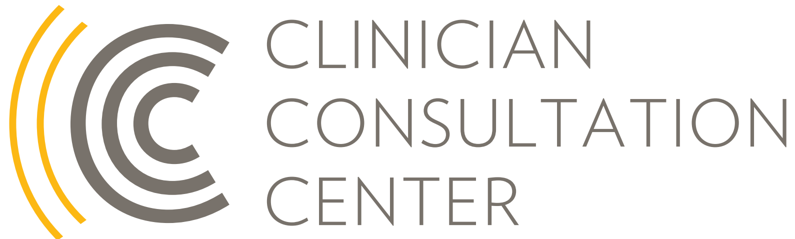

National rapid response for HIV management
and bloodborne pathogen exposures.

Breastfeeding among HIV-infected Women: Is there a role in the resource-rich setting?

Deborah Cohan, MD, MPH
National Perinatal HIV Hotline

CROI, Seattle 2012

UK Department of Health

"Under exceptional circumstances, and after seeking expert professional advice on reducing the risk of transmission of HIV through breastfeeding, a highly informed and motivated mother might be assisted to breastfeed".

HIV and Infant Feeding: Guidance from the UK Chief Medical Offices' Expert Advisory Group on AIDS

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Are these concepts relevant?

- Informed (free) choice
  - Contraception
  - Abortion
  - Genetic testing
- Harm reduction
  - Drug/tobacco use

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Informed Choice

- Voluntary decision by a client to [use], or not to [use, a contraceptive method or accept a sexual and reproductive health service] after receiving adequate information regarding options, risks, advantages and disadvantages of all available methods.
  - International Planned Parenthood Federation

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Harm Reduction

- Policies, programmes and practices that aim to reduce the harms associated with the [use of psychoactive drugs] in people unable or unwilling to stop. The defining features are the focus on the prevention of harm, rather than on the prevention of [drug use] itself, and the focus on people who continue to [use drugs].
  - International Harm Reduction Association
- A range of public health policies designed to reduce the harmful consequences associated with [recreational drug use] and other high risk activities.
  - Wikipedia

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Feeding Options for HIV-exposed Infants

- Formula
- Breast milk
  - Milk bank
  - Flash pasteurization at home
  - Wet nurse
  - Lactating woman on cART

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Human Milk Banking Association of North America (Holder pasteurization)

- Vancouver, B.C.
- San Jose, CA
- Denver, CO
- Orlando, FL
- Indianapolis, IN
- Coralville, IA
- Kalamazoo, MI
- Madison, MS
- Newtonville, MA
- Raleigh, NC
- Columbus, OH
- Portland, OR
- Austin, TX
- Fort Worth, TX
- In development:
  - Kansas City
  - Ontario, Toronto

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Flash pasteurization

- Acceptable and feasible in resource limited setting
- Effectively kills HIV
- Retains most other properties in milk

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(Potential) Benefits of Breastfeeding

Woman	Baby
HIV-associated stigma	Optimal nutrition
Motivation for ART adherence?	Immunologic, anti-infective properties
Birth spacing	Reduced morbidity: NEC, infectious
Bonding	Bonding
Decreased risk breast/ovarian CA, diabetes	Food security
Free, convenient	

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(Potential) Risks and Disadvantages of Breastfeeding

Woman	Baby
Nutritional depletion (fat, micronutrient)	HIV acquisition
Inconvenient (pumping/flash heating)	Toxicity related to extended ARV exposure

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How do we balance risks and benefits?

- Does risk of otherwise avoidable HIV transmission (and ARV toxicity) trump all potential benefits?
- Who gets to decide?
- Is there a way to mitigate the transmission risk?

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Lactational HIV transmission

- Breastfeeding and HIV International Transmission Study Group meta-analysis: 42% infections attributable to breast milk
- Modeling estimates (no ARVs):
  - 6 months EBF/rapid wean: 6% risk
  - 2 years BF: 15% risk
- Risk of lactational HIV transmission
  - 0.0005 per liter breast milk (no ARVs)

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ART and Postnatal transmission

Study	N	BF duration	ART/infant prophy	Postnatal transmission
Palombi 2007	251, DREAM	6 mos	HAART until wean, infant sdNVP	0.8%
Kilewo 2008	398, Mitra	18 weeks	ZDV/3TC until 1wk pp, infant ZDV/3TC x1wk, 3TC during BF	1%
Kilewo 2009	441, Mitra Plus	Up to 6 mos	HAART to 6mos, infant ZDV/3TC x1wk	
Marazzi 2009	341, DREAM	6 mos	HAART, infant sdNVP + ZDV x1wk	0.6%
Peltier 2009	227, Rwanda	6 mos	HAART to 7 mos pp, infant sdNVP + ZDV x1wk	0.4%
Shapiro 2010	709, Mma Bana	6 mos	HAART until wean, infant sdNVP + ZDV x1mon	0.3%
Homsy 2010	109, HBAC	5 mos	HAART during BF, infant sdNVP (± ZDV x1wk)	0
Thomas 2011	487, KIBS	6 mos	HAART to 6mos, infant sdNVP	0.8%

Is cART during lactation enough?

- cART → ↓ breast milk RNA, but not DNA
- 2 of 2 postnatal transmissions in Mma Bana (ZDV/3TC/ABC): plasma and milk VL < 50 copies at 1 and 3 mos
  - One case with delivery RNA: 257
  - Other case with delivery RNA <50 but "adherence issues"
- Episodic breast milk RNA and DNA shedding
  - ZDV/3TC/NVP from 34wk gestation → 6 mos pp
  - N=25 still breastfeeding to 6 mos pp
  - Milk collected 1-3x/week during 1st month, 3 mo, 6 mo
- Detectable milk HIV RNA: 56% ≥ once
  - 1.4 episodes/100 person-days overall vs. 2.5 if plasma viremia
  - Predictors: plasma viremia OR 9; plasma viral load OR 13
  - milk DNA not predictive of milk RNA
- Detectable milk HIV DNA: 68% ≥ once
  - Including among women with undetect milk RNA

Lehman AIDS 2008; Shapiro JID 2005; Shapiro NEJM 2010; Slyker PLoS One 2012

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Risks of ARVs: Toxicity

- Penetration into milk compartment (not necessarily assoc. with infant levels)
  - Significant but sub-therapeutic: 3TC, NVP, EFV, d4T
  - Conflicting data: ZDV
  - Minimal: NFV
- Toxicity related to maternal ARV?
  - Limited data

Rezk Ther Drug Monit 2008; Mirochnick AAC 2009; Schneider JAIDS 2008

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Risk of Lactational cART: Resistance in Infants with Postnatal HIV

- Resistance likely due to ARV penetration, not transmitted resistant virus
- KiBS (ZDV/3TC + NVP or NFV to 6mo pp + infant sdNVP); 32 HIV+ infants by 24mo
- 24 (75%) infected by 6 mo (9 NFV, 15 NVP)
- Genotypic mutations by timing of + PCR
  - 2 wks: 0/8
  - 6 wks: 30% (6/20)
  - 14 wks: 63% (14/22)
  - 6 months: 67% (16/24)
  - Most common: M184V and K103N
- Resistance by maternal ARV
  - NFV: 100% (9/9) vs. NVP: 47% (7/15)
- 1 matching maternal plasma-infant genotype (M184V, K103N)
- No resistance among infants infected after women d/c'd ARVs

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Zeh, PLoS Med 2011

Additional questions

- How long to “recommend” BF?
- Which ARVs to recommend?
  - Maximize penetration into breast milk to minimize HIV risk?
  - Minimize penetration into breast milk to minimize AEs?
- Infant ARV prophylaxis as well?
- How often to monitor viral load?
- How to best monitor adherence?
- How often to test the baby?
- Will infant ingestion of ARVs via milk affect sensitivity of DNA or RNA assays?
- ????????

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Conclusions

Thank you Shannon Weber!

Join the Repro ID HIV listserv:
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