Evaluating PrEP during pregnancy and postpartum in a high-risk setting

Kalisha Bheemraj

Division of Epidemiology and Biostatistics, School of Public Health, Faculty of Health Sciences, University of Cape Town, South Africa

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School of Public Health
Departement Openbare Gesondheid
Isikolo Sempilo Yoluntu
UNIVERSITY OF CAPE TOWN

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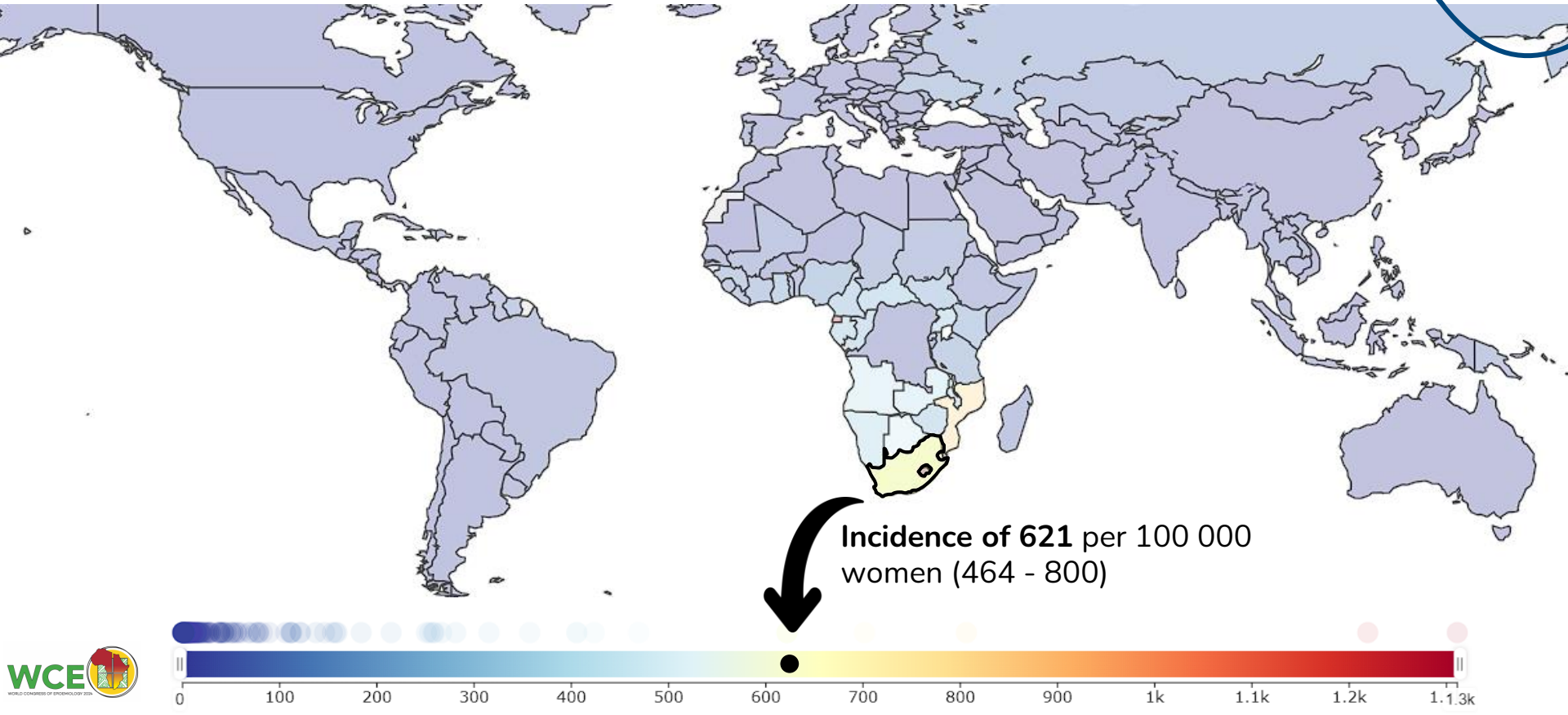
PrEP-PP
Pre-exposure Prophylaxis in Pregnancy & Postpartum

SCOPE-PP
Stepped Care to Optimise PrEP Effectiveness in Pregnant & Postpartum Women

Incidence of HIV in South Africa

HIV incidence among women aged 15-49 years [1]



Incidence of HIV in South Africa

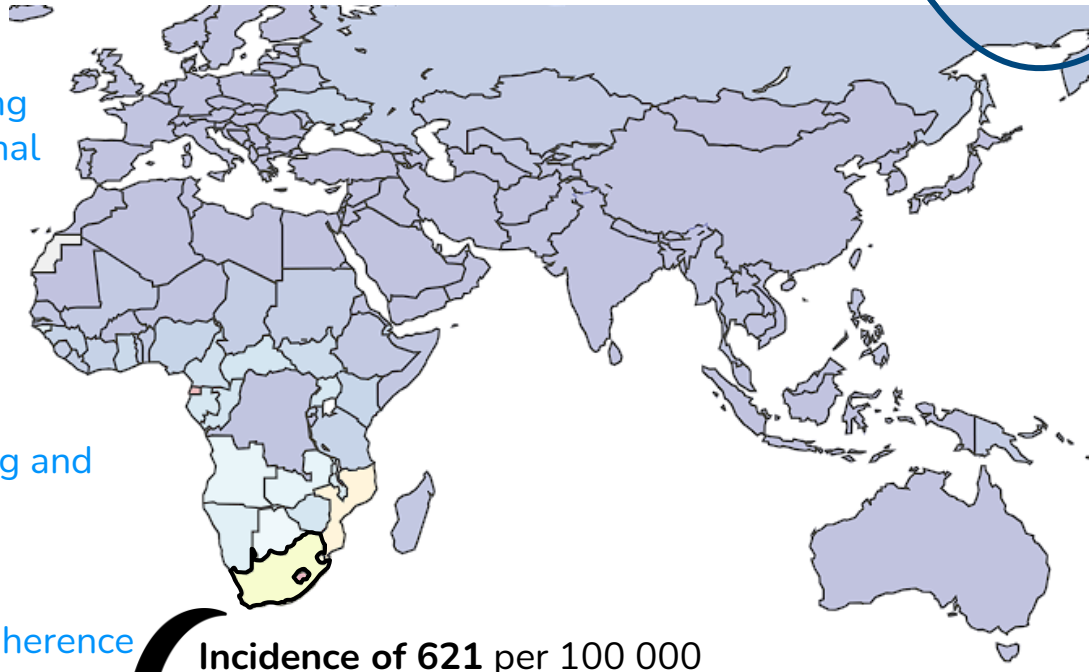
Reducing the risk of HIV acquisition during pregnancy is crucial for improving maternal health and preventing mother-to-child transmission [2-3]

PrEP efficacy relies on correct and consistent use [2-3]

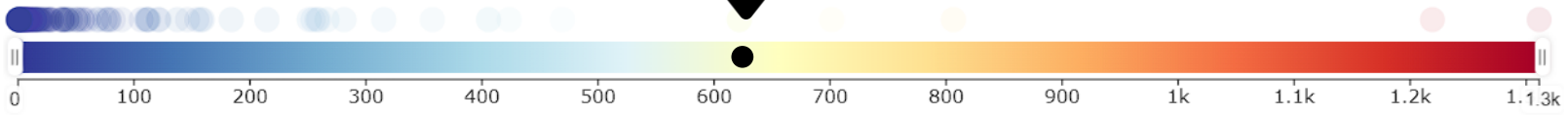
Highlighting the importance of monitoring and understanding adherence by accurately measuring PrEP exposure to:

- maximise protective benefits
- identify individuals with suboptimal adherence

HIV incidence among women aged 15-49 years [1]



Incidence of 621 per 100 000 women (464 - 800)



PrEP-PP

Pre-exposure Prophylaxis in Pregnancy & Postpartum

- > 16-year-old pregnant women not living with HIV
- Enrolled 1 195 women
- 18 months follow-up
- Observational cohort

SCOPE-PP

Stepped Care to Optimise PrEP Effectiveness in Pregnant & Postpartum Women

- > 16-year-old pregnant women not living with HIV
- Enrolled 750 women
- 15 months follow-up
- Ongoing RCT

Measuring PrEP Exposure

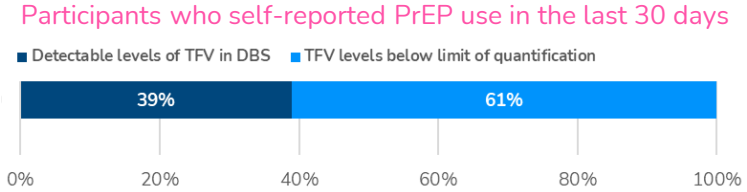
Subjective

Method

Self-reported

Self-reported [4-6]

Collected through questionnaires or interviews



Easy to implement

Cost-effective

Immediate overview of the general adherence trends

Often overestimated and subject to recall bias

Influenced by social desirability to meet perceived expectations

→ non-differential exposure misclassification

Measuring PrEP Exposure

Subjective

Pill count [7]

Tracking the number of pills remaining from a previously prescribed supply

Method
Self-reported
Pill count

Support dosage-related measures of adherence

Patients not returning with prescription bottles

Pill dumping or pill sharing

Does not capture occasionally missed doses

Measuring PrEP Exposure

Objective

TDF-FTC tests: Urine assay [8-10]

Detects Tenofovir disoproxil fumarate/ emtricitabine (TDF-FTC) present in urine

Method
Self-reported
Pill count
Urine assay

- High sensitivity (96%) and specificity (100%)
- Confirms TFV presence of PrEP taken in last 48 hours
- Point-of-care monitoring

- Requires proper handling and laboratory analysis
- Unable to assess long-term adherence

IMPAACT
International Maternal Pediatric Adolescent AIDS Clinical Trials Network

Lower TFV-DP concentrations were observed during pregnancy compared to the postpartum period

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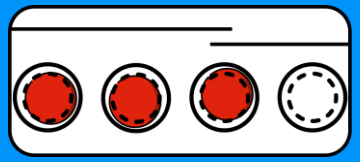

Measuring PrEP Exposure

Objective

TDF-FTC tests: DBS [11-14]

Dried blood spots (DBS) cumulative PrEP adherence of TDF-FTC in erythrocytes

Method
Self-reported
Pill count
Urine assay
DBS

Long-term PrEP adherence of 30 days

Gold-standard technique

PrEP-PP study
In 7% DBS results above detectable limit, participants indicated they did not take PrEP in the last 30 days.

Logistical challenges and costly

Specialised laboratories (advanced technology and trained professionals)

Limited use for real-time adherence monitoring

Measuring PrEP Exposure

	Self-reported	Pill count	TDF-FTC via urine assay	TDF-FTC via DBS	TDF-FTC via Hair sample
Cost and ease of implementation 	✓	✓			
Objective measure 			✓	✓	✓
Ascertainment of PrEP usage 	Daily, weekly, monthly	Monthly	Last 48 hours	Last 30 days	Monthly
Adherence results immediately available 	✓	✓	✓		
Non-invasive 	✓	✓	✓		

Measuring PrEP outcomes [15]

The type of outcome depends on the focus of the study

PrEP persistence

Participants take breaks throughout their PrEP use journey

Interruptions make it difficult to measure adherence consistently and assess long-term persistence

Question: Did you use PrEP in the last 30 days? **Logistic regression**

ID	Baseline	3-month visit	6-month visit	9-month visit	12-month visit	PrEP continuation at 12-months
001	Initiated PrEP	Yes	Yes	No	Yes	Continued
002	Initiated PrEP	Yes	Yes	Yes	No	Discontinued
003	Did not initiate PrEP	Initiated PrEP	Yes	No	Yes	Continued

Measuring PrEP outcomes [15]

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Question: Did you use PrEP in the last 30 days?

						Logistic regression	Cox PH
ID	Baseline	3-month visit	6-month visit	9-month visit	12-month visit	PrEP continuation at 12-months	Time until first discontinuation
001	Initiated PrEP	Yes	Yes	No	Yes	Continued	9 months
002	Initiated PrEP	Yes	Yes	Yes	No	Discontinued	12 months
003	Did not initiate PrEP	Initiated PrEP	Yes	No	Yes	Continued	6 months

Measuring PrEP outcomes [6]

The type of outcome depends on the focus of the study

PrEP safety

Birth outcomes are critical for assessing maternal and infant health

Obtained through multiple sources with possibility of high ascertainment rates

- Directly from participants
- Online data bases
- Clinic registries

96% of birth outcomes were ascertained for 1 195 participants

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Pre-exposure Prophylaxis in Pregnancy & Postpartum

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Measuring PrEP outcomes [16]

The type of outcome depends on the focus of the study

PrEP efficacy and effectiveness

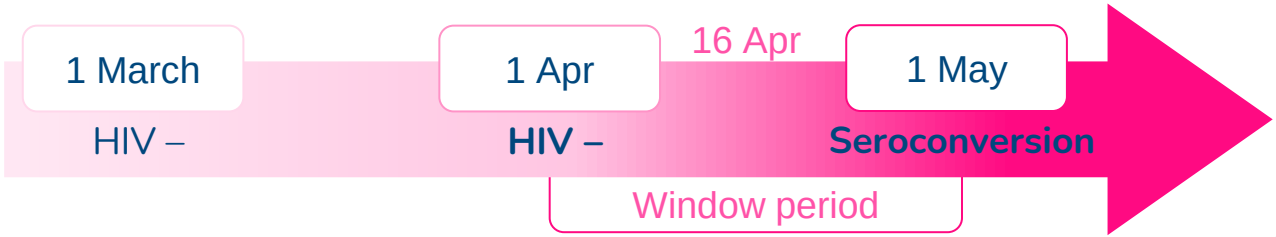
Seroconversion rates are a key indicator of PrEP efficacy

Exact date of seroconversion is crucial in PrEP studies

Encourages HIV testing at each clinic visit

Differentiate between PrEP failure (efficacy) and adherence issues (effectiveness)

The midpoint between the last negative test and the first positive test to estimate the date of seroconversion



Measuring PrEP outcomes [16]

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PrEP efficacy and effectiveness

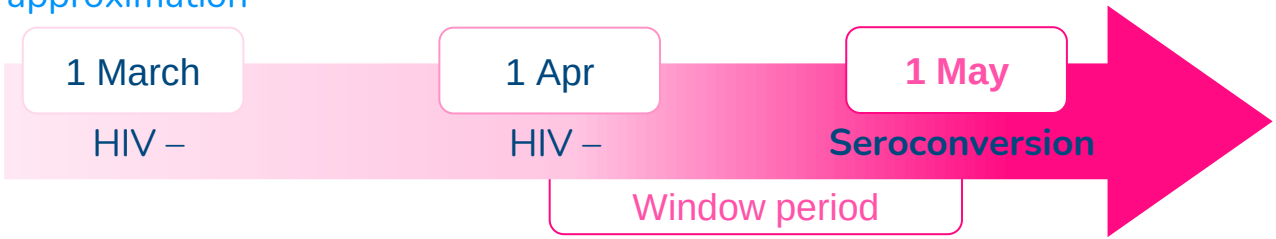
Seroconversion rates are a key indicator of PrEP efficacy

Exact date of seroconversion is crucial in PrEP studies

Encourages HIV testing at each clinic visit

Differentiate between PrEP failure (efficacy) and adherence issues (effectiveness)

For participants who are LTFU, test results can be sources from online data bases where the date of first positive test result can be used as the closest approximation

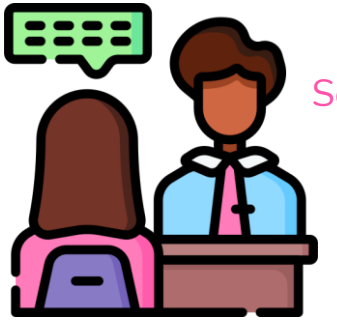


Measuring PrEP outcomes

The type of outcome depends on the focus of the study

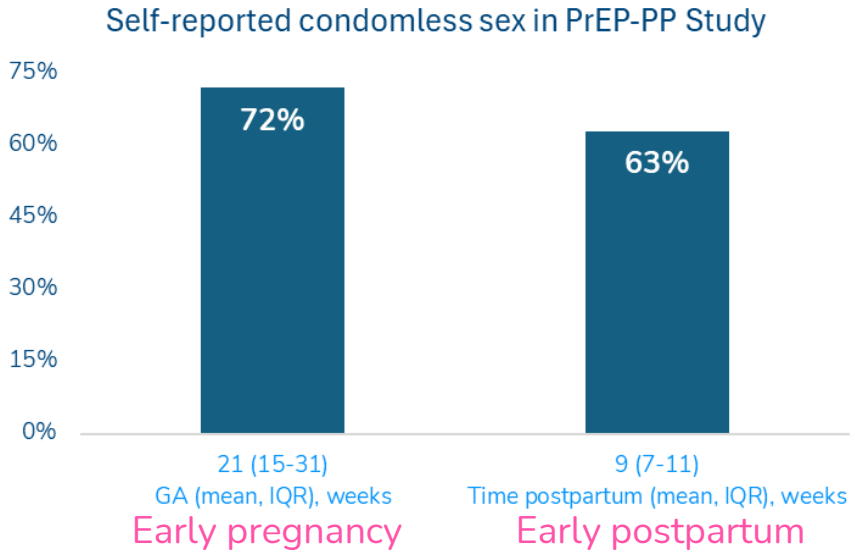
Behavioural outcomes

Patterns of sexual behaviour and effective use of PrEP among pregnant and postpartum women is crucial for identifying high-risk periods



Self-reported sexual behaviour

- Subject to recall bias
- Under reporting of risk behaviour due to stigma
- Missing visit leaves gaps in behaviour changes



Data management issues

Lost to follow-up

- Capturing reasons for LTFU are essential in providing insight
- Help in tailoring retention strategies and improving data completeness

Missing data

- Obtaining birth outcomes and seroconversion data from online databases and clinical registries
- Prescription records from clinics, however, participants may not be directly comparable due to differing methodologies

Future directions [17-18]

Long-acting injectable

Bi-monthly Cabotegravir and bi-annually Lenacapavir could simplify adherence monitoring and potentially improve participant retention when aligned with ANC visits

Long-acting duration, greater user discretion with a lower burden of use compared to daily oral pill

Digital pill systems

Directly measuring ingestion events

Ingestible radiofrequency emitter that signals a wearable reader upon PrEP ingestion, transmitting data to a smartphone app

Can reduce biases in self-reported data

Final Thoughts

Effective PrEP use is essential for reducing HIV risk in South Africa, particularly among pregnant and breastfeeding women

Accurate adherence measurement is challenging but critical for evaluating PrEP efficacy and effectiveness

Future innovations, including long-acting PrEP and digital tracking systems, offer promising solutions to enhance adherence monitoring and address data biases

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Author correspondence: kalisha.bheemraj@uct.ac.za

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