The Evolution of Botswana's Approach to the Prevention of Mother-to-child Transmission (PMTCT) of **HIV: A Critical Analysis**

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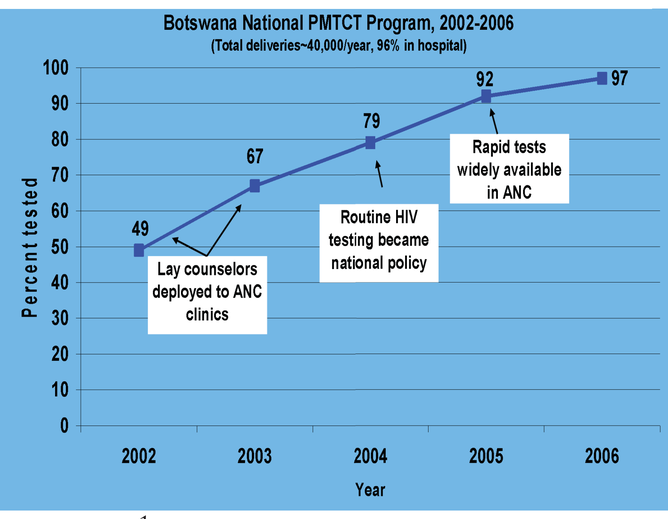
Issues

- Despite the availability of effective interventions, most childhood HIV infection occurs via vertical transmission
- Without intervention, 30% of babies born to HIV positive mothers will be infected
- In 2007, 1 in 3 pregnant women in Botswana were HIV positive
- Nearly 100% of pregnant women in Botswana received antenatal care and deliver in a health facility
- The government of Botswana introduced PMTCT services in 1999; however, by 2003 the PMTCT program's uptake was only 30%
- By 2007, uptake had dramatically increased to 85% and vertical HIV transmission had been reduced to under 4%

Percent of Women Delivering in Hospitals Tested for HIV During Pregnancy or Postpartum, & Interventions Undertaken to Increase Testing



[1] Creek, T. Personal communication, March 2008

Description

- Qualitative analysis of PMTCT service delivery in Botswana using the care delivery value chain (CDVC)[2]
- A CDVC maps the sequence, organization, and interdependence of discrete activities required to deliver care
- The CDVC for PMTCT can be divided into six stages of primary activities
- Three sets of activities (Inform and Communicate, Measure, and Access) integrate the six stages essential for a successful outcome
- The PMTCT CDVC demonstrates the need for integrated health services, from HIV prevention to child development

Key Interventions

- Lay counselor training and pre-test, group counseling eased burden on health workers
- Opt-out HIV testing policy enabled routine HIV testing of pregnant women at ANC which increased uptake
- Rapid HIV testing provided same day results and minimized losses to follow up
- Increased linkage of positive HIV diagnosis with CD4 cell count improved access to timely ART

[2] Porter M and Teisberg E. Redefining Health Care. 2006. Harvard Business School Press

Lessons Learned

Patterns of Success

- Strong political leadership and sustained political will underlie the program's success
- Integration with reproductive health services encourages participation and adherence, and creates value through shared delivery infrastructure
- Strategic policy changes should be informed by clinical research and program evaluation
- Monitoring and testing efficiencies allow for improved data collection and communication

Ongoing Challenges

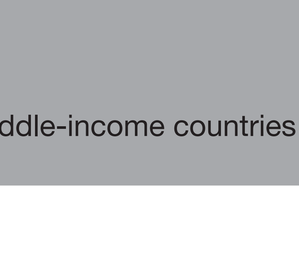
- Lack of integration with downstream child health services created difficulties
- Incomplete follow up of HIV exposed infants
- High rates of morbidity and mortality from diarrheal disease and malnutrition among HIV-exposed infants receiving replacement feeding were linked to water contamination following flooding and interruptions in the supply chain of infant formula

Next Steps

- Perform additional case studies examining PMTCT service delivery in resource-limited settings
- Identify key strategic and operational decisions related to infrastructure, financing, and information transfer
- Reveal patterns critical to PMTCT program success
- Create a model of PMTCT service delivery that may serve as a tool for policymakers and practitioners in low and middle-income countries

Care Delivery Value Chain of Patient Activities for Prevention of Mother-to-Child Transmission of HIV

	Antenatal 1	Antenatal 2	Antenatal 3	Peripartum	Postpartum 1	Postpartum 2
Inform and Communicate	Prevention counseling on modes of transmission and condom use Counsel on family planning Community Health Workers	Explain diagnosis and implications Explain the course of HIV and prognosis Counsel on nutrition, infant feeding (Electronic) medical records (VCT, ANC, HIV/PMTCT, Lab, CHWs)* Community Health Workers	Explain forestalling progression Explain medication and side-effects Counsel adherence Prevention counseling Community Health Workers	Confirm antenatal services received Medical records - information Explanation diagnosis and implications	Explain medication and side effects for mother and infant Counsel adherence Counsel on nuturition and feeding practices Prevention counseling Counsel of family planning Medical records - information	Explanation of co-morbid diagnoses
Measure	HIV Testing Pregnancy testing Screening for sexually transmitted infections Collect baseline demographics	HIV testing for others at risk Examination and clinical staging CD4+ count and other labs Testing for common co-morbidities, such as tuburculosis and sexually transmitted diseases Socioeconomic and Nutrition Assessment	CD4+ count monitoring Continuous assessment of Co-Morbidities Regular clinical examinations to assess for disease progression Laboratory Evaluation for medication initiation	Rapid HIV testing CD4+ Count	CD4+ count Regular primary care assessment Laboratory evaluation for medication initiation Socioeconomics and nutrition assessment Laboratory evaluation	Infant HIV testing * PCR * Antibody testing Assessing response to therapy Regular primary care assessment Laboratory evauation Assess/Manage complications of therapy Adherence to infant feeding HIV testing for others at risk (bi-annually)
Access	Voluntary counseling and testing centers Antenatal/Primary care clinics Other care Laboratories (VCT centers and ante-natal care and primary care clinics) Family planning Community health workers/ Home visits	Antenatal/Primary care clinics HIV/PMTCT clinics Laboratories (on-site at antenatal care clinics and HIV/PMCTC clinics (and primary care clinics)) Community health workers/Home visits Support groups	Antenatal/Primary care clinics Laboratories (on-site at primary care clinic) Pharmacy Food centers Community health workers/Home visits Support groups	Hospital Health center Laboratories (on-site at hospital/health center) Pharmacy (on-site at Hospital Health center) Home birth services Community health workers/Home visits	Post partum care clinics/hospital Primary care clinics Pharmacy (on-site at post partum care clinics/hospital and primary clinics) Community health workers/Home visits Support groups (mother) Food centers	Primary care clinics Pharmacy Laboratories (on-site at primary clinic) Community health workers/Home visits Hospitals Support groups Food centers
	Screening and Prevention	**Diagnosing and Staging**	**Initiating Antiretrovial Therapy**	**Labor and Delivery**	**Ongoing Disease Management: Early postpartum**	**Ongoing Disease Management: Late postpartum**
Primary Activities	- Connecting patients with primary care system - Identifying pregnant women and high risk individuals - Testing at-risk individuals - Pregnancy testing - Promoting appropriate risk reduction strategies - Modifying behavioral risk factors - Creating a medical record - Serial HIV testing for HIV negative women with seropositive partners - Family planning services	- Prompt PMCTC assessment and enrollment - Formal diagnosis and clinical staging - Determine gestational age, obstetric risk factors - Screen for TB, syphilis, and other sexually transmitted diseases - Screen for anemia, malnutrition - Determine method of transmission and others at potential risk - Create management plan, including scheduling of follow-up visits - Formulate a treatment plan - Connect patient to care team, including community health worker	- Initiate therapies that can delay HIV progreession, including food support - Treat co-morbidities that affect progression of disease, especially TB - Treatment initiation - CD4 > 350 : Begin AZT at 28 weeks - CD4 < 350 : Begin HAART - Stage III/IV disease : Begin HAART - Treat co-morbidities that affect birth outcomes - Anemia - Malaria prevention and prophylaxis - Smoking cessation - Connect patient to care team, including community health worker - Encourage delivery at medical facility	- Confirm HIV status on presentation, with rapid HIV testing if status unknown - Confirm CD4 count and antenatal antiretrovial regimen, if known **Maternal Treatment:** - If previosly on HAART, continue HAART - If on AZT or no therapy, give SD-NVP **Infant Treatment:** - SD-NVP, initiate AZT - Home birth PMTCT toolkit, including medication, for use by midwife CHW's in case of emergency If previosly on HAART, continue	**Maternal Treatment:** - If previously on AZT, give AZT/3TC x 7 days - If previosly on HAART, continue HAART - Coordinate continued follow-up **Infant Treatment:** - AZT syrup x 30 days - Coordinate continued follow-ups in PMTCT/perdiatric HIV clinic - Implement chosen feeding practice, counseling against mixed feeding - Family Planning	**Infant:** - Infant HIV testing beginning with PCR at one month - Formal diagnosis and staging if infant HIV positive - Initiate Cotrimoxazole at one month - Vaccinations, monitor growth and development - Manage acute illness and opportunistic infection either through aggressive outpatient management or hospitalization - Ongoing social support - Confirm HIV status with antibody test at 12-18 months **Mother:** - Manage side effects of treatment - Determine supporting nutritional modifications - Primary care and health maintenance - Identify clinical and laboratory deterioration - Initiate second-line drug therapies if indicated - Provide additional community/social support if needed



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