. The introduction of antiretroviral therapy (ARVs) has enhanced the quality of health of children living HIV/AIDS. **DESCRIPTION:** Since 2000, Aidchild has been working in the Masaka district of Uganda to provide homes for orphaned children living with HIV/AIDS, to reintegrate them back into a family set-up, as well as to improve their health and psychosocial welfare. The main objective of this study is to assess the overall health status of these children and the impact of ARV therapy. In this group of children, prior to the introduction of ARVs, adequate, quality nutrition and psychosocial support effected improvement in their health status. This is seen by the reduction of intercurrent infection and weight gain. **LESSONS**

LEARNED: With the introduction of ARV's, we have observed a marked improvement in the children's health status, a reduction in the frequency of illness among the children, along with an appreciable weight gain and a general improvement in their physical health. The monitoring of

the CD4 levels show greater than two-fold increase concurrent with a reduction of viral load in the eight months since the initiation of ARVs. **RECOMMENDATIONS:** The holistic approach of antiretroviral therapy and basic healthcare is a promising approach in improvement of health quality in these children.

How can MTCT-Plus program improve existing HIV care in the hospital?

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Issues: MTCT-Plus program introduces practical model of family-centered, multidisciplinary care for HIV-infected patients. While most university hospitals have existing HIV clinics, this model of care may still benefit them by formally organizing the already available services in the hospitals.

Description: Chulalongkorn hospital is one of the oldest and largest university hospitals in Thailand. Before MTCT-Plus program started in February 2003, adult and pediatric HIV clinics were run separately by internists and pediatricians. Obstetricians ran pMTCT program. Currently, the hospital is having "Family Clinic" every Tuesday which provides services to 91 MTCT-Plus families (198 patients). Pediatrician sees patients in the morning while internists/general practitioner/obstetricians see patients in the afternoon. Pediatric clinic, adult clinic, and pharmacy are in the same building but on separate floors. PLWA group, social worker, and counselor are available in the same clinic.

Lessons learned:

1. University hospital is not as good demonstrating site for new program as it seems to be. Space and time for clinic is hard to find since everyone is so busy.
2. Family-centered, multidisciplinary model of care needs more than the availability of specialists in each discipline.
3. Set up new clinic with new protocol was seen as "burden" to other hospital staff rather than the way to improve patient care.

Recommendations:

1. Don't rely the readiness and success of MTCT-Plus program on the size of the hospital.
2. Be flexible with the protocol. Keep in mind you are doing the best for your patients and everything will be easier.
3. Ask for commitment from everyone involved. Always give positive encouragement to the team.
4. Better HIV care and treatment model can be and should be set up even in complex setting of university hospitals. Next generation of doctors and medical students should be familiarized to MTCT-Plus program as model of care for chronic diseases.

Challenges in the provision of antiretroviral (ARV) therapy for children in Botswana: The Princess Marina Hospital Experience (2002 -2003)

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Issues: Botswana, with highest prevalence of HIV/AIDS in the world, was the first country in Africa to start a National ARV Program. As Botswana had little experience providing ARV therapy for infected children, we faced many challenges: logistical, socio-economic, cultural and linguistic that affected screening, initiation, follow up, adherence, and sustainability of the program. **Description:** This paper utilized documentation from the biggest paediatric ARV clinic in Africa (> 800 children on HAART) to analyze the challenges faced. Before establishing the HIV clinic, a pilot trial was begun. Training of the staff in the implementation of tailor made treatment guidelines was done by the National HIV/AIDS Training Program. Lack of staff remained one of the biggest problems. The Botswana-Baylor Children's Center was created with private funds. Creation of preliminary documentation was important. The lack of communication encumbered good follow up. The following social-economic characteristics of the caregivers were key: 72% primary education, 35% unemployment, 72% unmarried mothers and many orphans (33%) where grandmothers were the main caregivers. These grandmothers faced difficulties in drug dosing and many believed in tradition medicine. As >90% of the doctors were not local language speaking, linguistic barriers remained a big problem. **Lesson learned:** Prior training of staff was critical. Collaboration with local, foreign, private and public institutions and involvement of community and social services played a very important role. Implementation of a successful HIV treatment program for children in a developing country can be achieved, given good political and professional leadership and committed, determined and innovative staff. **Recommendations:** A model should be designed after a local preliminary study to establish Paediatric HIV clinics countrywide. It should be able provide guidelines on implementation of the program. Tools to facilitate proper pediatric dosing even by illiterate and often old and visually impaired caregivers should be developed.

Family support unit improves care and support to HIV infected children and their caregivers in Lusaka Zambia

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Issues: The number of children infected with HIV continues to grow in Zambia. HIV sero-prevalence among hospitalized children at the University Teaching Hospital (UTH) Lusaka has increased from 20% in 1992 to 39% in 2000. We describe our experience in providing care and support to HIV infected children and their caregivers.

Description: In 1992 we established a Family Support Unit (FSU) in the Department of Paediatrics and Child Health at the UTH with the following objectives: To provide HIV voluntary counseling and testing (VCT) to the caregivers and to improve care and support through health education, training nutritional and psychosocial support.

Lessons Learned: It was initially difficult for the affected clients to join the FSU due to low awareness of HIV/AIDS and high stigma attached to it. However over the years we have established a multi-disciplinary HIV care and support team, which includes pediatricians, clinical

officers, nurses, counselors, nutritionists and a medical social worker. The team has trained the fellow health care providers. It has re-organized Tuberculosis and Malnutrition follow-up clinics, which have many HIV, infected children. Guidelines are developed in the prevention of opportunistic infections. Effort is made to involve both the parents in the care of their children. Total number of clients counseled has increased from 349 in 1995 to 1,614 in 2003. Post-test clubs to the caregivers and various recreational and educational activities to HIV infected and affected children have assisted in improving care and support.

Recommendations: The activities of the FSU should be expanded to the primary health care centers, districts and regional hospitals. Caregivers and the government should plan to provide Anti-retroviral drugs to the needy children and their parents recruited at the FSU.

An innovative approach to pediatric HIV/AIDS in Uganda, East Africa

By: *G A Johnson, N P Dunigan, L Nakandi, P Banura*
NGO, Masaka, Uganda

ISSUES With over 2.3 million orphans in population of 23 million, Uganda's extended family network is over-burdened. Children orphaned by AIDS head households, live on the streets, exist with no medical care and minimal nutrition, and endure the stigmatization and abuse that comes with living with AIDS in sub-Saharan Africa. Currently, most orphanages do not accept children who are known to be HIV+. Subsequently, economic growth and development are greatly threatened, as a generation of children grow up without a caring guardian, without medical care, nutrition, or education. **DESCRIPTION** Aidchild, an international NGO located in Uganda, is comprised of homes, clinics, academies, and labs for orphans living with AIDS, who also lack a caring guardian (ie. no extended family). Working exclusively through an extensive referral process, children come to Aidchild in a critical state, most with a prognosis of less than thirty days to live. Through a holistic approach, including nutrition, treatment of opportunistic infections, psychosocial support, and academic intervention, children who would have died within weeks thrive three years later. **LESSONS LEARNED** While success has been seen through the administration of nutrition and medical care in the framework of a home-like environment, greater success has been registered with the introduction of anti-retroviral therapy (ARV's). With ARV's, there is a lower frequency of infection, steady increase in weight, greatly reduced viral loads, and increased CD4 counts. **RECOMMENDATIONS** In line with the Ugandan government's commitment to keeping children with their families, it is important to enable caregivers with both training and resources. Opportunistic infections can be partially controlled with nutrition and medical care. Concurrently, caregiver training and support should be offered to institutions currently unwilling to accept children living with HIV/AIDS so that the needs of many more can be addressed.

Don't forget the children: lessons in implementing antiretroviral (ARV) treatment for pediatric populations in resource-constrained settings

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Issue: There is insufficient knowledge of the appropriate treatment strategies for perinatally-infected children in resource-poor settings. The focus in pediatric HIV infection in these settings

has been placed so far on the prevention of mother-to-child transmission. **Description:** In order to implement an antiretroviral (ARV) treatment protocol for a pediatric population in a resource-poor setting in Africa, several factors need to be taken into account, including available pediatric ARV drug formulation, appropriate clinical and laboratory infrastructure, and support for families. Perinatally-infected children can have either a slow or rapid progression of HIV infection to AIDS. Risk factors for rapid or slow progression have not been clearly defined in sub-Saharan Africa, adding to the difficulty in deciding when to start ARV treatment. We developed an approach to pediatric ARV treatment in Kinshasa, DRC for HIV-infected children already receiving services at Kalembe Lembe Pediatric Hospital, as well as HIV-infected members of their immediate family. **Lessons learned:** Similar to pregnant women in PMTCT-plus programs, pediatric patients can serve as entry points for ARV treatment for family units. Our program had to develop guidelines for the initiation of ARV therapy based on limited data available on pediatric ARV treatment in Africa, a region with a high burden of malnutrition and opportunistic infections such as tuberculosis. **Recommendations:** The development of treatment schedules, appropriate ARV drug formulations and guidelines for the initiation of ARV treatment in African children who were perinatally-infected are urgently needed. Support requirements for families of HIV-infected children need to be better documented in pediatric HIV treatment programs to attain high adherence rates, continued clinical follow up, and improved well-being of families.

Relevance of clinical expertise in the Initiation of treatment or otherwise in pediatric HIV in a resource limited setting

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Background: This study stands to emphasize the need of Clinical expertise and good judgment in the management of Pediatric HIV infection. 77 children were enrolled in this observational study in a center Cyril Ross (SVP) Nursery for children living with HIV/AIDS in Trinidad and Tobago, and the need for Clinical expertise to the initiation of therapy was followed over a period of three and a half years April 2000 - November 2003. **Methods:** In this study the children were classified into 4 categories, the infants {less than 1 year}, slow progressors, fast progressors and adolescents {>12years old}. All the children in the infant category (6) were put on HAART, the slow progressors were not on HAART, while the fast progressors were put on HAART along with the adolescents. All the children were ARV-naïve before starting this study. And their mortality and morbidity were followed up after 4 years. The morbidity was measured based on the number of times they were hospitalized or treated for opportunistic infections and the death rate from each category. **Results:** The morbidity (measured by number of times of hospitalizations) and mortality (death rates per year) in this study over three and a half years the four groups of children followed up were essentially the same rate. For morbidity April 2000 - November 2003, we had 28 hospitalizations, 6 (21%) in 2000, 6 (21%) in 2001, 8 (29%) in 2002 and 8 (29%) in 2003, from the whole four categories of children. In the case of mortality we had from the same period of April 2000 - November 2003, we had 2 (25%) deaths in 2000, 3 (38%) in 2001, 2 (25%) in 2002 and 1 (13%) in 2003. The children in these two categories were from the infants, slow progressors, fast progressors and adolescents groups above 12 years old in this study irrespective of the fact of whether on HAART or no HAART therapy. **Conclusion:** This study showed that

the mortality / morbidity of children infected with HIV who are ARV-naïve were the same based on good clinical expertise in management irrespective of whether they are on HAART or not.

Use of quartile-based normalization of pediatric CD4 counts in the analysis of response to antiretroviral treatment

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Background: Normal age-dependent changes in CD4 counts in children may obscure changes in response to antiretroviral interventions. Our study aimed at applying appropriate z-score standardization to take age-dependent changes into account and correlate the standardized scores with initiation of treatment or treatment changes. **Methods:** This observational study was undertaken at the Hospital for Sick Children, Toronto, Canada between May 1995 and February 2003. Viral load, CD4 lymphocyte counts, and medication status were determined for 113 HIV-positive children who were under 16 years of age and who had a follow-up of at least 3 months. Median and inter-quartile ranges for age-dependent changes in CD4 counts were extracted from the literature and used to convert the raw CD4 counts to z-scores. **Results:** The average age (SD) at baseline was 6.3 ± 4.5 years, ranging from 12 days to 16 years. Twenty patients were not on treatment at baseline. Following treatment their mean CD4 count changed from 828 to 1282 ($P = 0.0668$). Removing the normal age-dependent change in CD4 count using our method of normalization showed a change of 1.4 in the standardized score, which was highly statistically significant ($P = 0.0027$). Similar findings were observed for other subgroups, such as children whose medication was changed from 2 to 3 antiretrovirals. **Conclusion:** Applying this methodology to the analysis of changes in CD4 counts in children provides a mechanism to disentangle age-related trends and accurately reflect the response to interventions.

A review of socioeconomic and demographic factors among HIV-infected Thai children in the Thai Ministry of Public Health Pediatric Access to Care era

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Background: In the year 2000, the Thai Ministry of Public Health launched an Access to Care (ATC) program to provide antiretroviral (ARV) drugs to HIV-infected individuals. The study objective was to examine socioeconomic and demographic data that influence ARV treatment outcomes. **Methods:** A retrospective study of HIV-infected children in the ATC program was conducted in December 2003. Medical records were reviewed. **Results:** 164 children's charts were reviewed. The mean age was 6.5 years. 46% were female. The subject's CDC clinical classifications were N-8%, A-29%, B-40% and C-23%. Immunological classifications were 1-7%, 2-26% and 3-67%. 28% received dual NRTIs. The rest received triple therapy. 90% of those were NNRTI-based regimens. Others were protease inhibitor (PI) based regimens. 53% of

children were accompanied by parents to the clinic. The rest were accompanied by grandparents or other relatives. 20% of the adults who accompanied the children to the clinic and who received ARV instructions were not the same people who gave ARV to the children. Only 53% of children and their families lived in Bangkok. Others came from different provinces. 60% of the caretakers were low income workers. 21% were local merchants. 47% of the caretakers earned < 5,000 baht per month and 30% earned 5,000 – 10,000 baht per month. The majority lived with extended families. 34% of the children's fathers did not know their own HIV status. Among those who knew, 77% were infected. Almost half (46%) of these children lost either their fathers or mothers to AIDS. Most of the children attended school. Reasons for school non-attendance were caretaker choice, illness, or refusal by the school. **Conclusions:** Socioeconomic and other demographic factors among these HIV-infected children and their families leave the potential success of their treatment vulnerable. Community out reach programs and improved referral systems are needed to better serve these children.

Improving quality of care for HIV adolescents in Brazil

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Background: HIV infection in adolescents has challenged health care providers and policy makers. Between 1980- 2002, 5,975 AIDS cases were notified among 10–19 years old adolescents, and 1,675 are in ARV therapy. Although, the Brazilian STD/AIDS Program has as its major objective the implementation of quality and access to care, by specialised HIV/AIDS services such as out-patient services, hospital day-care, reference hospitals and home-based care services, linking HIV infected adolescent to HIV health care has been difficult. **Methods:** Aiming to improve AIDS adolescents' care quality, physicians attending HIV/aids advanced training anonymously answer a questionnaire. **Results:** From all the respondents, 74.6% related caring for adolescents; 70.4% considered adherence to treatment an important issue in this population, and 93.6% considered the STI prevention highly relevant. Counselling on matters such as relationships, job concerns and career choices was felt to be part of providers' duties by 67.7%. Most of the respondents (67.6%) considered that integration between infectious diseases/HIV-AIDS services and adolescent health programs as not altogether ideal. Measures for improving care of HIV+ adolescents were thus rated: integration -HIV specialised health services X adolescent health programs, 35.3%; specific attention to prevention 16.6%; training of physicians in the clinical management of HIV+ adolescents, 47.5%. Most of the physicians said that the care should be conducted in an adult clinic liaised to a specialised adolescence service (61.8%), care should be provided by paediatricians (2.1%) or by a specialised adolescence clinic (25%). The large majority of physicians surveyed (79.9%) believed that specific health services to HIV+ adolescents should be established. **Conclusions:** Teenagers who are transitioning from pediatric to adult HIV health services require programs addressed to their development needs. A combination of the expertise, HIV specialist and adolescent care's skills is needed to provide a quality of care for adolescents with HIV infection.

Pediatric Impact: Pilot data from an intervention to increase medication adherence among children with HIV/AIDS

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Background: Improving adherence to complex antiretroviral (ARV) regimens is one of the most critical clinical issues in managing pediatric HIV infection today; poor adherence can lead to ARV resistance and treatment failure. The Pediatric Impact Study is a family-based intervention to promote ARV medication adherence among HIV-infected children ages 5-12 years. We present findings from the pilot study.

Methods: Pediatric Impact is an ongoing randomized intervention trial in 3 pediatric HIV clinics in the U.S. which will enroll 240 child-caregiver dyads. Structured needs assessments and provider and caregiver input inform tailored adherence plans for each family, comprising the following modules: (i) medication management; (ii) medication swallowing; (iii) diagnosis disclosure; (iv) HIV education; (v) behavior modification; and/or (vi) referrals to social services or mental health care. Modules are delivered in clinic and home settings by an Adherence Coordinator. Medication adherence is assessed by self-report interview, a medical care team assessment and Medication Electronic Monitoring System (MEMS®) caps.

Results: The ten children and caregivers enrolled in the pilot had a mean age of 9.3 (range 6-12) and 43.2 years (range 33-59) respectively. Caregivers were biological mothers (5), grandparents (3) and adoptive mothers (2). At baseline, 3 children had already been told they were HIV-infected. Baseline drug adherence estimates based on caregiver report ranged from 85 -100%, while care team estimates ranged from 50-100%. The intervention plans included assistance with referrals (n=7), diagnosis disclosure (n=6), HIV education (n=6), behavior modification (n=3), medication management (n=1) and medication swallowing (n=1).

Conclusions: The pilot confirmed the need for an intervention that addresses multiple barriers to adherence, the relevance of the intervention modules, and the importance of tailoring interventions to each family's needs.

Directly observed HAART treatment of HIV infected children in Cambodia

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Background: Highly active antiretroviral therapy (HAART) is becoming available for treatment of HIV infected children in some resource-limited settings. We analyzed the effect of HAART, given by twice daily directly observed treatment (DOT), on CD4 percentage in Cambodian HIV-infected children cared for by Maryknoll Cambodia. **Methods:** We conducted a retrospective record review of all children in the Maryknoll HIV pediatric treatment program in Phnom Penh, Cambodia. Medical records of all children who had available CD4 percentages and received a minimum of 6 months of twice-daily directly observed therapy with a HAART regimen were included in the analyses. Children received a HAART regimen of nevirapine or efavirenz plus d4T and 3TC. Children were monitored for possible drug toxicities and for change in CD4 percentage. **Results:** Records of 67 children met review criteria, and had results approximately 6 months after initiation of DOT-HAART. 42.6% were female. Mean age was 6.58 years (range =

2-12 years). The mean baseline CD4 percentage was 6.95 % (SD = 5.04), and increased to 17.59 % (SD = 8.08) after 6 months of treatment, representing a mean increase in CD4 cells of 10.63% (SD=5.23, p<0.0001). 28 children had 1 year of treatment. At 1 year, the mean CD4 percentage was 21.2 % (SD=6.70), representing a mean increase of 14.7% over baseline (SD=7.76, p<0.0001). Drug toxicities requiring antiretroviral treatment modification occurred in 10% of patients: 7 children were switched from nevirapine to efavirenz due to either rash, anemia, or elevated liver enzymes. **Conclusion:** In this cohort of HIV-infected Cambodian children receiving DOT-HAART, substantial increases in CD4 percentage were seen at 6 months and 1 year. Serious drug toxicities were not common, and were managed by switching from nevirapine to efavirenz. DOT-HAART appears to be a promising approach to effective treatment of HIV-infection in resource-poor settings.

18 Months of experience with HAART in the seaport of Tela, Honduras

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Background: The Honduras' Government reports to November of the 2003 a total of 19.792 PLWA in the country. It is estimated that 6 thousand people in Honduras need urgently HAART, the National AIDS Program is giving the steps to reach happiness put. Doctors Without Borders works since 1998 in Honduras (Prevention of STD and HIV/AIDS) In August 2001 started the integral Project of attention for the PLWA in Tela Seaport and from July 2002 HAART is available.

The project: USERS: 350 PLWA (Included 40 children) 300 Consultations Monthly
SERVICES: Counseling + Rapid Test VIH (600 Tests/Yearly, 30% +): HIV/AIDS Clinical Management: Diagnostic, Profilaxis and Opportunistic infections , Pediatrician and Gynecologist approach; National Hospital's References, Psico-Social Support, HBC Team and Nutritional support and follow up. **Main Goals** of the project:

1. Integral attention to the PVVS with Services Package
2. The availability of HAART
3. The advocacy for treatment in the country and the fight against discrimination

Methods:

- Time Frame: July 2002 to March 2004
- A Cohort of 200 Patients (170 Adults and 30 children)
- Availability of Antiretrovirales
- Standarized Protocols
- Facilities for VL, Cd4, and other measurements, and - Nutrition Valoration and following

Results:

- Comparison between AZT+3TC+EFZ and D4T+3TC+NVP Schemes
- Basal and Control VL and Cd4
- Nutricional Status and Karnowsky table, Basal and control.
- Links, overlap and interferences between Tb and HAART
- Laboral Re-entry for Adults
- Mortality, Quitting, Resistence, Side Efects and Changes of scheme

Conclusions:

- 1) The improvement of the PLWA is totally possible, with HAART, in a poor settings country

- 2) HAART can be done , not only in third level hospital facilities, but also in decentralized units
- 3) The impact of Results in the Public Health Sector its maybe the main achievement of the project
- 4) The health recoverance is perhaps the most easy chore in comparing with all socio-economical tasks

People living with HIV/AIDS, a living tool for adherence

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Issues: It is acknowledged that successful treatment with antiretroviral (ARV) therapy requires the patient to maintain consistent adherence to the prescribed regimen on a long-term basis. Before and during treatment HIV-infected children and their caregivers may confront some problems that may affect adherence. Trained people living with HIV/AIDS (PLWA) with their own experience in disease process can fill this gap.

Description: With support from non-governmental organization, 4 PLWA worked as volunteers in pediatric out-patient services in provincial hospital in Thailand. They managed group activity, giving information concerning disease process, opportunistic infections, ARV drugs and their undesirable side effects to children through child friendly tools. They taught technique of pill taking, counted remaining pills for physicians and prepared drug packets for the old caregivers of low literacy. They did regular home visits giving psychosocial support, assessed adherence to ARV drugs and relayed these data to health team.

Lessons learned: Adherence was effectively enhanced with the help of PLWA. They gave hope and affection to children, educated them on disease and supervised drug taking from their experience. They had enough time to form intimate contact and relationship with children and their caregivers.

Recommendation: With proper support PLWA can be a valuable living tool in enhancing adherence. They provide complimentary task for physicians and other health care workers. In a project to deliver ARV drugs, a working group of PLWA should be part of a health team.

Uptake and characteristics of children in the Thai Ministry of Public Health (MOPH) Pediatric Access to Care (PATC) Program at HIV-NAT/Chulalongkorn Pediatric Infectious Disease Clinic

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Background: We estimate that at least 10,000 Thai children are in need of ARV. Since October 2003, the Thai MOPH has expanded the PATC program to all children. We explore the uptake of children into the PATC program and their characteristics at our tertiary care center.

Methods: HIV-NAT/Chulalongkorn pediatric Infectious disease clinic PATC program included

children who fulfilled ARV initiation criteria (CDC B or C or CD4 < 20%). NNRTI-based HAART was used. ARV and CD4 are provided at no cost to the patients.

Results: Of the 60-target enrollment, 44 pts (73%) were enrolled within the first 9 months (Apr-Dec 2003). Baseline characteristics were 50% males, median age 5.8 yrs (IQR4-8.6), CDC A (34%), CDC B (39%) CDC C (27%). Of the 44 patients, 14 (32%) were old cases (seen prior to PATC) with financial problems and 30 were new (walk-in) cases with a mean of 3.3 new patients per mo. Of the new cases, 80% had no previous knowledge of the PATC program. Only 2/44 (5%) of children had HIV diagnosis disclosed to them. Forty-five percent was orphans. Primary caregivers were 21/44 (47%) biological parents, 36% relatives, 9% others. Of the 24 HIV-infected parents, 9 (38%) never sought their own HIV care. Since their child's enrollment, all except 1 had received HIV care (CD4 and ARV if needed), mostly through adult ATC programs at HIV-NAT.

Conclusion: Uptake of children in the PATC program at our tertiary care center is below target. There were 3.3 new cases per month. Almost all children do not know their HIV diagnosis. The PATC program offers an opportunity to identify and provide HIV-specific care to parents. The majority of patients did not know about the PATC program. There is a need to publicize and involve the community in order to increase uptake of children for the PATC program.

Incidence of reverse transcriptase genotypic mutations in children treated with dual nucleoside reverse transcriptase inhibitors: HIV-NAT 013 study

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Background: To determine incidence of reverse transcriptase (RT) mutations in Thai children treated with dual NRTI. The results will guide the next appropriate ARV regimen options.

Methods: Between Mar and May 2003, 100 dual NRTI-treated children attending the pediatric infectious disease clinics at 2 tertiary care centers in Bangkok were recruited. Clinical, HIV RNA, CD4, RT genotyping were performed. Logistic regression analysis was used to determine the association between NRTI regimens and mutations.

Results: Analysis included 95 pts (5 were excluded from other regimens exposure). Data were mean age 6.6 yrs (SD 2.7yrs), Male (41%), CDC class N (2.1%), A (40%), B (51.6%), and C (6.3%), and median CD4 16% (IQR 8-25%) and HIV RNA 4.5 log (IQR 4.1 - 4.5). Mean time on ARV was 3.8 yrs (SD 2.1yrs) with 73.7%, 21% and 5.3% on their 1st, 2nd and 3rd dual NRTI regimens respectively. Current regimens were AZT/ddI (68.4%), AZT/3TC (18.9%), d4T/ddI (6.3%) and d4T/3TC (5.3%). RT mutations to at least 1 NRTI were seen in 92/95 (96.8%) with mutations to AZT in 90.5%, d4T in 90.5%, 3TC in 31.6% and Q151M cpx in 2.1%. Nucleoside analog mutations (NAMS) were seen in 89.5% with 40% having at least 4 NAMS. Top five RT mutations were all NAMS: D67N (58.7%), M41L (43.5%), T215Y (40.2%), K70R (39.1%) and T215F (32.6%). There was 99% AZT-d4T cross-resistance. AZT-based had more NAMS than d4T-based regimens (OR 4.8, p 0.05). NRTI resistance incidence positively correlated with HIV RNA copies. Most parents (96%) said their child did not miss any doses in the past 3 days.

Conclusions: Almost all children on dual NRTI had RT mutations to at least one NRTI with half

having 4 NAMS or more signifying multi-NRTI resistance. Cross-resistance between d4T and AZT was universal. Use of dual NRTI in children should be discouraged. Salvage therapy with 2 new NRTI plus one new class, especially NNRTI, will likely fail in most children.

Efficacy and safety of Nevirapine based HAART in a cohort of Thai children

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Background: The efficacy and safety of nevirapine (NVP) in severely immune compromised children is poorly documented. Health care professionals in Thailand often tend to choose efavirenz or protease inhibitors as part of first-line HAART regimens in children. This affects the choice of the second line regimen and in particular has long term cost implications for the patient. We evaluated the efficacy and safety of NVP based HAART in a cohort of severe immune compromised children in different settings of Thailand. **Methods:** NVP was provided as part of the ARV regimen in 7 different centres at district and provincial level. Antiretroviral regimens, prescriptions and monitoring were simplified and standardised according to the national guidelines. Efficacy was assessed using clinical and immunological parameters. Adverse events were monitored using clinical signs and symptoms, full blood count and liver enzymes. **Results:** 93 children, with severe immune suppression (median CD4%: 6) have been receiving NVP based HAART since August 2000 for a median duration of 16 months. Immunological response assessed by determination of CD4 % at 6, 12, 18 and 24 months were 15%, 15.5%, 17% and 23% respectively. 10 children (11%) changed regimen because of immunological and /or clinical failure. Other reasons that required discontinuation of NVP included: side effects (rash, fever, elevated liver enzymes) (5%), drug interaction (1%), ended treatment (3%) (no caregiver, relocated, syrup formulation problem) and death (6%), all due to HIV related diseases. 68 patients remained on NVP. There were no fatal side effects. **Conclusion:** In our experience, NVP is effective and safe in severe immune suppressed children. This is particularly important given that NVP containing regimens will become more available in resource poor settings. Efforts to produce pediatric fixed dose combinations (FDC) containing NVP should be supported.

Monitoring of antiretroviral treatment in the private health sector through a country-wide online pharmaceutical management system in Namibia

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Background: In Namibia, about 100,000 persons (5.6%) of the total population are covered by private medical insurance. An online pharmaceutical management system covers since mid 2003 all claims for drugs dispatched through all private pharmacies in Namibia, including ARVs.

Methods: Information from the online database on the ARV regimens dispatched during the last quarter of 2003 was analyzed. The appropriateness of the dispatched regimens was compared with Namibian national ART guidelines for the public and private sector and the cost of regimens was analyzed.

Results: ARVs were dispatched to a total of 2604 patients. Of those, 2449 (94%) received adult and 155 (6%) pediatric formulations. Of the adult patients, 1557 (62%) received recommended

HAART regimens of which 1419 (93%) NNRTI-based and 108 (7%) boosted PI-based. Not recommended regimens (non-boosted PI-based, less potent regimens or regimens containing d4T/ddI) were dispatched to 525 (21%) patients. Regimens recommended for prophylaxis (PMTCT or PEP) were dispatched to 143 patients (6%). Ineffective regimens were given to 238 (10%) patients. Sixteen patients received salvage regimens. Among the 155 children, 68 (44%) received recommended HAART regimens, 52 (34%) received prophylactic regimens and 35 (22%) received inappropriate regimens. The wholesale price of recommended regimens for adults varies between US\$ 82 (EFZ+d4T+3TC) and US\$ 309 (SQV/r+AZT+3TC) per month.

Conclusions: The private health sector is the main provider of ART in Namibia. ART regimens can be greatly improved at a lower cost. The online pharmaceutical management system is an efficient tool to manage HIV care by clinicians, monitor treatment adherence and target interventions to improve HIV management.

Use of resistance testing and most common resistance patterns among HIV-infected children in the Pediatric Spectrum of HIV Disease Cohort, USA, 2002-2003

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Background: The use of antiretroviral (ARV) resistance tests (RTs) with HIV RNA viral load tests (VL) and CD4 counts have proven to be beneficial in the clinical management of HIV-infected adults. As of September 23, 2003, U.S. pediatric ARV guidelines have recommend the use of RTs in children on failing ARV regimens with a VL >1,000 copies/mL. We describe the use of RTs and most common RT results in children in the Pediatric Spectrum of HIV Disease (PSD) Cohort.

Methods: We abstracted results from genotypic (G), phenotypic (P), and virtual phenotypic (VP) RTs; and VLs and CD4 counts documented in the medical records of HIV-infected children in 6 U.S sites: Los Angeles, Texas, Puerto Rico, Washington D.C., Massachusetts, and New York City between 3/1/02 and 5/31/03.

Results: 357 (17%) of 2101 actively followed HIV-infected children had at least one RT documented in a 14 month period. Of 357 children, 64%, 40%, and 20% had G-, P-, or VP- RTs. The median age, VL and CD4 count of children with a RT was 11.2 years, 42,737 copies/mL, and 402 cells/ μ L. 243 (28%) of 869 children on HAART and a VL>1000 copies/mL had a documented RT within 3 months after the VL. "Virologic failure" was the most common documented reason (50%) for a RT. 275 (92%) of 298 children with either a G- or VP- RT had viral mutation(s) and we list the most common genotypic mutations :

Among 141 children with P-RTs, the following drugs had resistance associated in \geq 40% of children: Nevirapine (55%), 3TC (52%), Zidovudine (47%), Efavirenz (47%), Nelfinavir (46%), Delaviridine (45%), and Ritonavir (41%).

Conclusions: In the PSD cohort, RTs were conducted in 17% of actively followed HIV-infected

children mainly due to virological failure. It will be important to determine whether children meeting criteria for failing therapy are undergoing resistance testing as recommended and to document the impact of RTs on pediatric clinical outcomes.

Innovative PMTCT programs at PHC level in rural settings: Initial results from Kilombero and Hai districts in Tanzania.

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Background:In 2002, PMTCT services were only available at 5 tertiary hospitals in Tanzania and only 30% of antenatal attendees were actually getting counseling and HIV testing. In 2003, the district health authorities, with funding from the Elizabeth Glaser Pediatric AIDS Foundation and technical assistance from Axios, introduced PMTCT services in two rural districts to explore the feasibility of PMTCT delivery at primary health care level with active community involvement.

Methods:A needs assessment with all the key stakeholders was done in 2003 and two districts were selected. Selection criteria included HIV prevalence; number of pregnant women; ANC attendance and availability of services.

Six facilities in each district (2 hospitals and 4 health centres) were selected with eventual scale-up to all eligible units. The assessment determined specific requirements after which training, renovation and provision of equipment and supplies was done. Actual service delivery started in September 2003.

Results:Results for the first 3 months show that 3,889 expectant mothers attended antenatal care. 3,201/3,889 (82%) received counseling and HIV testing. 3,058/3,201 (96%) received their test results during post-test counseling. 195/3,058 (6%) were HIV-positive. 121 (62%) of the HIV+ women were above 27 weeks of gestation, and were given Nevirapine to take home with them. At time of writing this paper, 37 mothers had already delivered and their babies had received nevirapine at the health facilities. *Results will be updated at the conference.*

Conclusion:Demand for PMTCT services is high in both districts and VCT attrition rates are quite low for a new program. The high nevirapine uptake shows that PMTCT service delivery can be highly effective at primary health care level.

Effects of combination antiretroviral therapy (CART) on pediatric metabolite levels

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Background: Treatment for HIV is extending survival into adulthood which raises concerns about long-term effects of metabolic changes in childhood.

Methods: This is a retrospective longitudinal study of the significance, extent and frequency of raised metabolites in pediatric HIV patients before and on CART from Jan 2000 to June 2003. Routine non-fasting blood analyses included cholesterol (total C, HDL, LDL), triglyceride (TG), lactate (L) and glucose (G). Mixed-effects regression models (SAS) were used to analyze effects of CART on metabolites.

Results: 146(68 male) children aged 0.1-16(6.9) years attended 1,208 clinic visits, median 6.7(1-23) each. 68% were from Africa. At baseline, 75 children were on therapy. Those on CART had higher median total C 0.7mmol/L p=0.0001, HDL 0.21mMol/L p=0.0001, and LDL 0.43 mMol/L p=0.0003. 82% of follow-up visits were for children on CART. Over time of follow-up, in mixed effect regression, total C increased by 0.07 mMol/L/year of therapy p=0.02, and 53 patients (46.1%) had at least one high total C (>5mMol/L) on CART. The total C increases were reflected in the LDL and HDL: 0.05mMol/L/year p=0.05, 0.03mMol/L/year p=0.02 but no effect was observed on TG, L or G with time on CART. L declined with increasing age -0.06mMol/L/year p=0.0001. Africans had significantly lower total C, TG, LDL and total C/HDL ratio than Caucasians.

Conclusions: To date, this is the largest reported longitudinal pediatric study of metabolites and CART. As no effect was seen on L with CART, we recommend measuring L only in symptomatic patients. CART raises total C above normal basal levels and this increases with longer exposure. The significance of this gradual increase over time is unclear as HDL rises with LDL however, HIV and CART may increase cardiovascular risk, therefore monitoring lipids in children remains important in their management. Drug developments for children should focus on reducing metabolic side-effects.

Determining accurate methods of assessing adherence to highly active antiretroviral therapy (HAART) in Thai children

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Background: Strict adherence to ARV is a critical factor in achieving virologic response. This is a prospective study of the optimal methods of measuring adherence in the pediatric Thai population.

Methods: 14 HIV-infected ARV-naive children returned to clinic at wk 4, 8, 12 and 24. At each f/u visit, adherence was determined through pill count and doctor-patient interview, in which caregivers reported number of doses missed since the last visit. Adherence was calculated as the % of doses taken over those prescribed. Adherence levels were described as follows: full adherence = 100%, partial adherence $\geq 95\%$ and <100 , and non-adherence as $<95\%$ of prescribed doses taken since the last visit.

Results: Children (n=14) were enrolled, 64% male, with a mean age of 2.6 years (IQR 2.1-5.6), mean CD4 18% (IQR 15.3-20.8), CDC A (n=10), CDC B (n=4). A total of 40 caregiver reports were collected, with 80% reporting full and 15% reporting partial adherence. Forty-nine pill counts were collected, with 49% reporting full, 16% partial and the remaining 35% non-adherence. Of the 40 pill count-caregiver report pairs, 45% were in exact agreement, 23% differed $< 5\%$, and the remaining 32% differed $> 5\%$.

Conclusions: While caregiver report has been proven useful in some populations, low correlation between caregiver report and pill count estimates here implies that it may not be an optimal measure of assessing adherence in Thailand. 32% of paired estimates disagreed, with caregiver report tending to overestimate adherence in 82% of these cases. These cautionary results suggest

that caregivers may fear physician disapproval, and it underscores the need for further exploration into optimal population-specific measures of adherence.

Clinical characteristics among a large cohort of predominantly perinatally HIV-infected adolescents in Uganda

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Background: HIV among adolescents in sub-Saharan Africa has not been well studied. We collected data on 138 patients between the ages of 10 - 19 cared for at the Pediatric and Adult Infectious Diseases Clinics at Mulago Hospital in Kampala, Uganda.

Methods: Data were abstracted from the charts, including demographics, clinical presentation, transmission, HIV staging, CD4 counts, total lymphocyte count (TLC), and opportunistic infections (OI). Height/weight for age were calculated using the 2000 CDC growth reference with Epiinfo v.6.0.

Results: Our sample consisted of 38% males and 62% females with a median age of 12. Of 138, 82 (59%) contracted HIV through suspected perinatal transmission. Other risk factors included 5 patients with sexual activity, 3 with sex abuse and 13 with history of blood transfusions. The median height for age Z-score was -2.45; 62% were stunted (Z-score of < -2), and only 38% were within normal range. The median weight for age Z-score was -1.68; 43% were underweight (Z-score < -2). The median CD4 count was 157 (range of 1-2070) with a median TLC of 2.0 (range 0.4-7.5). Data were available to classify 96 of 138 adolescents using the 1993 revised CDC HIV staging. 78 of 96 (81%) patients had AIDS upon their initial presentation to the clinic. The most common complaints were chronic cough (62%), rash (40%), and failure to thrive (38%). The three most prevalent OIs were oral candidiasis (30%), pulmonary TB (27%) and herpes zoster (18%). Prevalence of OIs increased with lower CD4 counts.

CD4	Oral candidiasis	Pulm TB	Herpes zoster	Extra-pulm TB	Kaposi's sarcoma
(1) ≥500	0(0%)	2(7%)	1(6%)	1(33%)	0(0%)
(2) 200-499	8(30%)	10(36%)	2(11%)	0(0%)	0(0%)
(3) <200	19(70%)	16(57%)	15(83%)	2(67%)	4(100%)
Totals	27	28	18	3	4

Conclusions: We studied a large cohort of HIV infected adolescents. Many had marked growth failure and advanced disease. At least two-thirds qualified for antiretroviral therapy. HIV adolescents may represent a large, under-appreciated group in Uganda

Incidence of reverse transcriptase genotypic mutations in children treated with dual nucleoside reverse transcriptase inhibitors: HIV-NAT 013 study

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Background: To determine incidence of reverse transcriptase (RT) mutations in Thai children treated with dual NRTI. The results will guide the next appropriate ARV regimen options.

Methods: Between Mar and May 2003, 100 dual NRTI-treated children attending the pediatric infectious disease clinics at 2 tertiary care centers in Bangkok were recruited. Clinical, HIV RNA, CD4, RT genotyping were performed. Logistic regression analysis was used to determine the association between NRTI regimens and mutations.

Results: Analysis included 95 pts (5 were excluded from other regimens exposure). Data were mean age 6.6 yrs (SD 2.7yrs), Male (41%), CDC class N (2.1%), A (40%), B (51.6%), and C (6.3%), and median CD4 16% (IQR 8-25%) and HIV RNA 4.5 log (IQR 4.1 - 4.5). Mean time on ARV was 3.8 yrs (SD 2.1yrs) with 73.7%, 21% and 5.3% on their 1st, 2nd and 3rd dual NRTI regimens respectively. Current regimens were AZT/ddI (68.4%), AZT/3TC (18.9%), d4T/ddI (6.3%) and d4T/3TC (5.3%). RT mutations to at least 1 NRTI were seen in 92/95 (96.8%) with mutations to AZT in 90.5%, d4T in 90.5%, 3TC in 31.6% and Q151M cpx in 2.1%. Nucleoside analog mutations (NAMS) were seen in 89.5% with 40% having at least 4 NAMS. Top five RT mutations were all NAMS: D67N (58.7%), M41L (43.5%), T215Y (40.2%), K70R (39.1%) and T215F (32.6%). There was 99% AZT-d4T cross-resistance. AZT-based had more NAMS than d4T-based regimens (OR 4.8, p 0.05). NRTI resistance incidence positively correlated with HIV RNA copies. Most parents (96%) said their child did not miss any doses in the past 3 days.

Conclusions: Almost all children on dual NRTI had RT mutations to at least one NRTI with half having 4 NAMS or more signifying multi-NRTI resistance. Cross-resistance between d4T and AZT was universal. Use of dual NRTI in children should be discouraged. Salvage therapy with 2 new NRTI plus one new class, especially NNRTI, will likely fail in most children.

Use of resistance testing and most common resistance patterns among HIV-infected children in the Pediatric Spectrum of HIV Disease Cohort, USA, 2002-2003

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Background: The use of antiretroviral (ARV) resistance tests (RTs) with HIV RNA viral load tests (VL) and CD4 counts have proven to be beneficial in the clinical management of HIV-infected adults. As of September 23, 2003, U.S. pediatric ARV guidelines have recommend the use of RTs in children on failing ARV regimens with a VL >1,000 copies/mL. We describe the use of RTs and most common RT results in children in the Pediatric Spectrum of HIV Disease (PSD) Cohort.

Methods: We abstracted results from genotypic (G), phenotypic (P), and virtual phenotypic (VP) RTs; and VLs and CD4 counts documented in the medical records of HIV-infected children in 6 U.S sites: Los Angeles, Texas, Puerto Rico, Washington D.C., Massachusetts, and New York City between 3/1/02 and 5/31/03.

Results: 357 (17%) of 2101 actively followed HIV-infected children had at least one RT

documented in a 14 month period. Of 357 children, 64%, 40%, and 20% had G-, P-, or VP- RTs. The median age, VL and CD4 count of children with a RT was 11.2 years, 42,737 copies/mL, and 402 cells/ μ L. 243 (28%) of 869 children on HAART and a VL>1000 copies/mL had a documented RT within 3 months after the VL. "Virologic failure" was the most common documented reason (50%) for a RT. 275 (92%) of 298 children with either a G- or VP- RT had viral mutation(s) and we list the most common genotypic mutations :

Among 141 children with P-RTs, the following drugs had resistance associated in \geq 40% of children: Nevirapine (55%), 3TC (52%), Zidovudine (47%), Efavirenz (47%), Nelfinavir (46%), Delaviridine (45%), and Ritonavir (41%).

Conclusions: In the PSD cohort, RTs were conducted in 17% of actively followed HIV-infected children mainly due to virological failure. It will be important to determine whether children meeting criteria for failing therapy are undergoing resistance testing as recommended and to document the impact of RTs on pediatric clinical outcomes.

Resistance patterns characteristic to subtype C HIV-1 in children and their clinical applications

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Background: Data on resistance patterns of subtype C HIV-I and their relationship to treatment regimens in children is limited. Differences among subtypes may result in the selection of different mutations.

Methods: 136 genotypic sequencing, clinical and immunological evaluations were done in 59 children (6 mo – 18 yrs, median 7 yrs), 28 males, 49 subtype C.

Results: 7/43 NNRTI naïve subtype C children developed significant NNRTI mutations: A98G (2), Y181C (1), Y188S (1), G190A (3). Subtype C Children with M184V had lower RNA levels (log(RNA) 4.93 (n=45 samples of 28 children) vs. 5.68 (n=72 samples of 39 children; p=0.001). Of 20 children who received only D4T/ZDV + 3TC + PI(17)/NNRTI(3) over a mean of 21.5 \pm 3.6 months: 13/17 C and 3/3 B acquired M184V as their first mutation while 1/17 C and 3/3 B developed TAMs. Only one developed a major PI mutation. In this group, in whom therapy was not changed, there was a further mean follow up period of 16.8 \pm 2.3 (median 18) months, during which there was clinical deterioration in one B child only. HIV RNA decreased in 19/20 and in 8 it became undetectable. The average of CD4+ counts increased from 807 \pm 54 to 1013 \pm 189. In a second group of 17 (13 C) children treated with other drugs and multiple switches, 14 developed TAMs (mean 2.5 per patient); 3 non-TAMs; 7 developed major PI mutations. Difference in the number of patients developing TAM 1/15 vs. 14/17 was significant (p< 0.0001). HIV RNA levels and CD4 counts were similar in both groups.

Conclusions: In our subtype C pediatric population a conservative strategy following initiation of a thymidine analogue + 3TC based regimen preserves future options by reducing the accumulation of TAM without compromising outcome. This may be due to an enhanced TAM

sparing M184V effect in subtype C virus. Further prospective study is required to confirm this observation and to appreciate the clinical importance of NNRTI resistance in naïve C children.

High survival rates in HIV infected children living in a developing country without widespread access to antiretroviral treatment

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BACKGROUND: Information regarding survival rates in children living in developing countries where antiretroviral (ARV) therapy is not available is scarce. This study analyzed the overall survival (OS) rate of HIV positive children, without access to ARV, living in the Dominican Republic. **METHODS:** A consecutive sample of 437 HIV+ children followed by the same team of pediatricians between 1986 and 2003 was evaluated. HIV infection in children <18 months of age was calculated using RNA-HIV-1 (Quantiplex b DNA Analyzer, BAYER-CHIRON). Children >18 months were considered HIV-infected, if blood tested positive for the virus (ELISA, ABBOT). Co-trimoxazole was routinely given to all HIV infected children. Estimated HIV survival rates were obtained by Kaplan Meier method. Multivariate analysis was performed by the Cox model. OS was defined as the time the patient remained alive up to the documented date of death. **RESULTS:** Fifty one percent of the patients were female and the median overall survival (OS) was six years (OS= 6, 95%CI: 5.8, 6.9). The rate of survival at one, five and 10-years of follow-up was 91%, 60% and 22%, respectively. Multivariate Cox regression analysis identified three significant prognostic factors of mortality: vertical transmission (RR=2.4, 95%CI: 1.4, 4.3, p< 0.05), mother's death (RR=1.8, 95%CI:1.2, 2.7, p< 0.05), and baseline CD4 < 250 (RR =1.0, 95%CI: 1.01, 1.05, p < 0.05). **CONCLUSIONS:** The higher than expected survival rate in this cohort of HIV infected children not taking ARV therapy, and receiving co-trimoxazole, may reflect close medical supervision of clinical symptoms and effective treatment of the most prevalent opportunistic infections in this type of patients. Support: NIH/Fogarty AITRP(D43TW00017).

Once daily (QD) emtricitabine (FTC) with other antiretroviral agents (ART) in HIV-infected pediatric patients at 48 weeks

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Background: Emtricitabine is a newly approved QD NRTI for the treatment of HIV infection in adults. Emtricitabine has potent activity against HIV and HBV. In children, a 6-mg/kg QD dose produces plasma AUC values comparable to adults receiving 200 mg QD. An open-label, non-randomized Phase II study to obtain long-term safety and efficacy data for ART regimens

containing FTC in HIV-1 infected children is ongoing and 48-week data are presented.

Methods: ART-naïve [HIV-1 RNA (VL) ≥ 5000 but $\leq 500,000$ cp/mL] patients (pts) and ART-experienced pts (exp) on stable ART containing lamivudine (3TC) for ≥ 3 mo [≤ 400 cp/mL], ages 3 mo-17 yr were eligible for enrollment. Exp pts switched to FTC from 3TC in their regimens. Naïve pts received FTC + stavudine + lopinavir/ritonavir. Results are based on the Wk 48 ITT population for efficacy analyses. PK evaluation was conducted at steady-state.

Results: 82 children [median (range) age of 6 yr (4 mo-16 yr) were enrolled, 51 naïve and 31 exp (median 4 yr prior ART). Median baseline VL and CD4 were $4.6 \log_{10}$ and 840 cells/mm^3 , respectively and the median changes in VL and CD4 at Wk48 were $-2.8 \log_{10}$ and $+177 \text{ cells/mm}^3$, respectively. At Wk48, 89% pts achieved and maintained a VL ≤ 400 . Grade 3/4 lab abnormalities were reported in 5 patients with neutropenia in 2 pts. Fourteen pts discontinued the study, 2 for SAE related to study drugs (1 anemia, 1 pancreatitis), 1 death (acute myeloid leukemia), 4 for virologic failure, 1 for non-compliance, 3 lost to follow-up and 3 withdrew consent. PK results are available for 31 children: observed AUC values are similar to those produced in adults ($\sim 10 \text{ hr} \cdot \mu\text{g/mL}$).

Conclusion: These results suggest that once daily Emtricitabine (FTC) liquid solution in children is well tolerated and has a potent antiviral activity similar to that seen in adults.

Program of Prevention and Control of the Vertical Transmission of the Paediatric AIDS in Cuba

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Background: A controlled program has been implemented at the primary health care level in Cuba since 1986 aimed at reducing the perinatal transmission of the HIV .

Methods: The program includes the administration of antiretroviral drugs to every woman who decides to continue her pregnancy. AZT is used in a dose of 500 mg daily from week 14 until the end of pregnancy. Cesarean section is the most usual way of childbirth. During the first 6 weeks the child receives AZT in syrup (2mg/Kg/dose) every 6 hours. The evolution of these children is followed up at the Pediatric Outpatient clinic and are subsequently studied to determine whether they are infected or not by HIV.

Results: A total of 980 seropositive women have been reported since January 1, 1986 to August 30, 2003 (19, 6%) of all the seropositive, (980/4987). One hundred twenty six (12,8%) of them have delivered a total of 131 children (5 women have delivered twice). Eighteen out of 131 are HIV+ (13, 7%), and 16 already classified as AIDS (88, 8%) 9 have treatment with tritherapy, 7 (38, 8 %) have died and 2 are asymptomatic. There are 85 children with non-demonstrable infection using PCR and Western Blot assays (64, 8%). Twenty-eight (21, 3%) others children are still under study.

Conclusion: May be considered that the Cuban HIV Control and Prevention Program is effective since the number of infected children remains low when compared to the figures of infected children from other countries

Uptake of interventions, preliminary outcomes and challenges in caring for HIV exposed infants in Kingston, Jamaica. A preliminary report of the Kingston pediatric and perinatal

HIV/AIDS program, September 01, 2002 - August 31, 2003. Funded by the Elizabeth Glaser pediatric AIDS foundation, international leadership award 1-ILA-11-01

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Background: In a few Caribbean islands, pMTCT of HIV with zidovudine prophylaxis has reduced transmission rates from 27 - 44% to 5.5 - 9%. This paper highlights the uptake of interventions, preliminary outcomes and challenges in caring for HIV exposed infants in a pMTCT program in a resource-limited setting.

Methodology: A cohort of HIV infected pregnant women were identified at the leading maternity centers in Greater Kingston through HIV counseling and testing. Antiretroviral prophylaxis with zidovudine (long-short regimen), or nevirapine was given to the HIV-positive women and their newborns along with formula feeding. Some infants were enrolled retrospectively and followed irrespective of whether they had received antiretroviral prophylaxis. A multidisciplinary team at the pediatric centers supervised protocol-driven management of the infants. Infants were followed for clinical progress and definitive HIV-infection status is being confirmed at 18 months of age by HIV ELISA or the Determine Rapid Test.

Results: During Sept 01, 2002 through August 31, 2003, 132 HIV-exposed infants were identified. For those infants prospectively enrolled (78), 97% received antiretroviral prophylaxis and 90% were not breastfed. For all HIV-exposed children 90% received cotrimoxazole prophylaxis and 88% continued follow-up care. 92% of all the infants remained asymptomatic and 5 died, of which one is possibly HIV-related (severe sepsis at 11 weeks). This infant was retrospectively identified and received no anti-retroviral prophylaxis and was breastfed. The main program challenges, which were overcome, included the impact of stigma and compliance with prophylaxis, breast milk substitution and follow-up care. Financial constraints and laboratory quality assurance issues limited early diagnosis of HIV infection.

Conclusions: Despite challenges, the expected outcome, is to prevent 50 new cases of HIV/AIDS in children living in Kingston per year.

Prognostic factors and long-term survival of Thai children with HIV-1 infection

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Background: There is scant information from developing countries about prognostic factors and long-term survival of HIV-1-infected children. This report presents an experience from Thailand during a 15-year period. Setting: A university hospital in Bangkok. Methods: All vertically HIV-1-infected children, having first visit at Ramathibodi Hospital during 1988-2001, were included. The study was closed in December 2002. Children living with HIV-1-infected parents were taken care of as a family unit by a pediatric AIDS specialist and her team. Most antiretroviral drugs (ARV) were provided by the Ministry of Public Health, Thailand. Results: There were 121 children and their families. Ninety percent of the children living with families were in low socioeconomic status. Study was divided into 3 patient-enrollment periods: 1988-1992 (no ARV),

1993-1996 (mono or dual ARV), 1997-2001 (dual and triple ARV). The number of children in the 3 study periods were respectively 13, 44, 64; median (range) of ages at start of ARV treatment 12 (0-27), 8 (0-51), 37 (0-14) months. The percentages of severely symptomatic cases were respectively 46, 36, and 27; 5-year symptom-free children 50, 74 and 88; 5-year survival since ARV treatment 35, 62 and 91. Ten were lost to follow-up before the end of the study due to deaths of parents or moving to a place too distant from Bangkok. Lost to follow-up rate was 2/1000 person-month during a 4,957 person-month follow-up. Forty-seven children died. Risk factors for deaths were: enrollment during 1988-1992, severe malnutrition or severe AIDS at enrollment, and no ARV or ARV monotherapy. Infection was cause of deaths in 28%. At the end of the study, 64 children were alive and in good health, 36 (54%) were older than 6 years. Conclusion: Our model in a developing country of caring for HIV-1-infected children as part of a family unit and providing ARV therapy resulted in very low rate of lost to follow-up and good clinical outcome.

Fertility and the perinatally acquired HIV-infected female: a new public health dilemma

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Issues: Since the development of the Pediatric AIDS Clinical Trials Group (PACTG) Protocols, the risk of mother-to-child transmission has dramatically decreased. Prior to the protocols, the prognosis of children born to mothers with AIDS was poor. However, the advances of antiretroviral therapy have increased the life expectancy of HIV-infected children, with many now in their childbearing years. The protocols for treatment of children with HIV are different than for adults. A literature review of the topic has resulted in a paucity of data on the specific prenatal management of the perinatally acquired HIV-infected adolescent. Description: This paper will discuss the care of a 16 year old adolescent referred to a multidisciplinary, tertiary-level center for prenatal services. The patient was diagnosed with HIV since birth and had received antiretroviral therapy prior to the pregnancy. The perinatal center followed the PACTG protocol with particular attention given to issues specific to adolescent health, such as adherence to the new medication regimen and the emphasis on continuity of care. The plan of care included frequent outpatient prenatal visits and blood tests to determine any changes in her CD4 and HIV-RNA counts. The patient delivered a 3285-gram male infant by cesarean section at 38 weeks gestation. No complications were noted. Lessons learned: An understanding of the issues important to the adolescent patient is a critical factor in the successful management of HIV and pregnancy. A rapport must be established to determine her priorities for short- and long-term goals and the prognosis of the health of the mother and her infant. Recommendation: Additional research is necessary to determine the efficacy of the PACTG protocols for the pregnant adolescent infected with HIV from birth.

Co-Infection Among Adolescents And Children

Associated Factors and Outcomes of Tuberculosis in Jamaican Infants and Children with HIV/AIDS –

Funded in part by the Elizabeth Glaser Pediatric AIDS Foundation International Leadership Award, 1-ILA-11-01 (CDCC)

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Background: There has been a worldwide increased prevalence of tuberculosis (TB) in recent years including in Jamaica and in children attending the UHWI. Data regarding pediatric TB, especially as it relates to all aspects of HIV co-infection is badly needed from developing countries in diverse geographic settings (NIH, OAR, 2005 Plan). **Objective:** To determine associated factors and outcomes of tuberculosis in HIV-infected and non-infected children in Jamaica; where 1:5 HIV cases are associated with TB. **Method:** We reviewed records of children aged 0 - 12 years attending the University Hospital of the West Indies during Jan 1999 - Dec 2002. Associated factors and outcomes in HIV-infected and HIV-negative cases with TB were compared using exact statistical methods to account for the small number of children and an adjustment for multiple testing. TB diagnosis was determined using modified WHO criteria. **Results:** There was a statistically significant increase of active TB cases from 1999- 2002 with 24 children diagnosed; 15 occurred in 2002; 11 were HIV-infected from mother-to-child transmission. HIV-infected children were statistically more likely to be younger (mean 2.6 vs. 4.2 years), and also to have failure to thrive, splenomegaly, digital clubbing, hepatomegaly, generalized adenopathy and negative Mantoux tests. Appropriate in-hospital anti-TB therapy was given. Three of 11 HIV-infected cases received triple antiretroviral therapy. Hospital stay was longer (median 7.4 vs. 2.8 months) and death was more likely (7/11 vs. 2/13) in HIV-infected vs non-infected children. Household family members with active TB were identified in 12. **Conclusions:** HIV and TB co-infection is an increasing problem in Jamaican children. Severity of illness and death is greater in HIV-infected children, despite appropriate anti-TB therapy. Antiretroviral drugs must be made available to this population. Efforts must be maximized to reduce mother-to-child-transmission of HIV/AIDS; to achieve full contact tracing and complete TB therapy by DOTS to eliminate the spread of TB.

Clinical scoring systems for pediatric tuberculosis in the HIV era

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Background: Diagnosis of pediatric TB is difficult and based on clinical scoring systems. These were developed before the HIV era and haven't been validated in the HIV endemic setting. This study aims to evaluate the performance of published TB scoring systems in the setting of HIV co-infection. **Methods:** In a 1 year (8/2002 – 8/2003) retrospective study at Kalembelembe Pediatric Hospital, Kinshasa, Democratic Republic of Congo, TB cases were defined by a Keith Edwards score ≥ 7 , which equals treatment strongly recommended. Clinical data were collected and scores for the Fourie, WHO, Stegen, Nair, Seth, Brazilian MOH, and Ghidey & Habte scales were calculated. **Results:** Of 111 cases, 105 had complete clinical records, 91 had known HIV results, of which 42 were HIV infected. The mean age was 2.6 and 3.8 years for HIV uninfected and infected, respectively ($p=0.11$). Except for 7 HIV uninfected children, all had symptoms for at

least 1 month. 74% and 41% of HIV infected and uninfected cases, respectively, were below the 80th percentile for weight. There was no substantial difference between in the proportions presenting with pulmonary TB, family history of TB, positive PPD, weight loss, fever, nightsweats and lymphadenopathy. The average Edwards score was 11.6 in HIV negative and 14.1 in HIV positive children ($p=0.0005$). 0 to 11% were classified as not TB by non-Edwards scoring systems (0% Nair and Seth, 1% Stegen, 4% Gides, 11% Fourie and 11% Brazil MOH). The proportion classified as certain or confirmed TB ranged from 2 to 82%. **Discussion:** In this population, HIV infected children did not present substantially different from HIV uninfected children. There was a higher level of agreement between the scoring systems for HIV negative compared to HIV positive cases. Studies prospectively validating the performance of TB scoring systems in HIV endemic areas are urgently needed.

CDC-defined diseases and opportunistic infections among Jamaican children with HIV/AIDS

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Background: The clinical presentation of Pediatric HIV/AIDS has not been clearly defined prospectively in the Caribbean. We document the frequency of CDC-defined clinical conditions among HIV/AIDS infected Jamaican children.

Methods: In a prospective, observational study of the Kingston Pediatric Perinatal Program, 110 children were followed in multicentre ambulatory clinics during 01 September to August 31, 2003. We report the clinico-pathologic characteristics of these children, using the CDC criteria.

Results: The median age of the 110 children was 6.0 years (range 0.9-17.5). Transmission was primarily Mother-to-Child (88.0%) and only 4% maternal/infant pairs received antiretroviral prophylaxis. By CDC category: 15.4% were asymptomatic (N), 20.0% mildly symptomatic (A), 27.3% moderately symptomatic (B) and 37.3% severely symptomatic (C). The most common CDC-defining symptoms were lymphadenopathy (42.9%) and asymptomatic (21.4%) in category N; lymphadenopathy (29.7%), dermatitis (19.8%) and persistent or recurrent upper respiratory tract infections (19.8%) in category A; bacterial sepsis (35.2%) and recurrent diarrhoea (20.4%) in category B; and wasting (29.5%), encephalopathy (29.5%), and serious bacterial infections (15.8%) in category C. Pulmonary tuberculosis (7.4%) and PCP (5.3%) were the most frequent opportunistic infections. Thirty-three percent commenced antiretroviral drugs (ARVs). There were 57 hospitalisations and five deaths.

Conclusions: The study is an important step toward documenting the natural history of pediatric HIV/AIDS in a primarily ARV-naïve population in a developing country. It promotes training in Pediatric HIV management in preparation for affordable access to ARVs in the Caribbean and implementation of clinical trials. Funded in part by the Elizabeth Glaser Pediatric AIDS Foundation, International Leadership Award 1-ILA-11-01 and a research fellowship from the University of the West Indies, Jamaica.

Palliative Care For Children With AIDS

Family support unit improves care and support to HIV infected children and their caregivers in Lusaka Zambia

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Issues: The number of children infected with HIV continues to grow in Zambia. HIV sero-prevalence among hospitalized children at the University Teaching Hospital (UTH) Lusaka has increased from 20% in 1992 to 39% in 2000. We describe our experience in providing care and support to HIV infected children and their caregivers.

Description: In 1992 we established a Family Support Unit (FSU) in the Department of Paediatrics and Child Health at the UTH with the following objectives: To provide HIV voluntary counseling and testing (VCT) to the caregivers and to improve care and support through health education, training nutritional and psychosocial support.

Lessons Learned: It was initially difficult for the affected clients to join the FSU due to low awareness of HIV/AIDS and high stigma attached to it. However over the years we have established a multi-disciplinary HIV care and support team, which includes pediatricians, clinical officers, nurses, counselors, nutritionists and a medical social worker. The team has trained the fellow health care providers. It has re-organized Tuberculosis and Malnutrition follow-up clinics, which have many HIV, infected children. Guidelines are developed in the prevention of opportunistic infections. Effort is made to involve both the parents in the care of their children. Total number of clients counseled has increased from 349 in 1995 to 1,614 in 2003. Post-test clubs to the caregivers and various recreational and educational activities to HIV infected and affected children have assisted in improving care and support.

Recommendations: The activities of the FSU should be expanded to the primary health care centers, districts and regional hospitals. Caregivers and the government should plan to provide Anti-retroviral drugs to the needy children and their parents recruited at the FSU.

Co-factors of malnutrition and bad nutritional recuperation of children infected by the HIV/AIDS

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Background: To determine co-factors contributing to the malnutrition and affecting nutritional recuperation of children infected by the HIV/AIDS. **Methods:** Assessment of nutritional rehabilitation of children infected by the HIV/AIDS. The study involved eighty (80) children between the age of 3 months and 12 years, who were admitted and treated in Department of the Infectious Illnesses of Kalembelembe Pediatric hospital at Kinshasa, in Democratic Republic of Congo from August 2002 to January 2003.

Results: *- 42 children, 52%, were in good nutritional state;
- 8 children, 10%, had light malnutrition;
- 30 children, 38%, had malnutrition, 18% of whom, that is 14 children suffered from severe malnutrition.

* As a result of the nutritional rehabilitation of 30 children suffering from malnutrition, 18

children (that is 60% of cases) could not recover due to the several oral cavity anomalies. These anomalies consisted of:

- Oro-esophagus candidacies: 66,6% of cases (12 children);
- Oral ulcerations: 33,3% of cases (6 children);
- Dental lesions (decayed or broken teeth...): 55,5 of cases (10 children).

* As a result of the oral dental infections treatment, in addition to general care provided, the following was observed:

- Improvement of 61,1% of cases (11 children) under nutritional rehabilitation;
- Improvement of 27,7% of cases (5 children) with regular meals;
- Death of 11,1% of cases (2 children) some illness advances following the state.

Conclusion: It is concluded that a rich well balanced diet adequately meets the needs of children infected by HIV/AIDS. However, this diet can only be beneficial (in 60% of the cases), if oral cavity infections and affections (that aggravate the malnutrition and affect nutritional recuperation) are also treated. Good treatment of oral infections and affections would contribute to the improvement of the nutritional state of children infected by the HIV/AIDS as well as to the quality of their life.

HIV positive children of Calcutta ---- survival strategies without antiretroviral drugs

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Background : Pediatric HIV is rapidly progressive than adult HIV infection. Antiretroviral drugs are costly and thus are beyond the reach of the families of HIV positive children. In this study some non-retroviral strategies were tried for the prolongation of survival of HIV positive children. **Method:** Sixty-five HIV positive children (2-11 yrs.) were longitudinally followed up for three and a half years at Calcutta(India). These patients were mostly from poor families, out of which about 50%(n=32) had single surviving parent and 9.2%(6) were orphans. Out of the 42 males and 23 females, 69.2%(45) had acquired the infection perinatally and the rest through blood transfusion. The following approaches were taken during follow-ups. A) Monthly or 2-monthly thorough check up. B) Patients were advised to maintain high standards of hygiene related to safe drinking water, food habits and environment. C) Nutritional supplementation (especially vit A/Zinc) and good affordable nutritional diet was advised. D) Early and adequate management of opportunistic infections were undertaken. E) CD+4 count was undertaken once or twice a year. Viral load could not be done due to unaffordability. **Result:** Five patients were lost during follow up. Significant number of children 83.3%(n=50) were found to be maintaining good health without any immunosuppression and with a normal or slightly low-normal CD+4 count(CDC) as per their age. Sixty-six %(40) children maintained schooling and education. Around 16.6%(10) suffered from recurrent diarrhoea, respiratory infection with moderate immunosuppression(CDC)..Recurrent itchy and seborrheic dermatitis were observed in 20%(12) of these children. There was significant decrease in the mortality rate with only 8.3%(5) children dying due to tubercular meningitis and bacterial pneumonia. **Conclusion:** Strict maintenance of high standard of hygiene, good nutrition, early and aggressive management of opportunistic infections and frequent counseling prolonged survival of these HIV positive children who could not afford antiretroviral therapy.

Nutrition And Feeding Of Children With HIV/AIDS

Effect of antiretroviral therapy on nutritional status of HIV infected children

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Nutritional status is frequently affected in HIV-infected children, particularly the height/age ratio but there are today only a limited number of studies defining growth parameters and nutritional status for HIV children under antiretroviral therapy.

Objective: To evaluate the effect of antiretroviral therapy (ARV-T) on nutritional status of HIV infected children.

Methodology: This is a cross-sectional descriptive study that evaluates HIV children, aged above 2 years, from an ambulatory pediatric HIV clinic, in a period of time between January 2002 to December 2003. Patients were grouped in: Group A (without therapy due to medical advice, n=15) and Group B (under ARV-T longer than a year, n=34). The following indicators were use: Body Mass Index (BMI), Height-for-age (HA), Mid Upper Arm Circumference for Height (MUACH), fat distribution according to triceps and subscapular skinfold thickness. Statistical analysis was performed using Student-t test on the EpiInfo2003 program. Results are expressed as z-score means (b SD).

Results: the results are showed in Table 1.

Table 1. Nutritional status evaluation.

	Group A (mean+/-SD)	Group B (mean +/-SD)	p
Age	6+/-3	7+/-3	p>0.05
BMI*	0.45+/-0.9	0.34+/-1.1	p>0.05
MUACH	-0.6+/-0.9	0.2+/-0.98	p>0.05
HA	-0.75+/-0.3	-1.1+/-1.21	p>0.05

*[No differences (p>0.05) were observe when comparing the fat distribution in children with normal BMI].

Conclusion: As an average both groups compared with international reference values show normal anthropometric distribution with exception of HA. In our study no differences were observed on anthropometric parameters between groups; and height deficit observed on children under antiretroviral therapy in not significant.

Field test of guidelines for nutritional management in pediatric HIV infection

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Background: Guidelines for nutritional management of HIV-infected pediatric patients were field tested through two pediatric clinics (San Antonio and Harlingen, Texas). **Methods:** Children were referred for enrollment in the field test by their primary physician. A nutrition program based on guidelines included counseling and other nutrition interventions were implemented for the intervention group (Group A) and a control group (Group B) was observed for a period of 9-12 months. **Results:** Thirteen children were enrolled into Group A and 9 children were enrolled into Group B. Ages ranged from 2.3 to 14.6 years in Group A and 6.8 to 14.6 years in Group B. Observations were completed for a mean of 11.9 months (range 3-15) in Group A and 9.7 months (range 9-10) in Group B. Baseline and final visit comparisons for WHO Z-scores and body

composition estimates are shown in the tables below. Data comparisons to food intake, laboratory values, and medications will be included in the full evaluation.

	Grp A Baseline	Grp A Final Visit	Mean change/mo.	Group B Baseline	Group B Final Visit	Mean change/mo.
H/A Z	-0.8	-0.4	+0.02	-1.1	-1.3	-0.01
W/A Z	-0.6	-0.4	+0.01	-0.7	-0.4	-0.03
BMI/A Z	-0.3	-0.4	-0.01	-0.3	+0.4	+0.07
FFM (kg)	18.4	20.8	+0.46	20.2	22.1	+0.44
Fat Mass (kg)	7.1	7.2	+0.01	6.0	8.2	+0.23

Because there were differences in the length of observation between the two groups, a mean change per month was calculated. Routine visits, counseling, and intervention appeared to have a positive effect on improving Height for Age (H/A) and Weight for Age (W/A) Z scores. Estimated Fat Free Mass (FFM) was also improved in the intervention group. The control group showed an improvement in BMI for Age (BMI/A) and fat mass. **Conclusions:** The implementation of a nutritional management program was well received by the health care team and patient families. Nutritional management programs can be effective in improving markers of nutritional status and growth in HIV-infected pediatric patients. Routine nutrition-related evaluation with counseling and intervention should be considered in the development of a comprehensive health management program for these patients.

Malnutrition in HIV infected Cambodian children

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Background: Both malnutrition and HIV are prevalent in Cambodia. To date, the relationship between malnutrition and HIV disease stage has not been well described in Cambodian children, but malnutrition is likely to impact on the course of HIV infection. We examined the relationship between malnutrition, assessed by anthropometric measures, and disease stage, assessed by CD4%, in a cohort of HIV infected antiretroviral naïve children in Siem Reap, Cambodia.

Methods: A cross-sectional retrospective review was performed among HIV infected children currently enrolled in the HIV clinic at a free pediatric hospital. Clinical data included demographic information, CD4% and malnutrition as described by Weight for Height Z-scores (WHZ). Patients were included if their record included a recent CD4 percentage, height and weight.

Results: 50 patients were included in the study. The mean age of the patients was 54.5 months with a range of 14 months to 10 years. There were 29 males and 21 females; there was no significant difference in WHZ or CD4% based on sex. The mean CD4% was 10.7±8.6 and 70% of patients had CD4%<15. The mean WHZ was -1.6±1.0 and 28% of patients had WHZ<-2. Using linear regression analysis there was a positive, although not statistically significant, correlation between CD4% and WHZ.

Conclusions: Untreated HIV infected children at the hospital, as a group, tend to be both severely immune suppressed and malnourished. There is a trend towards a correlation between the degree of malnutrition and the degree of immune suppression, and a larger sample size would help to

ascertain whether this trend is significant. Given the high prevalence of malnutrition among HIV infected children nutritional interventions need to be developed for them.

Social And Community Roles In Caring For HIV/AIDS Infected Children

Youngz in action a program for youth affected by HIV/AIDS

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Issues: For children living in HIV infected households, children orphaned by HIV/AIDS and children who are themselves HIV positive, basic rights to food, housing, and health care are violated to such an extent that their survival is threatened.

Description:

The primary focus was on motivation, coping skills development and communication skills development. The focus was not specifically on coping with HIV in their family, but instead was to develop skills for positive living that could be used regardless of their status. The other main objective of the project was to prepare the students for either the disclosure of their parents' HIV status and/or the death of their parents. The sessions allowed the students to develop skills, attitudes and values that would help them to deal with the circumstances of their lives. During the final session with the parents, the main objective was to get feedback from the parents on their views on the project and what had happened in their families as a result of their children's participation.

Lessons learned:

The ultimate success of the project was that the students were able to express their emotions in a positive way, they developed a sense of hope for the future and they were able to develop skills that to help them to communicate in a healthy manner with their parents and others.

Recommendations:

- Develop an ongoing project for the students to provide support, more skills development, and problem solving on an weekly basis.
- The need for referrals to community services that will help them address their needs for food, clothing and housing.
- Additional programs such as this that allow more youth to develop positive life skills that will assist them as they face the death of their parents from AIDS.
- More involvement of the parents with the children in discussing death and the future of their children.

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HIV Disclosure in children

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Background: In our pediatric population, only 2% of caregivers tell their children of his/her HIV status. We explore the attitudes of caregivers towards HIV disclosure.

Methods: Between October to December 2003, caregivers that have not disclosed HIV diagnosis to their children were recruited and asked to complete a questionnaire developed by our group which was modified from the questionnaire of Lori Weiner (National Institutes of Health, Bethesda, MD, USA).

Results: Of the 41 caregivers, 41% were mothers, 22% were fathers, 27% were others. The children's median age was 7 yrs (ranges 2.8 to 13 yrs) and half were males. Seventeen percent of caregivers were unsure whether the child was aware of his/her HIV status. Sixty-three and 37% intended to disclose and not disclose respectively. The reasons for not disclosing were effect on child's mental health (73%), confidentiality (5%), child's immaturity (31%). Factors to attain before disclosing were child's maturity (80%), ability to keep secrets (37%), and good health (32%). Only 7% of caregivers said that they needed to have enough knowledge. The child's reactions if told: ask how he/she contracted it (46%), cry/sad (34%), and depress/quiet (34%), commit suicide (5%). The planned responses if asked by the child about his/her HIV status: inquire what the child would do if HIV positive and respond accordingly (56%), tell the child he/she does not have HIV (17%), tell the truth (17%). Of the 11 who answered, the mean age to disclose was 12 (ranges 5-18yrs). The best person to disclose was caregiver (59%), doctor (15%), team of health professionals (10%), let the child discover on his/her own (5%).

Conclusion: Sixty percent of caregivers intended to disclose HIV diagnosis to their children but have poor preparation and are willing to lie/distort the truth if asked. There is a need to help both caregivers and children prepare for HIV disclosure.

Should we participate? Community perceptions at PMTCT program sites in Hai and Kilombero districts of Tanzania.

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Issues: Due to high HIV prevalence among pregnant women attending antenatal care (ANC) in Tanzania (12%), district health authorities, with funding from the Elizabeth Glaser Pediatric AIDS Foundation and technical assistance from Axios, introduced prevention of mother-to-child HIV transmission (PMTCT) services in 2 rural districts to explore the feasibility of PMTCT at primary health care level. Client perceptions to this new program were a key step.

Description: Interviewers explored community perceptions about PMTCT to guide the development of relevant communication messages about the new program. 4 focus groups of pregnant women were conducted, 2 with married men and 2 with the 'influencers' (women over 45 with grandchildren) in each district. Issues discussed dealt with perceptions about ANC attendance, HIV infection and prevention as well as VCT & PMTCT uptake.

Lessons learned: Most respondents felt that expectant mothers should attend ANC at least once, but some respondents (especially men) felt their wives should attend ANC only if they had specific pregnancy related problems.

While most respondents knew about HIV, some expressed fear to accept VCT due to stigma and because HIV is incurable. One third of study participants in one district expressed the hopelessness of saving the baby when the mother and husband are going to die – "*Why should I die and leave my child to suffer?*"

Some respondents mentioned taboos like taking water during labour which is believed to stop contractions – this has an implication on swallowing Nevirapine tablet during labour with water.

Furthermore, beliefs that a new born should not see the sun before 40 days after birth implies that HIV+ mothers may not take their infants to the health facility for their nevirapine syrup.

Recommendations: The program design should account for these perceptions while developing communication messages to counter myths and dispel concerns.

Costs Of Treatment And Care Of Children With HIV/AIDS

Economic cost of pediatric AIDS in Nan province, Thailand

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Background: While developing and refining treatments to prolong the survival and improve the quality of life of HIV-infected infants and children remains an important task, socioeconomic factors also add to the challenges for improving the quality of life of pediatric AIDS and families. This is the first prospective study in Thailand investigating the short- and long-term economic cost of pediatric AIDS from provider, patient, and family perspectives and assessing the impact of pediatric AIDS on socioeconomic status of families.

Methods: In January 2003, the total of 35 pediatric AIDS cases age 37 to 154 months from 4 districts and 1 sub-district with high HIV/AIDS prevalence rate in the Northern Province of Thailand (Nan) were identified. The health facility (general hospitals, district hospitals, and health centers) survey collected data on health expenditures on all visits. In-depth interviews among caregivers on medical and non-medical cost, income forgone of families of pediatric AIDS, and socioeconomic data were conducted every 3 months over the 15 months period.

Results: Preliminary results based on the first 3 months of data collection suggested that on average provider and family spent 18,595 and 6,231 Baht for each pediatric AIDS case respectively. A severe decrease in household income was prevailing following the death of father. Quality of life and health care for children was poor and worsen when mothers do not survive. Financial supports from government and NGOs served as an important source for living expenses.

Conclusions: These complex medical and social problems of families affected by HIV highlight the important of a multidisciplinary approach that integrates medical, social, mental health and educational services. Future public policy should be directed at ensuring families with pediatric AIDS to have access to care that helps prolonging lives of parents and children, financial resources, and social support.

Costs of care to children with HIV/AIDS or exposed to the virus in a teaching hospital in São Paulo- Brazil

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Background: Studies that estimate the cost of treating children with HIV have been carried out in developed countries and are based, in general, on a small number of patients. This study evaluates the costs of a cohort of children born to HIV infected mothers in a pediatric service in Brazil.

Methods: All medical records of patients followed at the Children Institute Hospital das Clinicas of the University of São Paulo were analyzed in Mar 2002. Information on all procedures was collected, using 3 instruments, during Jan-June 2001. The cost estimates were based on the mean number of procedures and valued based on three perspectives: 1) the cost accounting system used at the hospital; 2) the market price of inputs and services used, which is likely to result in a more reliable estimate of the true cost of treatment, 3) the value reimbursed by the Brazilian public health system (SUS). This study was supported by MOH, AIDS II Project/ Unesco. **Results:** 291

children's records were analyzed, of which 112 were exposed to HIV (39%), and 179 infected (73 were classified in mild/moderate categories according to CDC criteria). Half were female (52%), and the mean age was 72.1 months. The total cost of treatment for children infected with HIV was R\$ 8.092,71 per year. The annual mean cost of ambulatory care was R\$ 5.021,16 including the real consumption of drugs, which corresponded to 62% of the cost total, mostly antiretroviral drugs; the mean annual ambulatory costs were R\$ 6.047,28, R\$ 3.714,45, and R\$ 948,63, respectively for severe, mild/moderate and exposed children. The annual mean cost at the day hospital facility was R\$ 7.469,63, including the real consumption of medicines (78% of the cost total, mainly from antiretrovirals (58%) and intravenous immunoglobulin (42%). The annual mean cost for hospitalized children was R\$ 19.278,48, with 81,8% of the total accounted for by "hotel" costs. **Conclusions:** The cost estimated in this study is affected by the hospital's and patients' characteristics, but it was comparable to the results obtained in other studies.

The cost of early infant diagnosis in PMTCT programs in low resource settings.

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Background: PMTCT programs in low resource settings recommend regular clinical follow up of all HIV exposed children on co-trimoxazole prophylaxis to age 12 months before establishing their HIV infection status with an HIV ELISA test. This policy, based on the assumption that earlier diagnosis using PCR testing is unaffordable, fails to identify HIV infected children for medical management because of high loss to follow up rates at 12 months of age. The cost to government (provider cost) of diagnosing an infant at 3 versus 12 months of age using PCR versus ELISA testing respectively was assessed.

Methods: A questionnaire was administered by a single investigator to 30 HIV-infected women whose infants were enrolled in an urban PMTCT program in Johannesburg, South Africa at each of the 6-week, 3-, 4-, 7- and 12-month infant visits. The time spent with different categories of staff, medication prescribed and consumables used at each visit was documented. These costs and the capital costs of the program were calculated to establish the average provider cost per patient for each diagnostic option.

Results: The average provider cost per patient, determined from 126 (84%) questionnaires, was R366.95 (range: R219 to R479) and R375.53 (range: R311 to R459) using HIV ELISA and DNA PCR testing respectively. On average, early infant diagnosis would cost government R8.38 (USD1.18) more per patient. Societal costs incurred by patients to attend the PMTCT program are excluded. The lost to follow up rates in this PMTCT program indicate that the number of infants available for earlier HIV testing would be 3-fold higher than at 12 months of age.

Conclusions:

A marginal additional investment by government to access an earlier HIV diagnosis for infants could triple the effectiveness of PMTCT programs to identify HIV infected children for medical management and improved quality and quantity of life.

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