Linking mothers with the diagnosis and care of HIV-exposed infants

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Overview

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• Background and Methods
• Linking/Identifying the delivering mother
• Birth diagnosis of the HIV-exposed neonate
• Care of the HIV-infected neonate
• Links to later testing
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Origins of birth diagnosis

- Transmission has moved from 20-40% down to 2%
- Early peak of mortality remains
- Changing ratio of IU/IP infection
- Late ART initiation, high mortality
  - Despite 6 week testing
  - Birth testing therefore started

2008-2010: Mum: CD4<200 → HAART; CD4>=200 → AZT from 28 weeks + sd NVP at labor;
  Baby: Sd NVP at birth + 7 day AZT. HIV test at 4-6 weeks
April 2010: HAART (≤350 CD4) or AZT from 14 weeks + Infant NVP for 6 weeks or thro’ BF
April 2013: HAART(FDC) to all mothers from time of diagnosis to the end of breastfeeding +
  Infant 6 weeks NVP
January 2015: HAART (FDC) to all mothers life long, 6-12 weeks NVP to baby, +/- AZT

PP = Postpartum transmission, IP = Intrapartum transmission, IU = In-utero transmission
Context of the project

- Mother and Child Hospital with busy maternity (~1000 deliveries/month, approximate HIV prevalence: 23%)
- Initially targeted testing (Sept 2013-May 2014)
- **Expanded to universal testing (June 2014 – ongoing), today’s focus**
- Ethics approval – University of the Witwatersrand, support of the Department of Health
- Associated project of concurrent POC testing since October 2014
- Early treatment studies for all identified infants – not discussed here
General Objectives

• Ensure all HIV-exposed infants and their HIV-positive mothers are identified

• Ensure all HIV-infected infants with detection possible at birth are identified

• Ensure all identified infected infants are linked to care

• Ensure all infants remain in care and achieve long term suppression while their mothers remain healthy
Specific Objectives

- Assess **feasibility** of doing diagnostic birth testing at hospital with busy maternity
- Assess **transmission rate** and risk factors for transmission at birth
- Assess **success of linking infants to care**
Logistic Structure / Methods

• Systematic process to determine maternal HIV status
  – Maternal interview, record review (midwives/counselors)
  – Identify known positive mothers – detailed interview/consent for birth testing
  – Identify mothers of unknown status
  – Identify mothers with negative status – note guideline change during project

• Adequate numbers of trained staff
  – Counselors, nurses, phlebotomist, data capturers

• Registers and electronic database to document testing activities and results

• Protocols and systems to manage newly identified HIV+ moms/babies
  – Ensure results are received, returned to mothers, addressed by clinicians, maternal and infant ARVs initiated
Staffing for newborn HIV diagnostic testing program at RMMCH

• Screening ±900 women per month, 30/day (Mon-Sun)
  – Brief interview to ascertain HIV status
  – HIV test for women with negative or unknown status
  – Requires counselling and data-capturing staff who work hand-in-hand with birth testing/counselling staff

• ~200 HIV-exposed deliveries/month, 8-10/day
  – 4 full-time counselors: counsel mothers on postnatal ward 7 days/week – detailed interview (coping/PMTCT processes/feeding)
  – 1 full-time nurse: supervise counselors, draw blood
  – 2 data-capturers: reporting, results retrieval, patient tracking
  – Weekly clinic where moms obtain results (Integrated with routine ARV/EID clinic)
  – Need to ensure weekend testing coverage

• Birth/Delivery is a potential focal point for assessment of maternal care up to then and appropriate onward referral for both mother and baby
Logistic Structure / Methods

• Infant exam
  – Ballard score to assess physical maturity/gestation

• Infant Blood test
  – Standard of Care – PCR test sent to laboratory, 0.5 ml EDTA whole blood - Roche COBAS® TaqMan® HIV-1 Qualitative Test (Version 2)
  – Study Procedure 1 – Dried Blood Spot (DBS) collection – purpose – additional sample for diagnostic dilemmas
  – Study Procedure 2 – PCR test sent to on site POINT of CARE laboratory for Genexpert test, 0.5 ml EDTA whole blood - Xpert® HIV-1 Qual - Cepheid
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Women with live births, n=11313

- HIV-negative on arrival, n=8610
  - 2666 (31%) tests offered
  - 2640 retested, 26 (1%) refused
    - 24 positive (0.9%)
    - 2616 negative

- HIV-positive on arrival, n=2446
  - 257 tests offered
  - 255 tested, 2 (0.8%) refused
    - 43 positive (17%)
    - 212 negative

- HIV-unknown on arrival, n=257
Important points

• **Maternal Testing and Retesting** vital components

• 67 newly diagnosed women
  – =2.3% of the women tested
  – =2.7% of all identified HIV-positive women
  – Rate of maternal HIV test refusal was <1%
Discussing diagnosis with mothers

- Difficulties reaching mothers at the start of the programme and during festive period
• Weekends and public holidays form a significant component of the work
Testing Infants LAB vs POC

- As time goes on – laboratory testing coverage improves
- New challenge – introduction of POC testing
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Timing of laboratory test and result

**Time to result** 45.1 hours (IQR: 33.6-60.3 hours)

**Birth PCR** was 13.9 hours (IQR: 7.6-20.9 hours)

**NVP Dose**: 0.33 hours (IQR: 0.2-1.5)
Timing of test and result

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• >95% of neonates had blood drawn after NVP dose
Birth testing – POINT OF CARE component

• Point of care testing
  – Cepheid HIV-1 Qual Xpert
  – Run concurrently with NHLS PCR
  – Started October 2014
  – ~70% coverage of week days/non-public holidays
  – Expanded to Sundays recently
Postnatal wards

200 uL whole blood

Transfer 100 uL to cartridge

Time to result in GeneXpert® 90 min.

Put cartridge in machine
Time from baby’s point of view

- **Birth**
- **Blood test – Average 14 hours**
- **Received in lab - Average 35 minutes**
- **Yielded result -Average 100 minutes**
- **Result to mother (85%) received result – Average 25 minutes**

2.8 hours
Time for POC test

Time Overview

- Minutes from phlebotomy to side room: 23%
- Minutes for processing in side room: 6%
- Minutes in the POC machine: 55%
- Minutes authorising and despatching result out of side room: 7%
- Minutes before mother receives the result: 9%
Update:
Outcomes – tests June 2014-Sept 2015

• Infants tested – n=3073
  – 43 cases where no result was received

• Infants with result – n=3030
  – Positive – n= 44  = 1.45% (1.0-1.9%)
  – Indeterminate – n= 10 = 0.33% (0.1-0.5%)
  – Negative – n= 2976 = 98.2%
Update:
Outcomes – tests June 2014-Sept 2015

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- Infants with indeterminate – n= 10 = 0.33% (0.1-0.5%)
- On further testing and follow-up
  - 3 infants show an HIV-infected status
  - 7 infants so far show HIV-uninfected status
- Indeterminates
  - Initial : 10/54 => 18.5% of all non-negative results with uncertain result/diagnostic dilemma
  - Final : 7/54=> 13.0% of all non-negative results considered as HIV-negative
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Returning results and follow-up

- Two components
  - POC
  - Lab result

- System for return for results
  - POC – aim to give result straight away
  - LAB – appointment given for 7-10 days post delivery
Returning results and follow-up where POC available

• POC result available n= 1188
  – Negative – n= 1172
    • Received negative POC result – n=1022 (87%)
    • Received negative lab result – n= 585 (49.9%) – includes 65 mothers who did not receive their POC result on the day of birth – therefore 93% of mothers received the infant’s result either POC or LAB
  – Positive – n=16
    • Received positive POC result – n=16 (100%)
      – One mother elected not to receive the result on the same day and returned 10 days later as agreed
      – Two mothers infants where tested on a Sunday and they received their infant’s result on the Monday
  – Start of treatment
    • 15 infants where started on ART at a median of 1 day age (one infant at 11 days
    • One mother elected not to start and returned only much later
Returning results and follow-up where NO POC available

- No POC result available n= 1833
  - Negative – n= 1802
    - Received negative lab result – n= 935 (51.9%)
  - Positive – n=31
    - Received positive LAB result – n=26 (84%) on site
    - Received positive LAB result at other site – n=3 (10%)
    - Did not receive positive LAB result – n= 2 (6%)
      - One infant likely travelled soon after birth and mother could not be reached
      - One infant’s mother could not be reached
  - Start of treatment
    - 29 infants (94%) started ART at a median of 8 days
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Important later tests

- All HIV-negative mothers require later retesting
- Infant require follow-up testing
  - ASAP if birth diagnosis was missed
  - All HIV-negative infants at ten weeks
  - 18 weeks, post breastfeeding, 18 months
Concluding Remarks

• Large project with multiple logistic considerations and challenges
• Possible to achieve maternal and infant identification
• Comprehensive holistic care needed
• 7 days a week
• Diagnostic dilemmas require attention
• Active tracking needed to keep infants in care
Study Team

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• On site:
  – Dr Martie Conradie
  – Sr Mokupi Manaka
  – Sr Lerato Mthombeni, Sr Ntebogeleng Malevu
  – Ms Zanele Msomi
  – Ms Lois Nakan, Ms Liezl Pienaar
  – Dr Pam Murnane
  – Ms Kapila Bhowan
  – B-Block team, Prof Coovadia, Dr Strehlau and her team
  – Data capturers: Nonhlanhla Mogashoa, Puleng Gabela, Malose Lebelo
  – Counselors: Promise Duma, Boitumelo Molatudi, Patricia Mdau, Jacqueline Kgosa, Jabu Dlamini

• Off site
  – NICD – Prof Gayle Sherman, Prof Caroline Tiemessen and team
  – New York – Prof Louise Kuhn, Prof Elaine Abrams
  – Cepheid – Dipti Lallubhai, Gwynn Stevens and team
  – NIH – Dr Rohan Hazra and team
  – BARC – Dr Carole Wallis
  – NHLS – Dr Sergio Carmona, Dr Lucia Hans
Thank you!

ANY QUESTIONS