

Duration of HAART before delivery and low infant birthweight

Using multiple imputation to address missing data concerns

Nancy L. Hancock, MD, MPH



CIDRZ

Background and Motivation

- **Option B+**
 - Adopted by Zambian government in 2013
 - Currently being scaled up nation wide
- **Implications of Option B+:**
 - Earlier and longer HAART exposure during gestation
 - Maternal and fetal outcomes related to HAART
- **HAART's impact on low birthweight remains unclear**
- **Utilize routinely collected program data to help identify potential trends of HAART scale up**
 - Address missing data

Specific Aim:

To estimate the association between duration of HAART use during pregnancy and low birthweight (< 2500g).

Address missing data concerns using multiple imputation.

Methods

Study Design: Retrospective cohort

- Zambian Electronic Perinatal Record System
- January 1, 2009 – September 1, 2013

Eligibility criteria:

- HIV+ woman with a CD4 count ≤ 350
- Delivered a singleton in a healthcare facility at ≥ 28 weeks gestation
- No history of diabetes, heart disease, or hypertension due to potential relationship with birthweight

Methods

Model: Log binomial to estimate risk ratios

Primary analysis: Complete case

Sensitivity analyses:

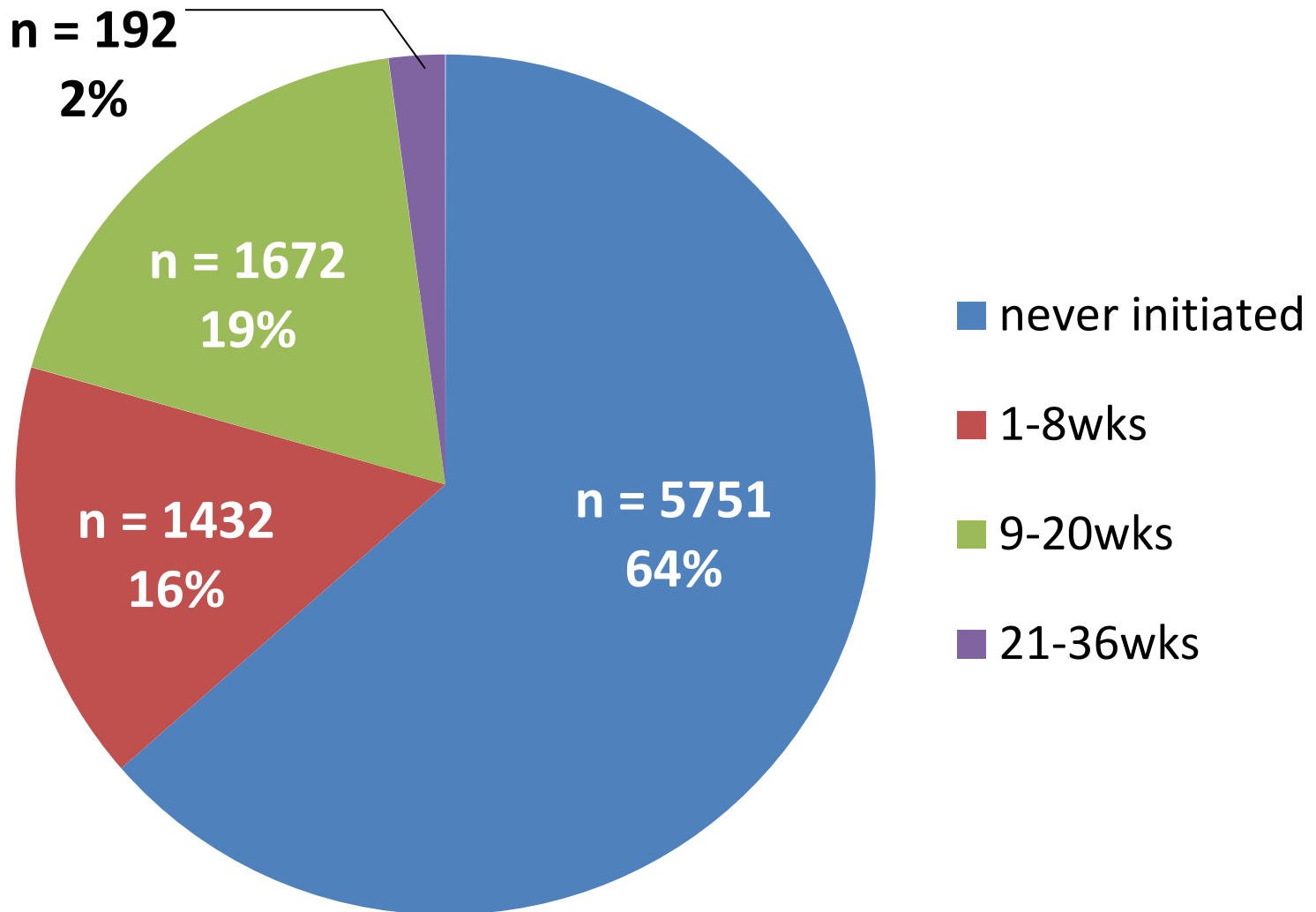
- Inclusion of imputed missing covariate information
- Inclusion of imputed HAART initiation dates
- Inclusion of imputed CD4 counts
- All imputed data (2 – 4)

Methods: Missing Data

For each type of missing data:

1. Explored predictors of missing data
2. Evaluated whether missing at random assumptions were reasonable
3. Performed multiple imputation
4. Performed analyses using combined imputed data

Duration of HAART before delivery for 9,276 women



Duration of HAART by LBW status

Weeks on HAART before delivery	Low Birthweight* N(%)	Normal Birthweight* N(%)
	N=1,267 (14.0)	N=7,784 (86.0)
<i>Median (IQR)†</i>	8 (4,13)	10 (6, 14)
21-36	16 (1.3)	176 (2.3)
9-20	209 (16.5)	1,463 (18.8)
≤8	235 (18.6)	1,197 (15.4)
Never initiated	807 (63.7)	4,944 (63.6)
<i>Missing</i>		4

*225 people missing birthweight information. † among individuals who initiated HAART.

Missing Data

Among **9,276 women** included:

- **5744 (62%)** were missing confounder, exposure or outcome information

Additional **2,154 (19%)** reported being on HAART at delivery, but had no HAART initiation date

- Higher baseline CD4 and hemoglobin
- More likely to have 1 ANC visit and no IPT

Among all HIV-infected women, **16,267 (32%)** were missing a CD4 count

Complete Case Analysis:

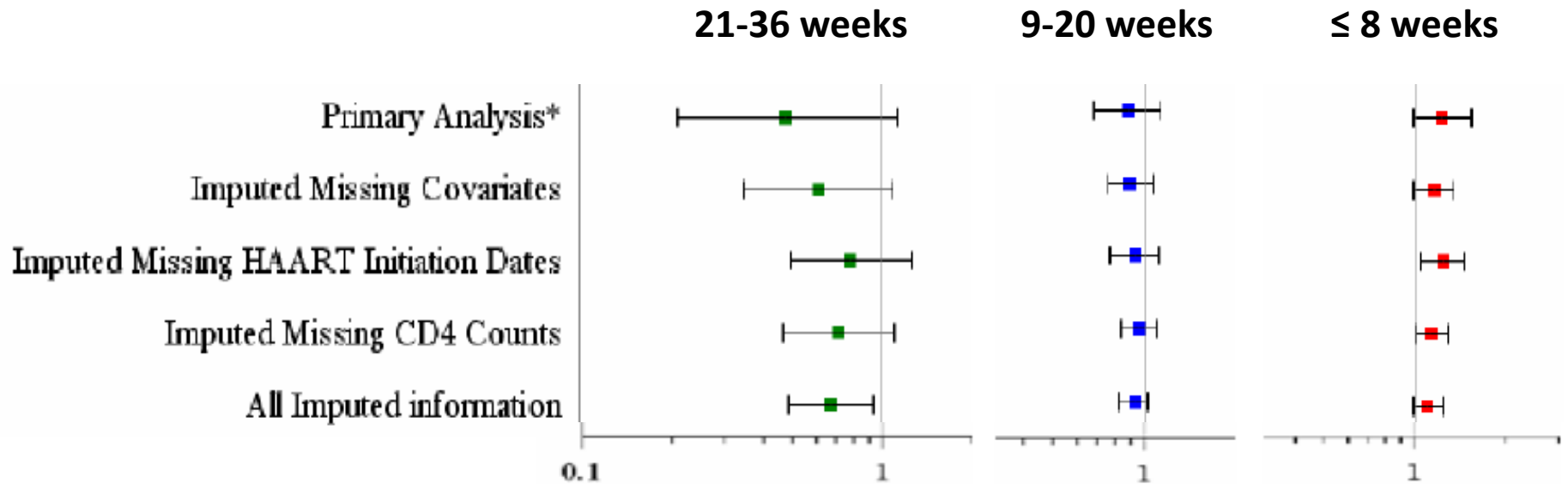
Association between duration of HAART and LBW

Primary Study Population N=9,276		
Weeks on HAART before delivery	RR*	95% CI
21-36	0.48	(0.21, 1.13)
9-20	0.87	(0.68, 1.12)
≤8	1.21	(0.97, 1.51)
Never initiated	1.00	

*Adjusted for: number of ANC visits, age, BMI, CD4 count, education, hemoglobin, malaria prophylaxis, parity, syphilis screening and tuberculosis status.

Duration of HAART Before Delivery

RRs and 95% CIs



*Adjusted for: number of ANC visits, age, BMI, CD4 count, education, hemoglobin, malaria prophylaxis, parity, syphilis screening and tuberculosis status.

Preterm birth driving the effect of duration of HAART on LBW?

Weeks on HAART before delivery	Preterm Birth	Term Birth
	3,536 (44.7)	4,381 (55.3)
21-36	18 (0.5)	103 (2.4)
9-20	435 (12.3)	976 (22.3)
≤8	654 (18.5)	643 (14.7)
Never initiated	2,429 (68.7)	2,659 (60.7)

Limitations

- Impact of preterm birth
- Earlier initiation of HAART may be a marker for better health seeking behavior
- Observational data collected during Option A

Conclusions

- Longer duration of HAART does not appear to increase the risk of LBW.
- May be a slight increased risk of LBW with 1 – 8 weeks of HAART.
- ***Reassuring trends that will continue to be monitored as Option B+ is scaled up in Zambia***

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