



Anal Intercourse, HIV-1 Risk, and Dapivirine Ring Efficacy

Kathryn Peebles, MPH, PhDc
University of Washington
Seattle, WA, United States

Women, HIV, and receptive anal intercourse (RAI)

- Women face disproportionately high HIV-1 risk
- 20% of women in South Africa report RAI in the prior three months
- HIV-1 risk is 5x to 17x higher for each act of RAI, relative to vaginal intercourse

UNAIDS, 2016

Voeller, 1991

Owen, et al., 2017

Patel, et al., 2014

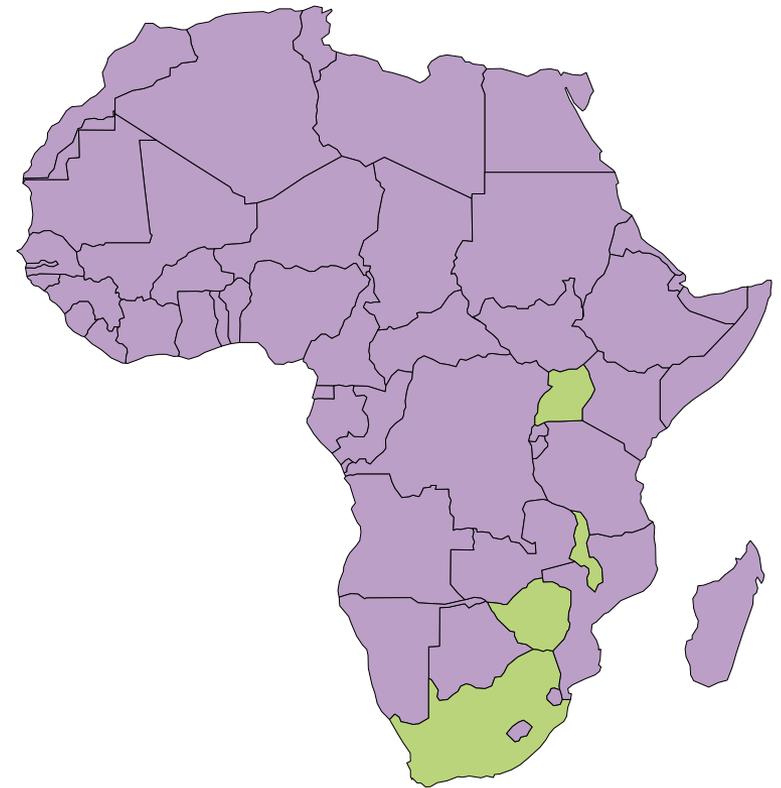
Boily, et al., 2009

Could receptive anal intercourse in ASPIRE have resulted in a lower estimate of ring efficacy than we would have seen in the absence of RAI?

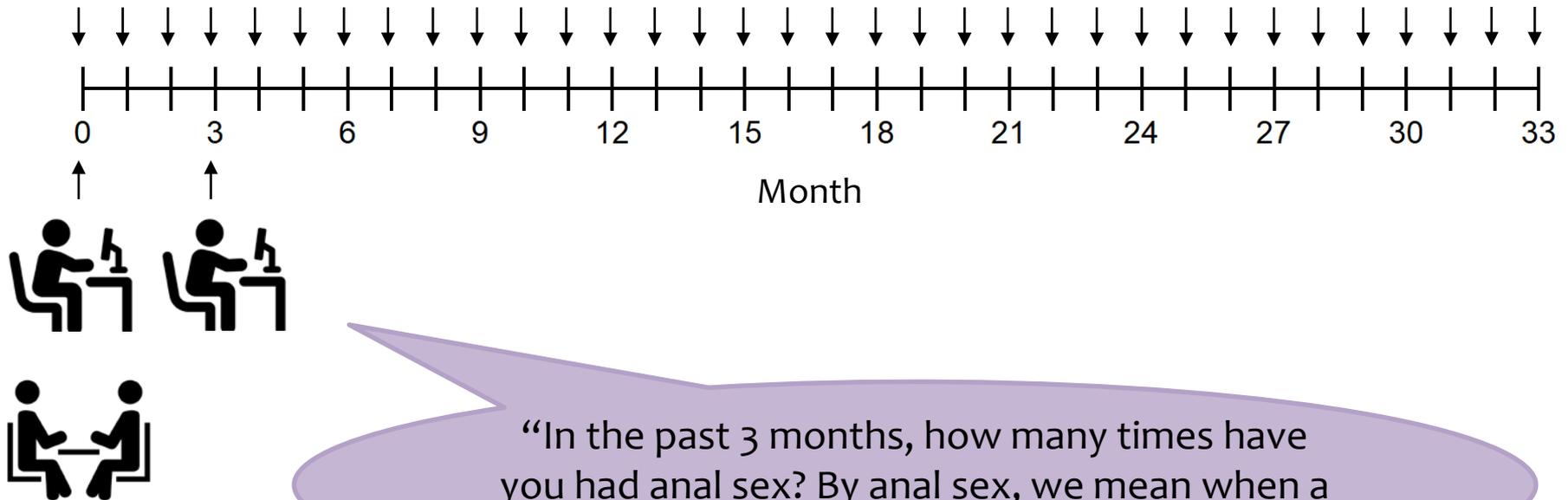
- RAI prevalence, frequency, and behavioral and demographic correlates
- Association between RAI and HIV-1 acquisition?
- Association between RAI and effect measure modification of ring efficacy?

Study setting and population

Sexually active HIV-1-negative women ages 18-45 from Malawi, South Africa, Uganda, and Zimbabwe



Data collection



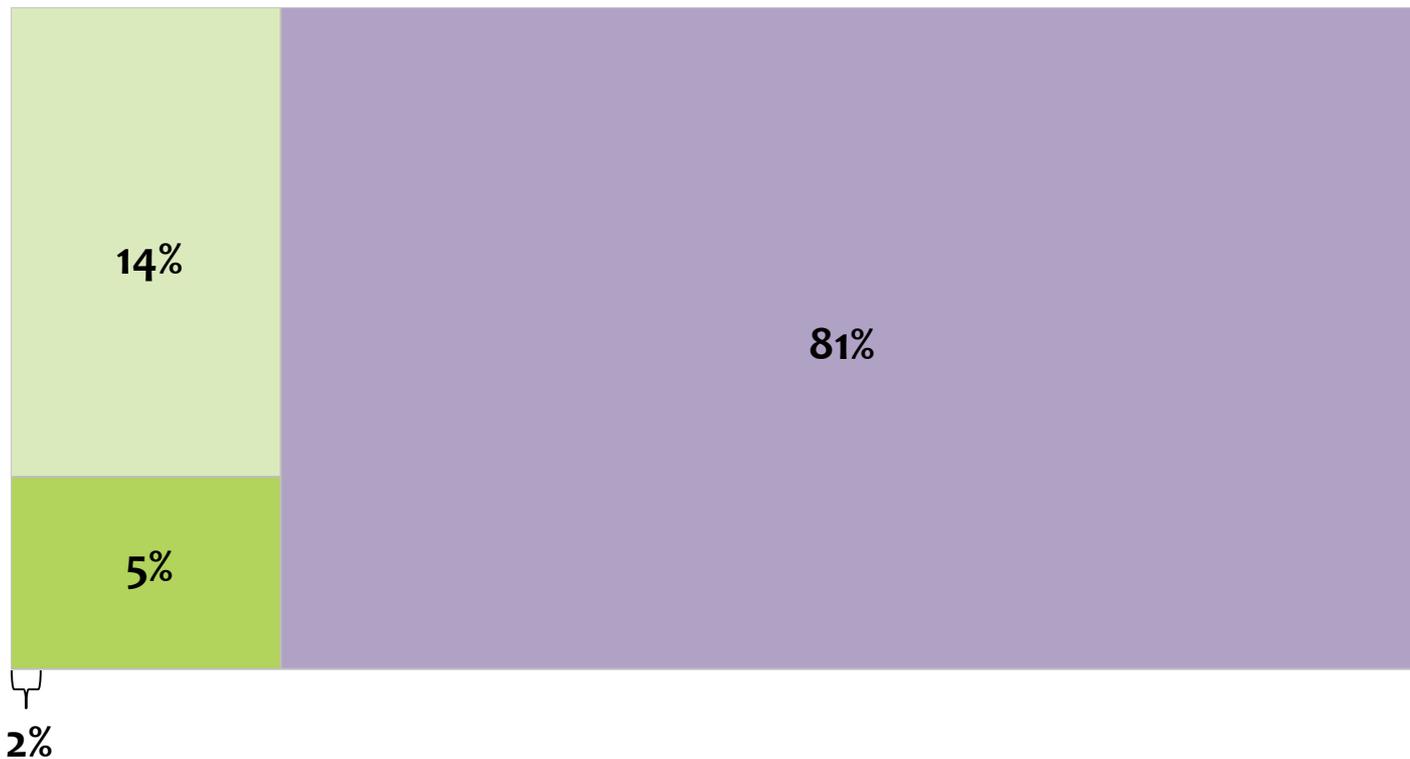
“In the past 3 months, how many times have you had anal sex? By anal sex, we mean when a man puts his penis inside your anus.”

Statistical analysis

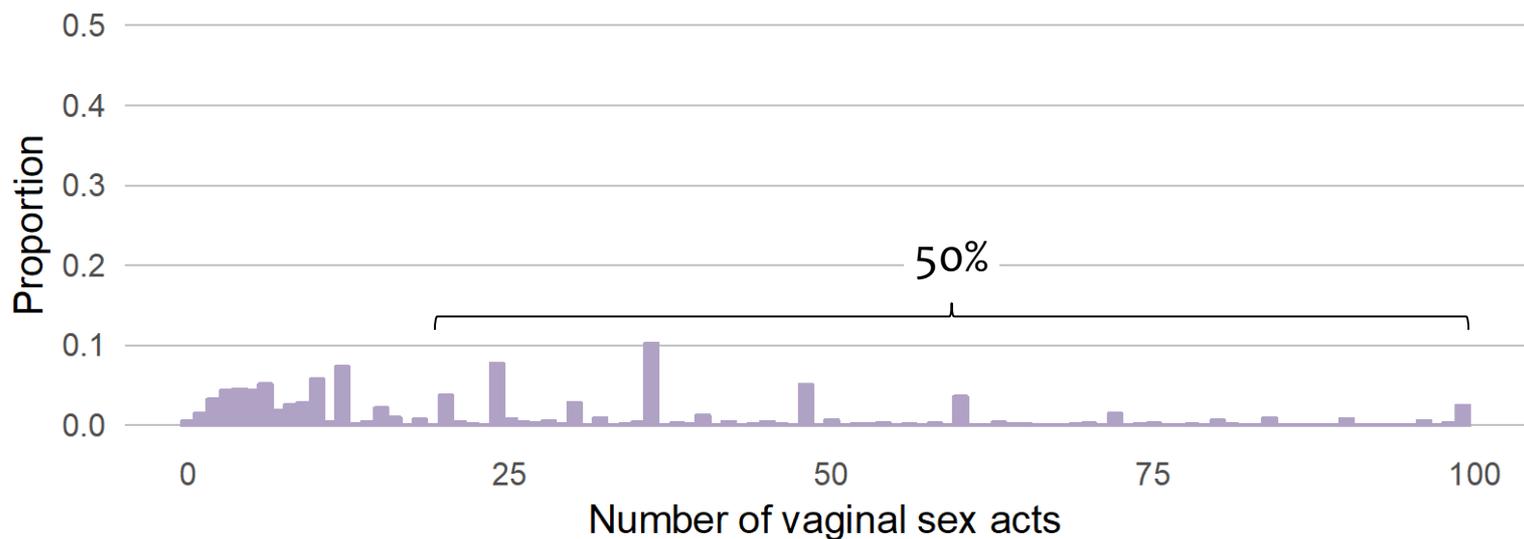
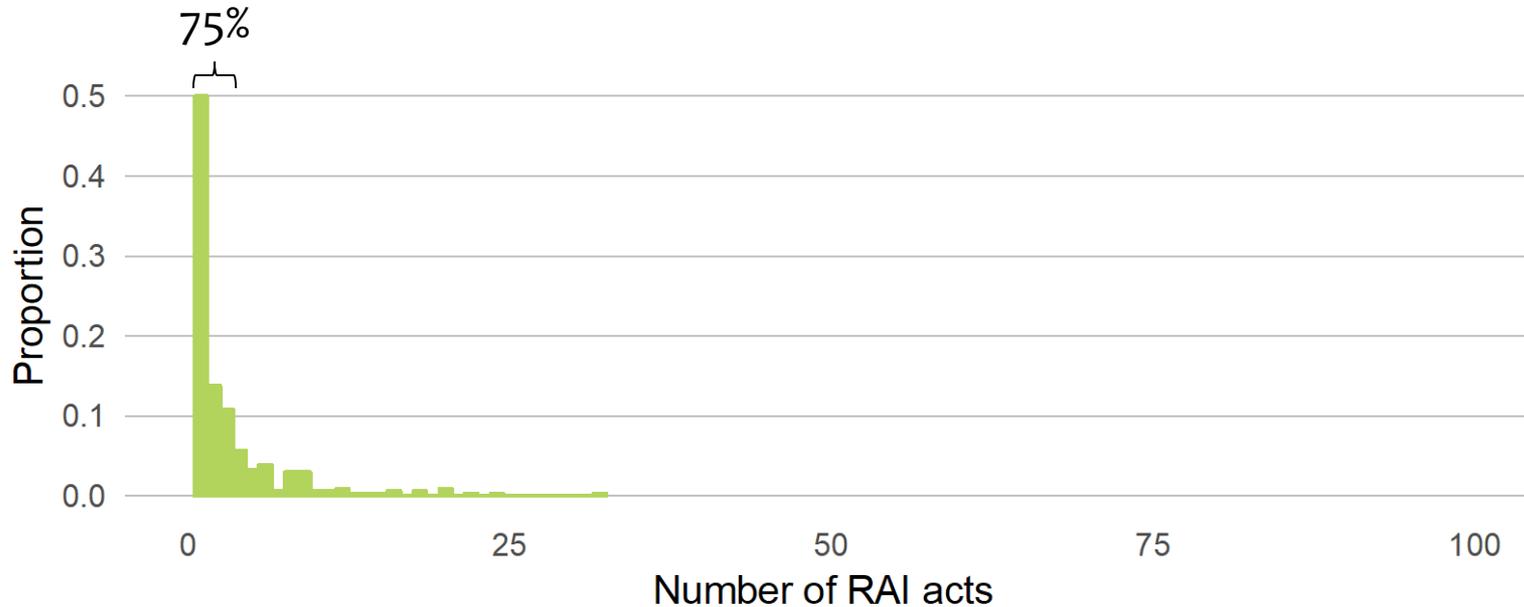
- Analyses include 2,562 (98.0%) women responding to RAI items at enrollment and/or month 3
- Cochran-Mantel-Haenzel chi-squared tests and t-test from linear models to evaluate the association of RAI with baseline characteristics
- Cox proportional hazards models to test:
 - Association between RAI and HIV-1 risk
 - Potential ring effect measure modification associated with RAI
- Sensitivity analyses:
 - RAI characterized as continuous variable
 - Exclusion of study populations with low adherence

RAI was relatively uncommon

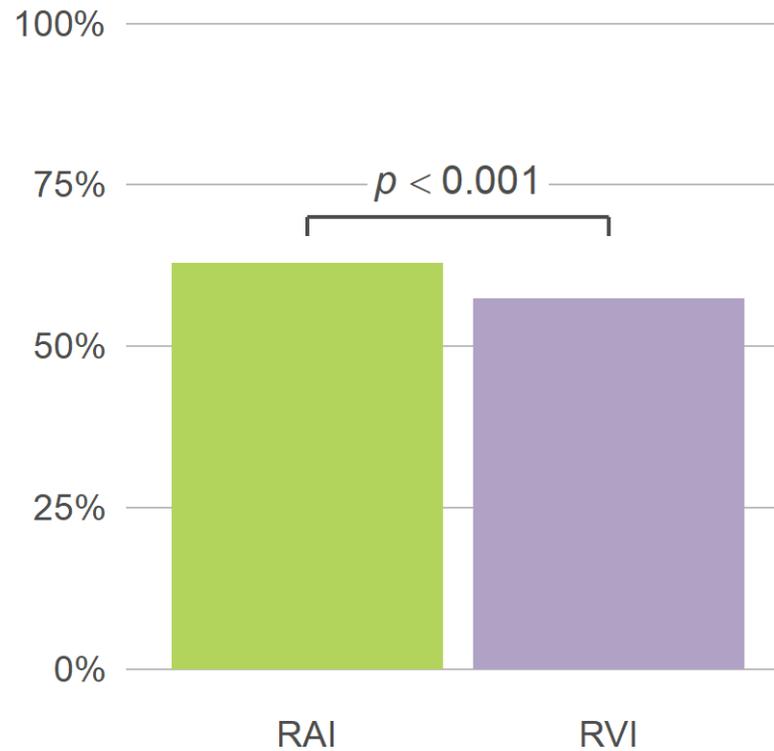
Any RAI reported at both enrollment and month 3 Any RAI reported at only enrollment or only month 3 No RAI reported at either enrollment nor month 3



RAI frequency was low



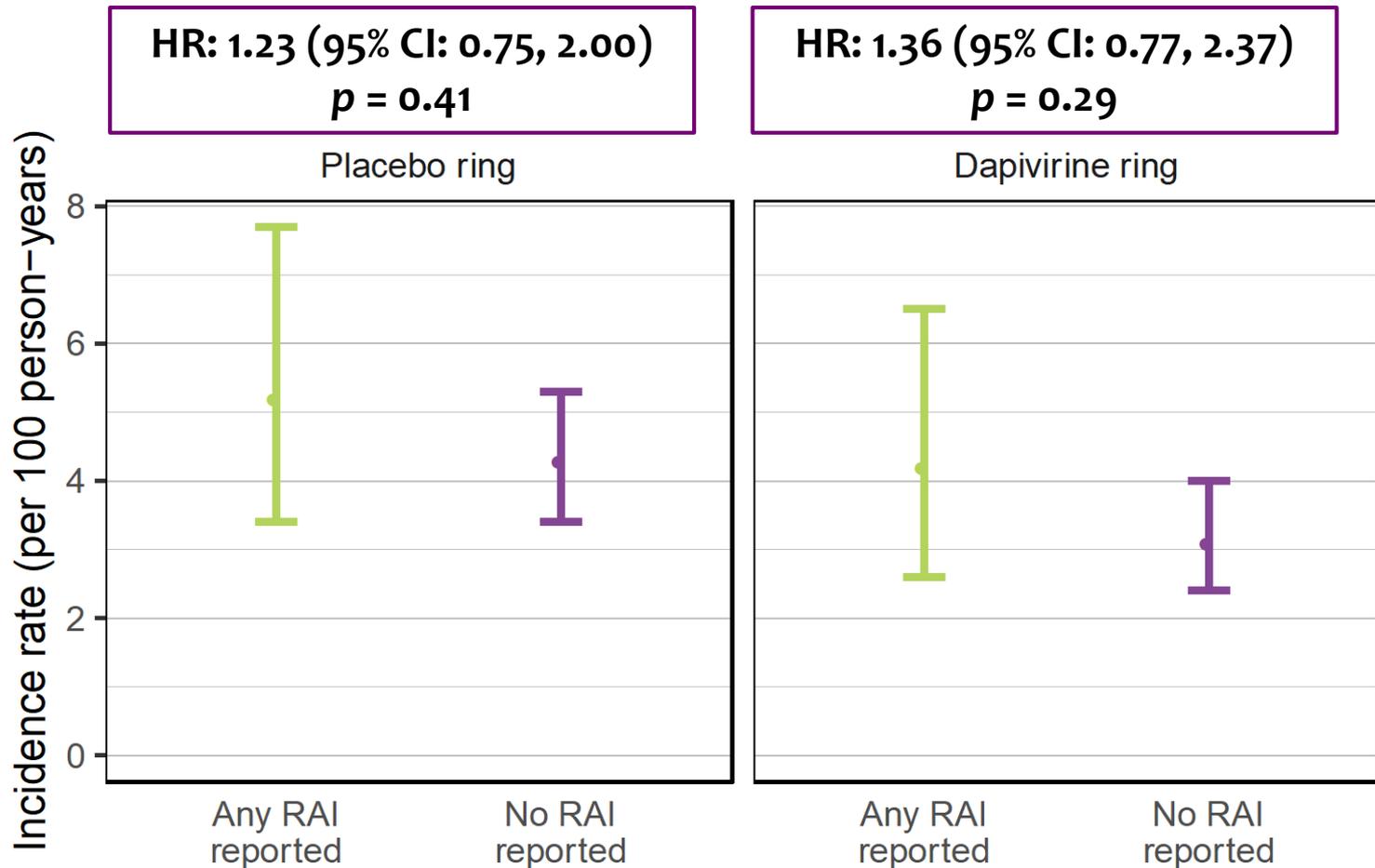
Condom use was higher for RAI



RAI and participant characteristics

	No RAI (n = 2,225)	Any RAI (n = 334)	p
Dapivirine ring, %	1,120 (50)	158 (47)	0.297
Country, %			
Malawi	225 (86)	37 (14)	< 0.001
South Africa	1,118 (81)	262 (19)	
Uganda	227 (93)	16 (7)	
Zimbabwe	665 (97)	19 (3)	
Age, %			
18-21	421 (83)	84 (17)	0.518
22-26	699 (85)	120 (15)	
27-45	1,105 (89)	130 (11)	
Secondary school education or above, %	1,888 (85)	279 (83)	0.002
Married, %	1976 (44)	75 (22)	0.757
Any alcohol consumption in the prior three months, %	264 (12)	46 (14)	0.138
Vaginal intercourse frequency, median (IQR)	20 (8, 36)	12 (6, 25)	0.515
Condom used at last vaginal intercourse, %	1,257 (56)	214 (64)	0.463
Contraceptive method, %			
Copper intrauterine device	300 (94)	18 (6)	0.042
Hormonal implant	472 (95)	23 (5)	
Hormonal injection	1,158 (83)	238 (17)	
Oral contraceptive pills	228 (84)	44 (16)	
Tubal ligation	67 (86)	11 (14)	
Any STI infection, %	460 (21)	78 (23)	0.839
Bacterial vaginosis, %	922 (41)	142 (43)	0.934
Engaged in transactional sex in the past year, %	123 (6)	36 (11)	0.002

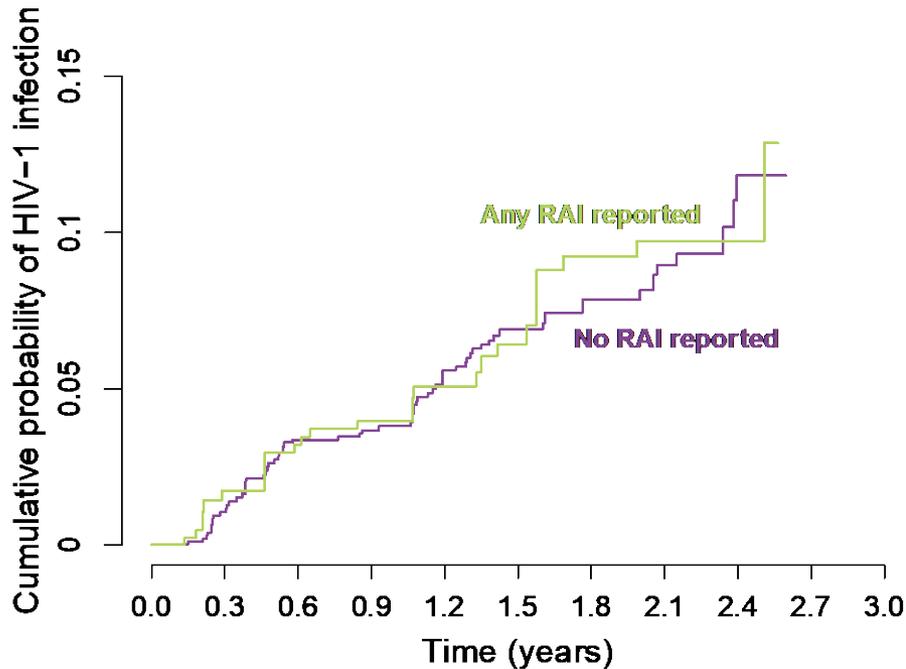
RAI was not associated with HIV-1



RAI was not associated with HIV-1

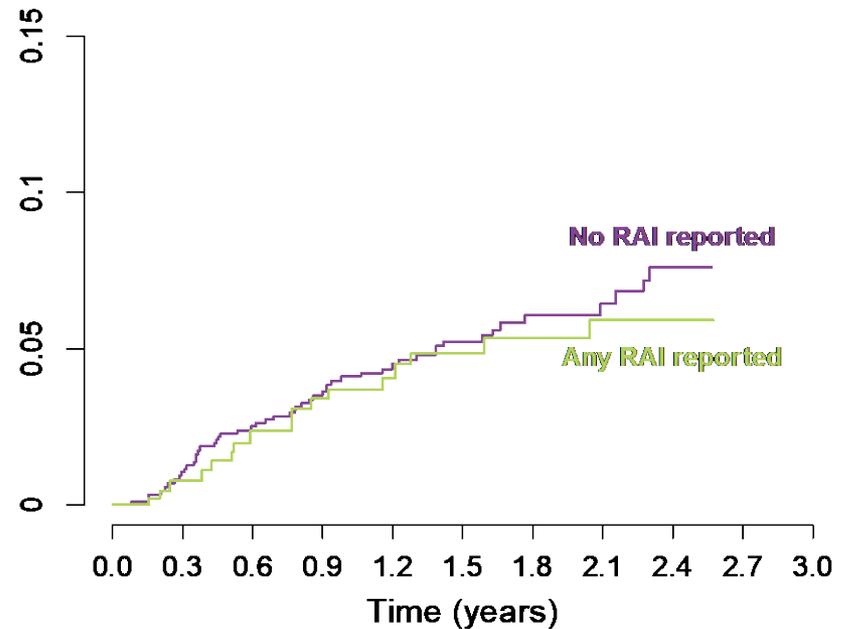
aHR: 0.97 (95% CI: 0.58, 1.62)

Placebo ring



aHR: 0.94 (95% CI: 0.52, 1.68)

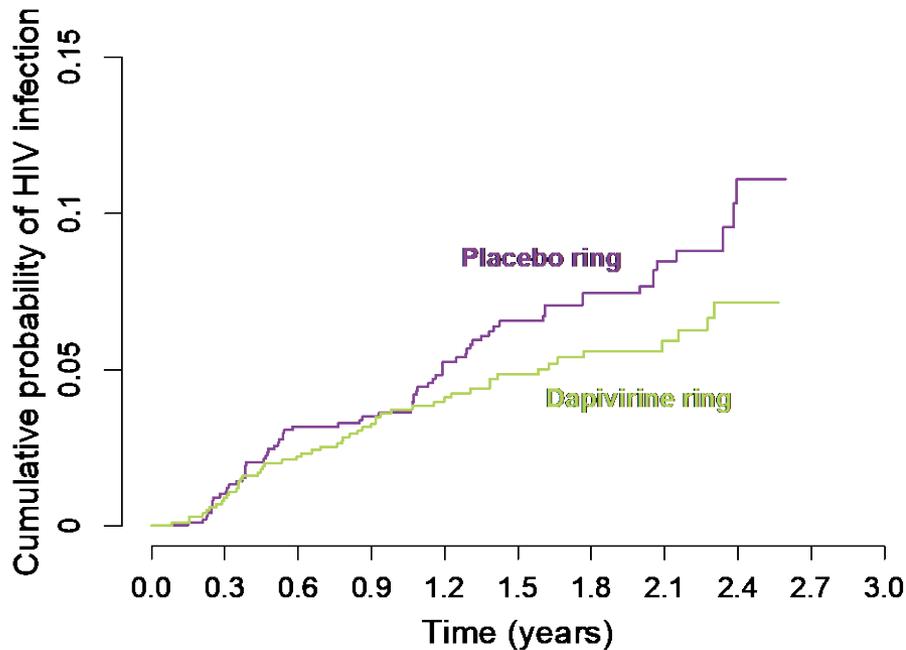
Dapivirine ring



RAI did not significantly reduce ring efficacy

aHR: 0.73 (95% CI: 0.51, 1.05)

No RAI reported



p-value for interaction = 0.77

Strengths and limitations

- + Collection of RAI data by ACASI
- Exposure misclassification
 - Potential misreporting
 - RAI measured at two time points only
- Interaction analyses considered randomization arm only

Summary and implications

- RAI was not associated with HIV-1 acquisition
- Ring efficacy was not significantly lower among women reporting RAI
- Vaginal sex accounted for the majority of HIV-1 risk
- RAI may not appreciably reduce the population-level impact of the ring
- Additional service delivery approaches and prevention options may benefit individual women who engage in RAI

MTN-020/ASPIRE Study Team

- **MTN-020/ASPIRE leadership:** Jared M. Baeten (protocol chair), Thesla Palanee-Phillips (protocol co-chair), Elizabeth R. Brown (protocol statistician), Katie Schwartz (FHI 360 senior clinical research manager), Lydia E. Soto-Torres (DAIDS medical officer)
- **Study sites:**
 - **Malawi: Blantyre site (Malawi College of Medicine-John Hopkins University Research Project):** Bonus Makanani, Taha E. Taha
 - **Malawi: Lilongwe site (University of North Carolina Project):** Francis Martinson
 - **South Africa: Cape Town site (University of Cape Town):** Linda-Gail Bekker
 - **South Africa: Durban eThekweni site (Centre for AIDS Programme of Research in South Africa):** Gonasagrie Nair
 - **South Africa: Durban – Botha’s Hill, Chatsworth, Isipingo, Tongaat, Umkomaas, Verulam sites (South African Medical Research Council):** Vaneshree Govender, Samantha Siva, Nitesha Jeenarain, Zakir Gaffoor, Arendevi Pather, Logashvari Naidoo, Gita Ramjee
 - **South Africa: Johannesburg site (Wits Reproductive Health and HIV Institute):** Thesla Palanee-Phillips
 - **Uganda: Kampala site (Makerere University-Johns Hopkins University Research Collaboration):** Flavia Matovu Kiweewa, Clemensia Nakabiito
 - **Zimbabwe: Chitungwiza-Seke South, Chitungwiza-Zengeza, Harare-Spilhaus sites (University of Zimbabwe-University of California San Francisco Collaborative Research Program):** Nyaradzo M. Mgodli, Felix Mhlanga, Zvavahera M. Chirenje
- **Microbicides Trials Network Leadership and Operations Center (University of Pittsburgh, Magee-Womens Research Institute, University of Washington, FHI 360, Population Council, RTI International):** Sharon Hillier, Ian McGowan, Katherine Bunge, Beth Galaska, Cindy Jacobson, Judith Jones, Ashley Mayo, Barbara S. Mensch, Elizabeth T. Montgomery, Patrick Ndase, Rachel Scheckter, Devika Singh, Kristine Torjesen, Ariane van der Straten, Rhonda White
- **Microbicides Trials Network Laboratory Center (Magee-Womens Research Institute, University of Pittsburgh, Johns Hopkins University):** Craig W. Hendrix, Edward Livant, Mark A. Marzinke, John W. Mellors, Urvi M. Parikh
- **Microbicides Trials Network Statistical and Data Management Center (Fred Hutchinson Cancer Research Center):** Elizabeth R. Brown, Jennifer Berthiaume, Marla Husnik, Karen Patterson, Barbra A. Richardson, Daniel W. Szydlo
- **US National Institutes of Health:** Nahida Chakhtoura, Donna Germuga, Cynthia I. Grossman, Lydia E. Soto-Torres
- **International Partnership for Microbicides:** Zeda Rosenberg, Annalene Nel
- **MTN-020/ASPIRE participants and their communities; MTN-020 Community Working Group; MTN-020 Study Monitoring Committee; DAIDS MNDSMB**
- The International Partnership for Microbicides developed the dapivirine ring and provided the study rings.
- The Microbicide Trials Network is funded by the National Institute of Allergy and Infectious Diseases (UM1AI068633, UM1AI068615, UM1AI06707), with co-funding from the Eunice Kennedy Shriver National Institute of Child Health and Human Development and the National Institute of Mental Health, all components of the U.S. National Institutes of Health.



University of the Witwatersrand
WITS RHI



A Study to Prevent Infection with a Ring for Extended Use

Thank you!

Kathryn Peebles, MPH, PhDc
Department of Epidemiology
University of Washington
kpeebles@uw.edu



DEPARTMENT OF EPIDEMIOLOGY
UNIVERSITY of WASHINGTON