

# Using Discrete Choice Experiments to understand Patient Preferences

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HEALTH ECONOMICS AND HIV AND AIDS RESEARCH DIVISION

# Outline

- Introduction
- What is a DCE?
  - Theoretical underpinnings
  - Innovative approaches to DCE design
  - Survey instrument design, piloting and data collection
- Observations from previous work
  - Disentangling stated from revealed preferences
  - Making sense of multiple sources of data
  - Working with adolescents
- Considerations for future work
- Group Work

We cannot assume that just because we think people need a health intervention that there will actually be demand for it – understanding *how* to deliver services is as important as *what* services are needed

We need to make patient-centric innovation a reality by incorporating patient preference studies (PPS) as part of new product or service delivery mechanisms.

# Theoretical and methodological approach

- Economists use the concept of utility to explain why people make choices:  
**CHOOSE WHATEVER MAXIMISES UTILITY**
- Lancaster proposed "...breaking away from the traditional approach that goods are the direct objects of utility and, instead, supposing that it is the properties or characteristics of the goods from which utility is derived" (1966)
- For example, if you were buying a new car, would you prefer:



# Switch to MentiMeter

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# Would you prefer a Toyota or a Volkswagen?

R170,000



**Toyota Corolla**  
2016 model  
40 000km  
Red  
7,5litres/100km

*OR*

R250,000



**Volkswagen Golf**  
2019 model  
80 000km  
Silver  
6,5litres/100km

# Patient Preference Information

- **Attributes:** What Matters?
- **Relative Importance:** How much it matters?
- **Trade-Offs:** What compromises are patients willing to make between benefits, harms and other aspects

# Key Steps to Developing a DCE

## 1. Define Treatment Attributes?

- Benefits (Efficacy, Remission etc)
- Risks (e.g. adverse events)
- Treatment modalities (When, Where, How...)

## 2. Assign Attribute Levels

- Pain Relieved after 1 hour (85%, 45%)
- Occurrence of an adverse event (8%, 15%, 25%)
- Mode of administration (IV once a month, Injection every 2 weeks)

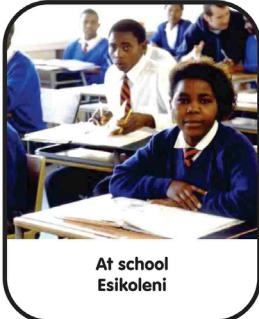
## 3. Create Scenarios and Choice Sets

- Option A vs Option B
- Opt-out

# Survey instrument design, piloting and data collection

## An Example of a Choice Set (HIV Testing)

A



At school  
Esikoleni

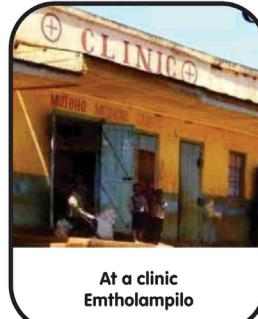


Free  
Awukhokhi lutho



Finger prick  
Ukuhlaba umunwe

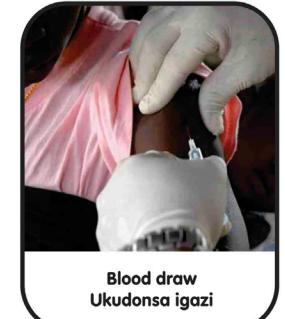
B



At a clinic  
Emtholampilo



You pay R20  
Ukhokha u-R20



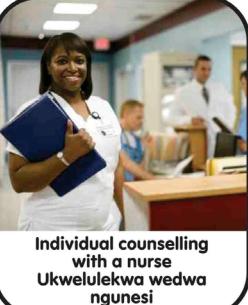
Blood draw  
Ukudonsa igazi



Somebody in your community  
you don't know  
Umuntu wangakini  
ongamazi



Weekday afternoon  
Ntambama phakathi  
nezinsuku



Individual counselling  
with a nurse  
Ukwelulekwa wedwa  
ngunesi



IHR  
One hour  
Ihora elliodwa



Somebody from your  
community you know  
Umuntu omaziyo ohlala  
kumphakathi wangakini



Weekday morning  
Ekuseni phakathi  
nezinsuku



Nurse group  
Ukwelulekwa nesixuku  
ngunesi



30 MIN  
30 minutes  
Imizuzu engamashumi  
amathathu

# Innovative approaches to designing DCEs

TB preventive therapy for children in Eswatini

Differentiated ART models for stable HIV patients in Zimbabwe

# The importance of refining attributes and levels

- Any attribute that is not included in the DCE design falls into the random component of the analysis
- There are often too many attributes to include in a DCE design, especially when designs need to be simple (e.g., among adolescents)
- Levels (different values each attribute can take) need to be context specific
- Too little variation in the levels will skew results – participants will be indifferent to changes in a particular attribute, even though that attribute does matter
- Too much variation will also skew results – participants will *only* focus on that attribute even though others may be equally important
- Not much guidance on how to decide what to include

# TB preventive therapy for children in Eswatini

- Developed an initial list of 13 attributes and conducted in-depth interviews understand how they may influence TPT decision-making and service delivery – participants were asked to select the 3 most important attributes

	Child		Caregiver		HCP
Cost of visit	9	Cost of visit	18	Size of pills	10
Number of pills	7	Wait time in the clinic	18	Cost of visit	8
Taste	7	Size of pills	17	Side effects	7
Size of pills	6	Taste	13	Number of pills	6
Dosing frequency	4	Number of pills	12	Duration of treatment	5
Wait time in the clinic	3	Times of operation	10	Taste	5
Times of operation	3	Availability of psychosocial support	9	Availability of psychosocial support	4
Side effects	2	Location of TPT services	8	Dosing frequency	4
Availability of psychosocial support	1	Number of clinic visits	6	Location of TPT services	3
Location of TPT services	1	Side effects	4	Wait time in the clinic	2
Interaction with other meds	1	Duration of treatment	3	Number of clinic visits	2
Duration of treatment	1	Dosing frequency	3	Interaction with other meds	1
Number of clinic visits		Interaction with other meds	1	Times of operation	

Children top 7	
1	Cost of visit
2	Number of pills
3	Taste
4	Size of pills
5	Dosing frequency
6	Wait time in the clinic
7	Times of operation

Caregivers top 7	
1	Cost of visit
2	Wait time in the clinic
3	Size of pills
4	Taste
5	Number of pills
6	Times of operation
7	Availability of psychosocial support

HCP top 7	
1	Size of pills
2	Cost of visit
3	Side effects
4	Number of pills
5	Duration of treatment
6	Taste
7	Availability of psychosocial support

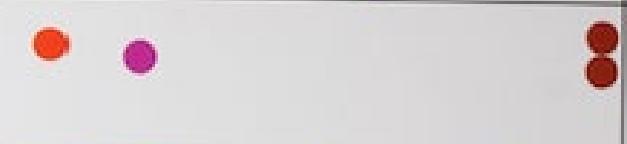
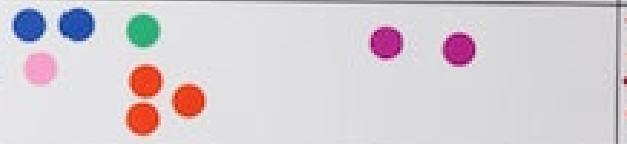
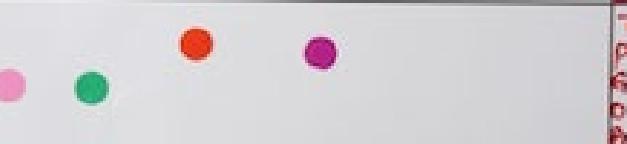
Children bottom 6	
8	Side effects
9	Availability of psychosocial support
10	Location of PT services
11	Interaction with other meds
12	Duration of treatment
13	Number of clinic visits

Caregivers bottom 6	
8	Location of PT services
9	Number of clinic visits
10	Side effects
11	Duration of treatment
12	Dosing frequency
13	Interaction with other meds

HCP bottom 6	
8	Dosing frequency
9	Location of PT services
10	Wait time in the clinic
11	Number of clinic visits
12	Interaction with other meds
13	Times of operation

# Differentiated ART for stable HIV patients in Zimbabwe

- Sticker exercise in a focus group discussion to understand how participants rank attributes
- Scores are tallied to help eliminate attributes that are not central to the decision-making process

Attribute	Sticker Space
1. Perceived service user importance (location of service delivery)  [Patients, Patients, Patients] [Health facility, Community, Home]	
2. Perceived service user importance (location of service delivery)  [Non-clinic service users; Community; Households, carers, family members]  [Isolated, Family members, Other (e.g., other community members)]	
3. Perceived service user importance (location of service delivery)  [Medical institutions; Health facility, Clinic, Hospital, Medical office] [Hospitals and medical institutions]  [Doctors (nurses, doctors, medical officers); Community Health Workers; Health clinics]	
4. Perceived service user importance (location of service delivery)  [Private practitioners; Community health workers; Community based organizations (non-governmental organizations); Traditional healers]  [Work place only; Extended family (from early childhood/adolescence); Religious groups]	
5. Perceived service user importance (location of service delivery)  [Health workers; Health facility, Hospital, Medical office]  [Non-clinic service users; Community; Households, carers, family members]  [Isolated, Family members, Other (e.g., other community members)]  [Non-clinic service users; Community; Households, carers, family members]  [Isolated, Family members, Other (e.g., other community members)]  [Non-clinic service users; Community; Households, carers, family members]  [Isolated, Family members, Other (e.g., other community members)]  [Non-clinic service users; Community; Households, carers, family members]  [Isolated, Family members, Other (e.g., other community members)]	
6. Perceived service user importance (location of service delivery)  [Non-clinic service users; Community]  [Isolated, Family members, Other (e.g., other community members)]  [Non-clinic service users; Community]  [Isolated, Family members, Other (e.g., other community members)]	
7. Perceived service user importance (location of service delivery)  [Non-clinic service users; Community]  [Isolated, Family members, Other (e.g., other community members)]	
8. Perceived service user importance (location of service delivery)  [Non-clinic service users; Community]  [Isolated, Family members, Other (e.g., other community members)]	

# Disentangling stated from revealed preferences

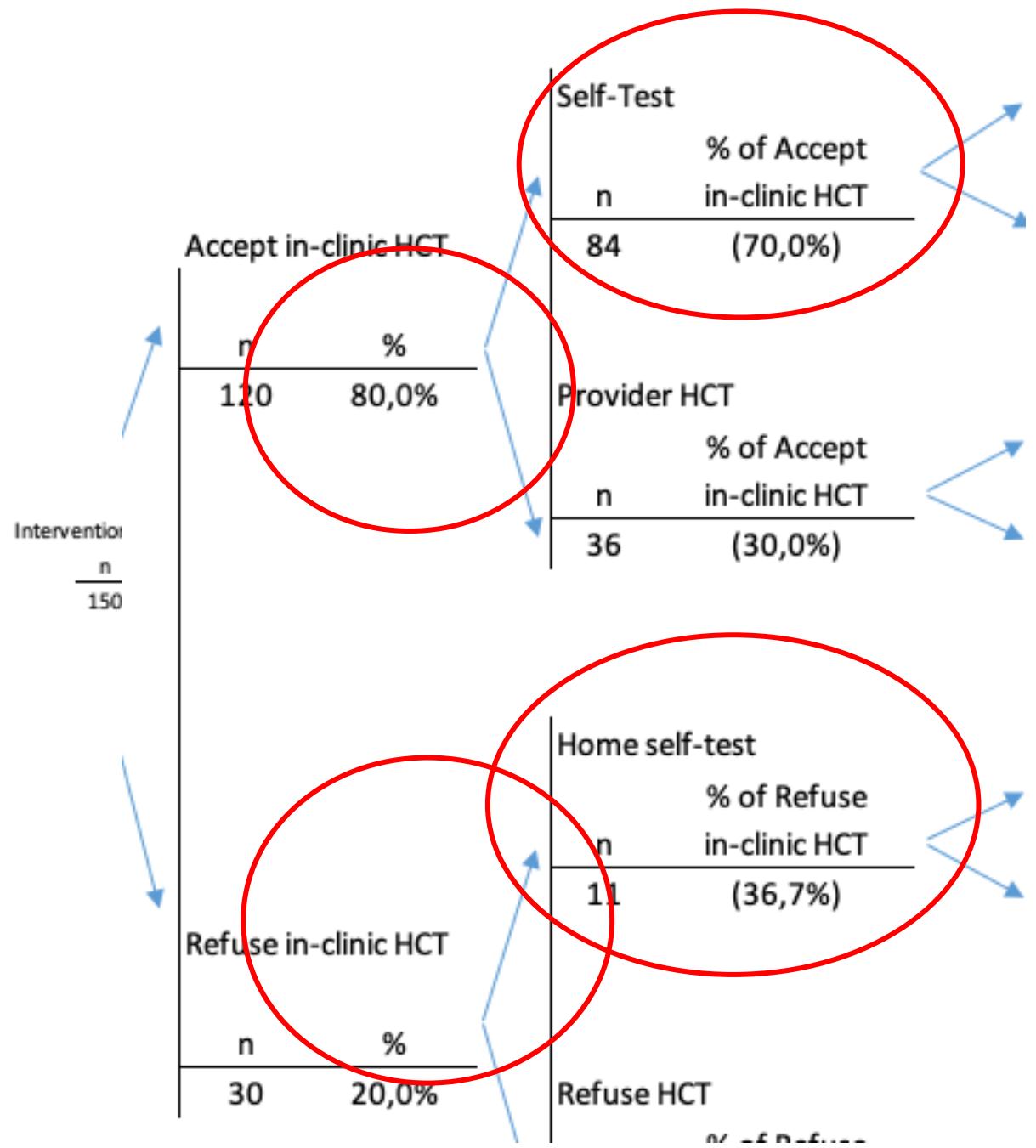
Oral self-testing for HIV among long distance truck drivers in Kenya

# Oral self-testing for HIV

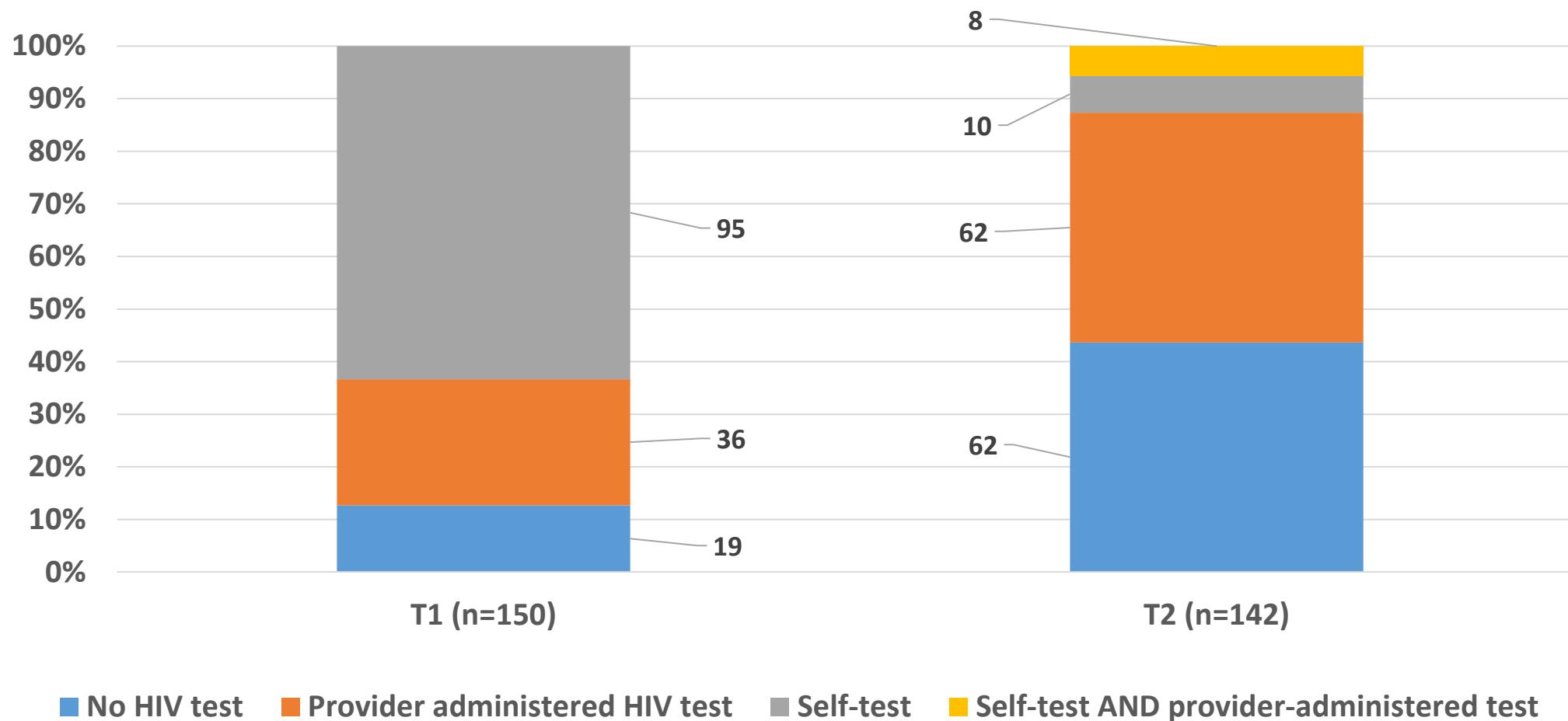
- Studies have found high levels of acceptability
- Countries have begun to use oral self-testing as a strategy to improve testing rates, particularly among hard-to-reach populations
- Uptake of oral self-testing kits has seen mixed levels of success
- What is it about oral self-testing that people like, and how is this different from more conventional clinic-based, provider-administered testing that is already available?

# Oral self-testing for HIV cont.

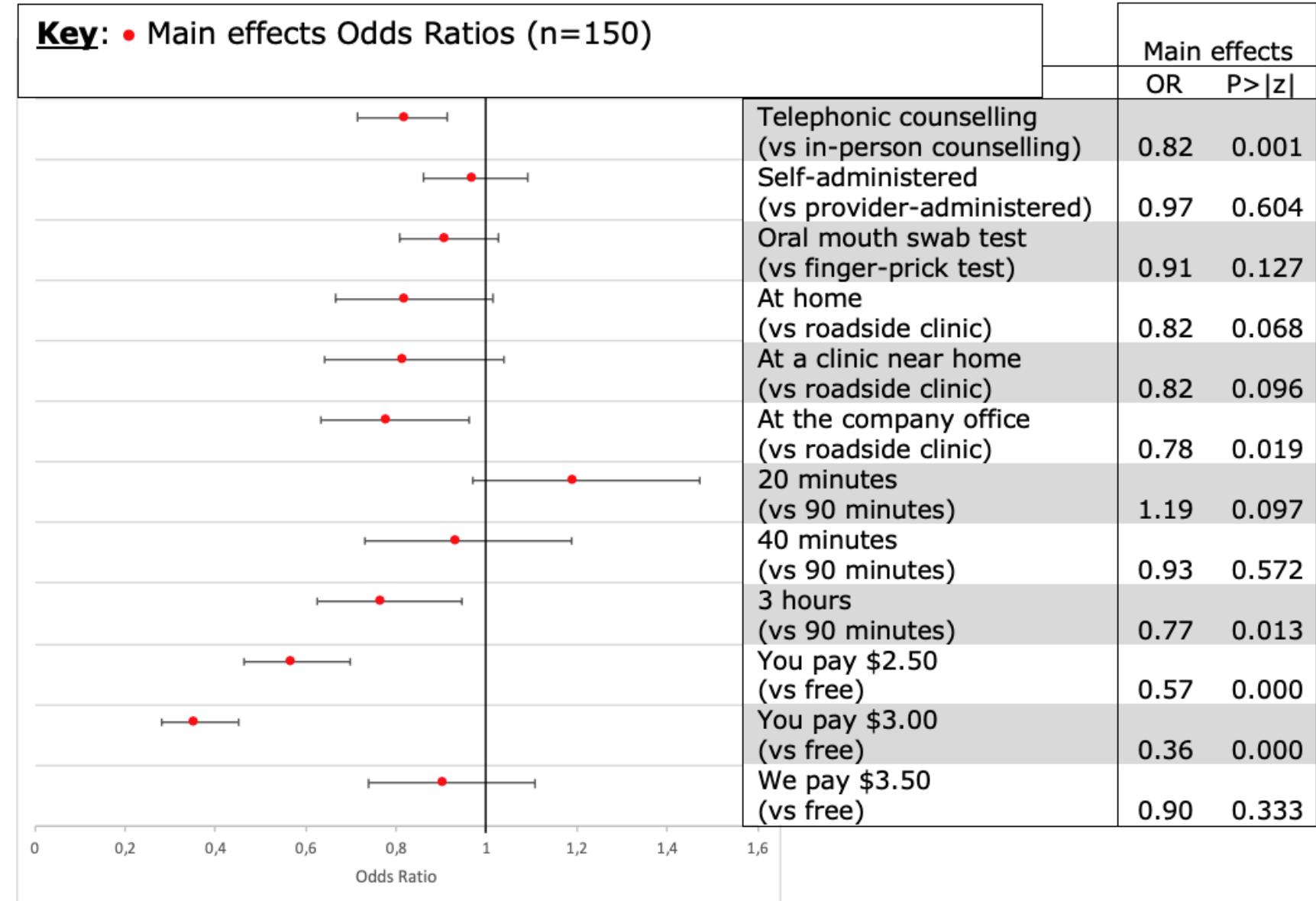
- A randomized control trial in Kenya
  - Choices made by participants and 6-month follow-up
- A discrete choice experiment
  - Preference structures of participants
- Choices in an experimental trial vs choices in the real world



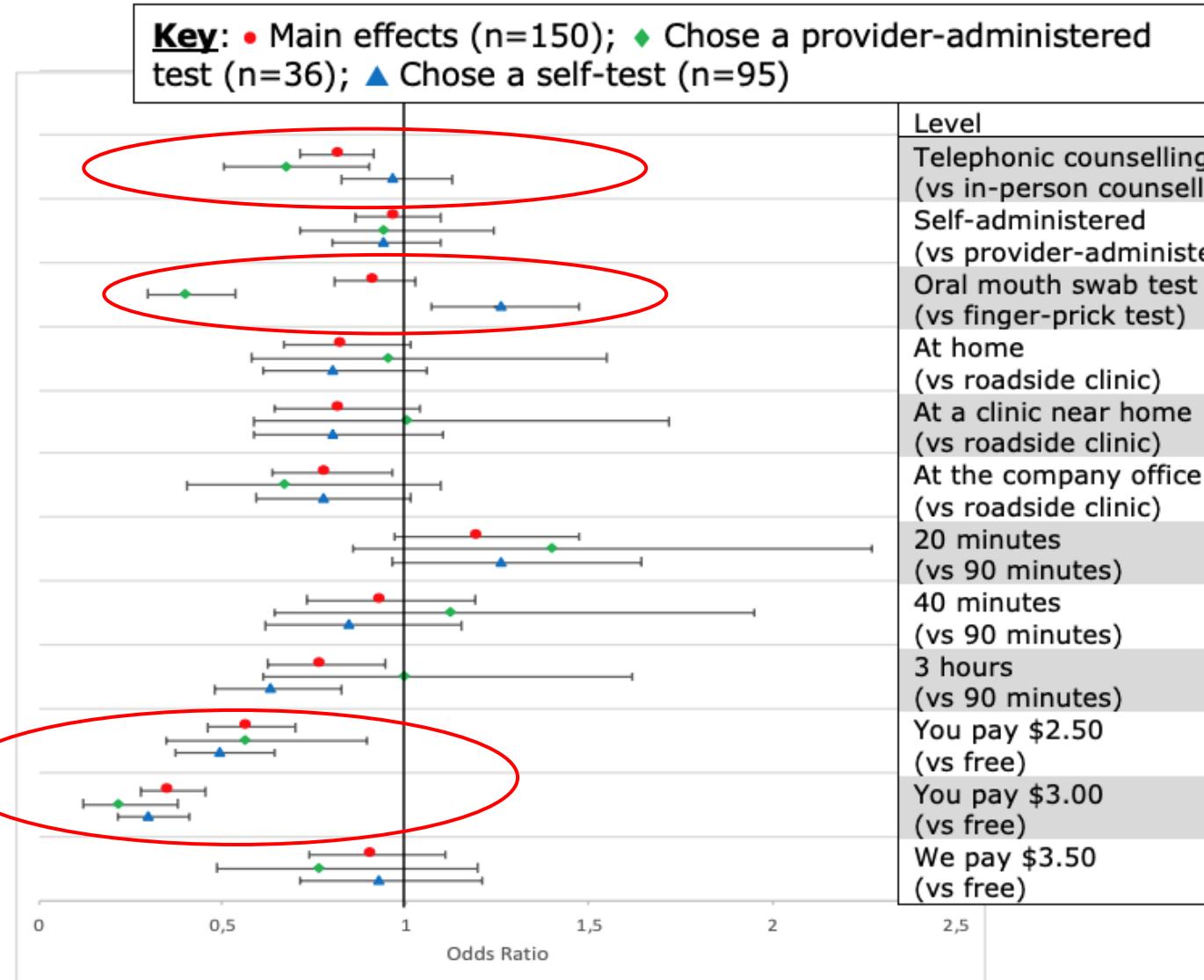
# Choices of participants in the intervention arm



# Preference structures of participants in the intervention arm



# Choices vs preference structures



	<b>Model 1</b>		<b>Model 2</b>	
	Main effects	Provider-administered test	Self-test	Self-test
Level	OR	P> z	OR	P> z
Telephonic counselling (vs in-person counselling)	0.82	0.001	0.68	0.008
Self-administered (vs provider-administered)	0.97	0.604	0.94	0.644
Oral mouth swab test (vs finger-prick test)	0.91	0.127	0.40	0.000
At home (vs roadside clinic)	0.82	0.068	0.95	0.833
At a clinic near home (vs roadside clinic)	0.82	0.096	1.00	0.995
At the company office (vs roadside clinic)	0.78	0.019	0.67	0.109
20 minutes (vs 90 minutes)	1.19	0.097	1.39	0.182
40 minutes (vs 90 minutes)	0.93	0.572	1.12	0.688
3 hours (vs 90 minutes)	0.77	0.013	0.99	0.983
You pay \$2.50 (vs free)	0.57	0.000	0.56	0.016
You pay \$3.00 (vs free)	0.36	0.000	0.21	0.000
We pay \$3.50 (vs free)	0.90	0.333	0.76	0.237

# Bringing together different sources of data

Differentiated ART models for stable HIV patients in Zimbabwe

Oral self-testing for HIV among long distance truck drivers in Kenya

# Differentiated ART for stable HIV patients in Zimbabwe



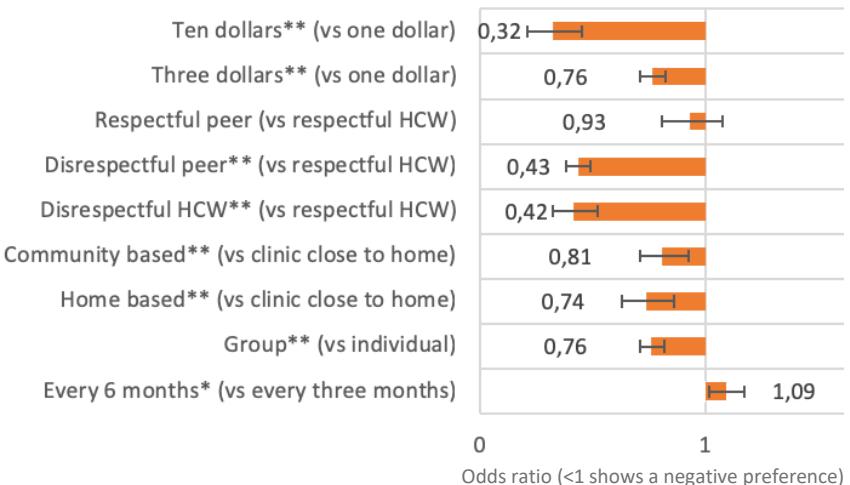
- **Fast-Track Refills:**
  - Facility-based individual model
  - Patients come to health facility quarterly
  - Patient collects medication from pharmacy/dispensing point quarterly
  - Annual facility-based clinical examination + laboratory testing
- **Community ART Refill Groups:**
  - Community-based group model
  - Patients come to health facility annually
  - Self-forming groups of 6-12 people meet quarterly in the community to review adherence, screen for symptoms, and provide peer support
  - One member goes to the health facility every 3 months to pick up medication for the whole group
  - Each member has an annual facility-based clinical examination and laboratory testing
- **Club Refills:**
  - Facility-based group model
  - Patients come to health facility quarterly
  - 10-20 people on ART are scheduled for pick-ups at the same time; a health care worker facilitates discussion, identifies individuals who need additional services, and dispenses medication to all
  - Each member has an annual facility-based clinical examination and laboratory testing
- **Family Member Refills:**
  - Facility-based group model
  - One member of family comes to health facility quarterly to pick up medications for all
  - Each member has an annual facility-based clinical examination and laboratory testing
- **Outreach Model:**
  - Community-based individual model
  - Patients come to health facility annually
  - Health care worker travels to meet patients one-on-one in the community, where they review adherence, screen for symptoms, and dispense medication
  - Annual facility-based clinical examination + laboratory testing

## Discrete Choice Experiment

N = 500 "stable" ART patients

Preferences were consistent, with little variation based on age or sex. The DCE found:

- Statistically significant and relatively strong preferences for
  - Individual vs. group models
  - Clinic-based vs. community- or home-based services
  - Respectful vs. not respectful providers
  - Cost < \$3 per visit
- Smaller but statistically significant preferences for:
  - Visits every 6 months vs. every 3 months
- No preferences re:
  - Cadre of health care worker
  - Distance from home to health facility
  - Operation times of clinic



## Key Informant Interviews / Site Surveys

N = 35 KII with HCWs, 7 site surveys

### Site survey:

- The 7 facilities had been implementing DSD for 1-3 yrs (median = 1 yr)
- Median # of adults on ART = 4,301 (range 3,296 – 6,621)
- Median observed wait time for ART patients = 83 minutes (range 29-148)

### Key informant interviews:

- Health care workers reported that patients prefer the fast track/visit spacing model (a facility-based individual model) because of its privacy and efficiency
- Health care workers themselves preferred the fast track/visit spacing model because it reduced facility congestion and HCW workload

## HEALTH ECONOMY

## Focus Group Discussions

N = 8 FGDs with 54 "stable" ART patients

In FGDs, patients expressed preferences for:

- Kind, welcoming and respectful staff who are attentive to issues of privacy and confidentiality
- Clinic-based services
- Flexible operating hours, including weekends
- Reduced visit frequency

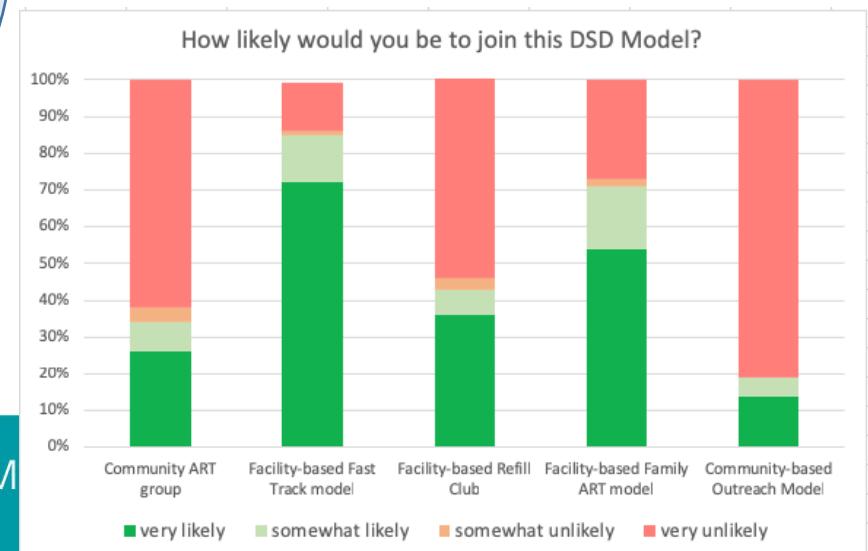
*"Everyone goes to the clinic, so no one knows why you are visiting the clinic..." – female FGD participant*

*"We are faced with different situations at work, this is why we suggested that if we can be given medication to last us 6 months or even for the whole year." – male FGD participant*

## Questionnaires

N = 500 "stable" ART patients

How likely would you be to join this DSD Model?



# Working with adolescents

TB preventive therapy among children

# Working with adolescents

- DCEs can make use of visual cues and instrument design can help to make the implementation of studies quick to administer and easy to understand
- High school learners aged 16 years and older in South Africa said they found the DCE choice tasks to be intuitive
- In Eswatini, adolescents aged 10-14 years participated in a DCE and fieldworkers said many of them responded more easily than their caregivers who also participated in the study
- We found young adolescents have somewhat less complicated trade-off strategies

# Example of a DCE for children from Eswatini

Which of the following models of TB preventive treatment for children would you most prefer?

Day	Sun	Mon	Tues	Wed	Thurs	Fri	Sat
✓	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓	✓

Day	Sun	Mon	Tues	Weds	Thurs	Fri	Sat
✗	✗	✗	✗	✓	✗	✗	✗
✗	✗	✗	✗	✓	✗	✗	✗
✗	✗	✗	✗	✓	✗	✗	✗
✗	✗	✗	✗	✓	✗	✗	✗
✗	✗	✗	✗	✓	✗	✗	✗
✗	✗	✗	✗	✓	✗	✗	✗
✗	✗	✗	✗	✓	✗	✗	✗

**Option A**

E40

Medication daily

6 months of treatment, 1 visit per month

Monday- Friday 8am-4pm,

Bitter taste

45 minute wait

2 small pills

FREE! MAHALA!

Zero Cost

1 hour and 30 minute wait

2 large pills

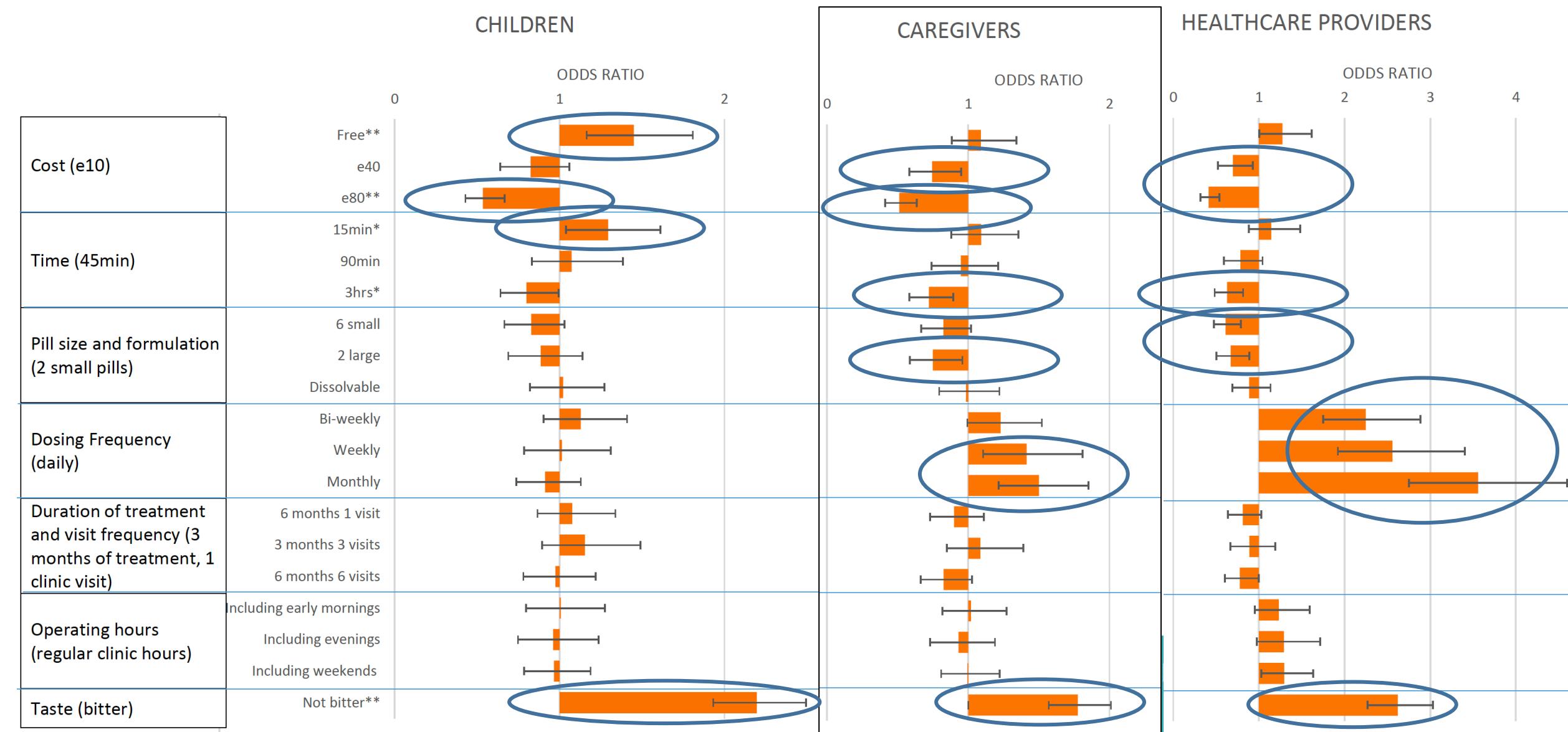
No bitter taste

Medication once a week

3 months of treatment, 1 visit per month

Monday- Friday 8am-4pm, Saturday & Sunday 8am-1pm

# TB preventive therapy preferences in Eswatini



# Considerations for future work

# Key questions for advancing the usefulness of DCEs in healthcare

- How to better understand sources of preference heterogeneity
- Preferences vs determining demand
- Preferences vs Cost-effectiveness vs Budget analysis
- Interpretation and presentation of results for policy change

# Comfort Break - Group Work

# Design a DCE to determine patient preferences for:

- COVID-19 Vaccine
- Employment preferences that would attract HCWs to work in under-served and under-resourced areas.
- PrEP for Women

# COVID-19 - DCE

**Table:** Discrete choice experiment attributes and levels.

Attribute	Definition	Attribute Levels
Vaccination location	Location/venues where vaccine services are provided	Government-local clinic or hospital, mobile clinics
		Private hospital, family doctor, or pharmacy
		At a UKZN vaccination site
Waiting time at vaccination site	Length of time taken to complete the vaccination process	1 hr
		3 hrs
		5 hrs
Incentive for vaccination	An amount provided as reward for getting vaccinated	No fee or incentive
		ZAR 50 (USD 3.33)
		ZAR 350 (USD 23.28)
Protection against serious infection (resulting in hospitalization, ICU admission, or death)	Percentage reduction in serious disease cases in a vaccinated group of people	Very effective (90%)
		Moderately Effective (70%)
		Partially Effective (50%)
Vaccine origin	Country/Region where the vaccine was developed	USA/North America
		UK/Europe
		Russia
		China
Number of doses	Number of vaccine shots required in order to complete the regimen	One dose
		Two doses
Boosters required	Frequency of additional vaccine booster shots required	One vaccination provides life-long immunity (no boosters)
		A booster required every 5 years
		Annual booster vaccinations required

DCE Choice Set 1 of 8

Which of the following models of COVID-19 vaccination do you most prefer?

## Option A



Vaccination Location:  
UKZN Campus



3 hours  
waiting time at the  
vaccination site



You get a R 350  
incentive for  
vaccinating



Vaccine is 90%  
(very) effective  
against severe  
illness and death



The vaccine  
comes from  
China



Two doses



Booster vaccination  
required every  
5 years

## Option B



Vaccination Location:  
Private Health Facility



5 hours  
waiting time at the  
vaccination site



You get no  
incentive for  
vaccinating



Vaccine is 70%  
(moderately) effective  
against severe illness  
and death



The vaccine  
comes from  
Russia



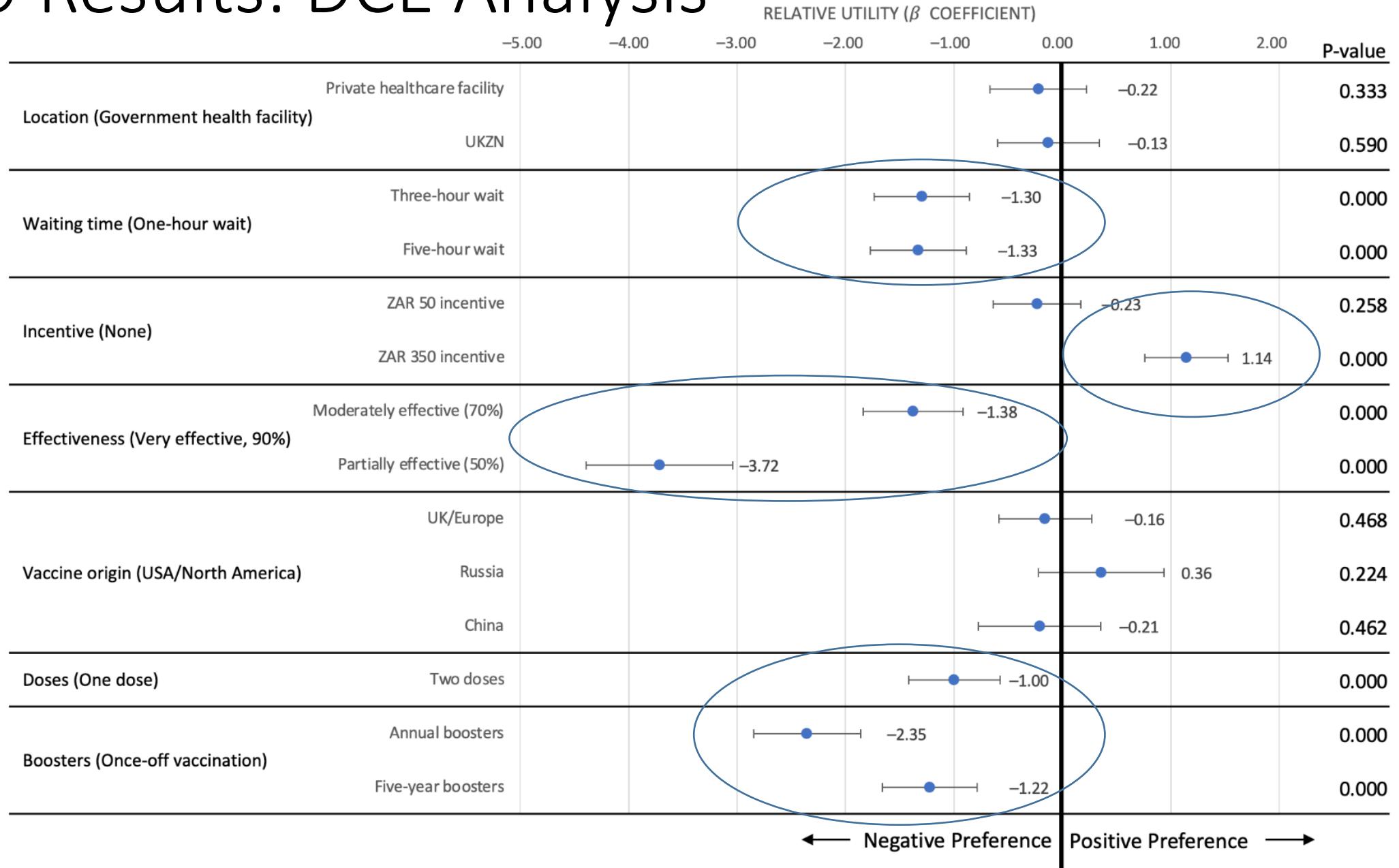
One dose



Annual booster  
vaccinations  
required

# COVID-19 Results: DCE Analysis

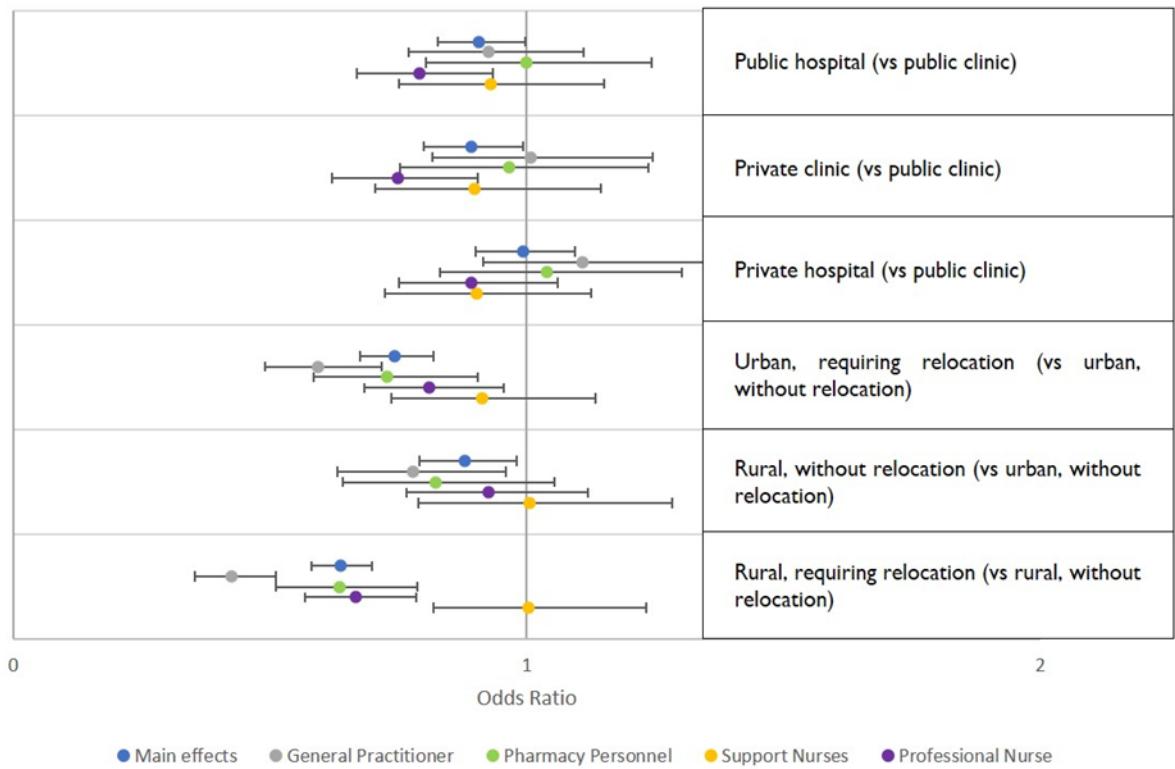
Mixed logit model main effects all staff and students



# Design and Results for HCW employment preferences

Table: Attributes and Levels Included in the DCE Design				
Attribute	Level 1 (Baseline)	Level 2	Level 3	Level 4
Workload	Manageable	Heavy	-	-
Workplace Culture	Enabling culture	Poor culture	-	-
Availability of Equipment	Sufficient	Insufficient	-	-
Opportunities for Training	Frequent	Infrequent/minimal	-	-
Sector and Facility type	Public clinic	Public Hospital	Private clinic	Private Hospital
Location	Urban; No relocation	Urban; Relocation	Rural; No relocation	Rural; Relocation
Salary	5% increase on current salary	10% increase on current salary	20% increase on current salary	Salary cut of 20%
Benefits	None	Medical aid contribution to the value of 7% of salary	Medical aid and pension contribution of 20% of salary	Medical aid, pension housing contribution of 40% of salary

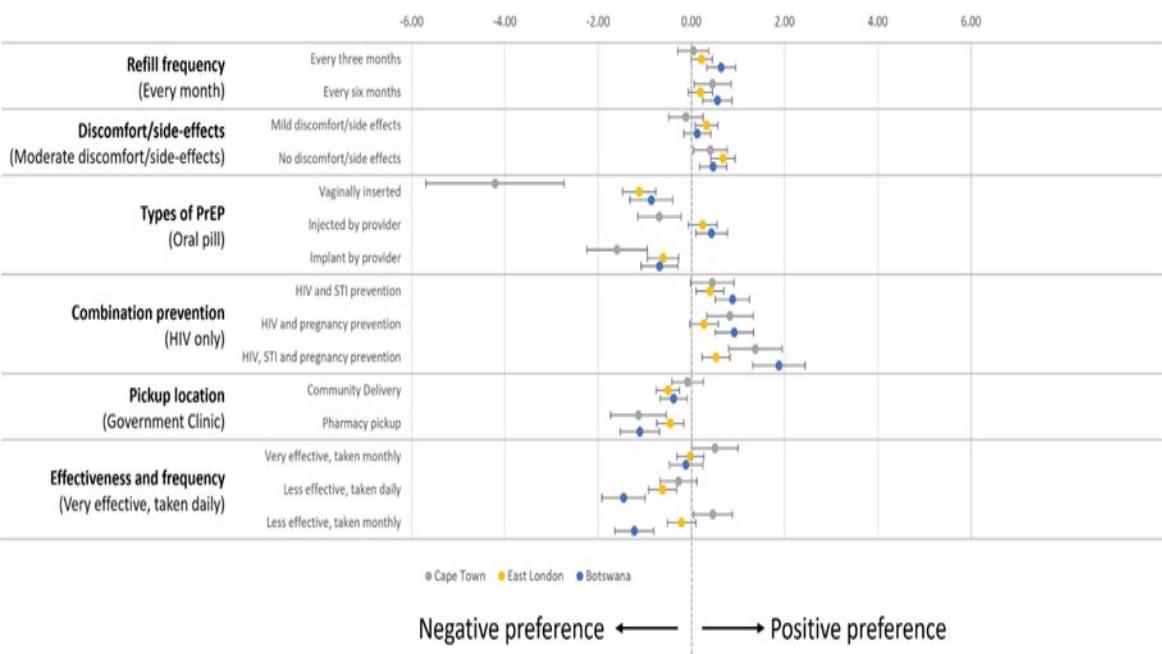
Note: The column "Level 1" shows the baseline scenario and the level for each attribute that was used as a reference category in the analysis (see section 2.4). Four attributes had only two levels each, and four attributes had four levels each. "Level 2", "Level 3" and "Level 4" are generic column headings



# Design and Results for PrEP preferences

Attribute	Level 1	Level 2	Level 3	Level 4
Clinic visit (and product refill)	Refill every month	Refill every 3 months	Refill every 6 months	-
Discomfort with PrEP use incl. side effects	No discomfort or side effects (can't feel it nor tell you are using it)	Mild discomfort or side effects (may feel headaches, fatigue, nausea or vomiting or site injection pain, but it goes away)	Moderate discomfort or side effects (will feel headaches, fatigue, nausea or vomiting, or site injection pain, but it goes away)	-
Types of PrEP Product	Oral pill	Vaginal inserted	Injection in arm or butt	Implant in arm
Combination of prevention methods	HIV prevention only	HIV and STI prevention	HIV and pregnancy prevention	HIV, STIs and pregnancy prevention
Pick-up location	Government clinic pick-up	Mobile community delivery (e.g., community delivery point or mobile van)	Private pharmacy pick-up (e.g., Clicks)	-
Effectiveness and duration of protection	Very effective (75-90%) and take more frequently e.g., daily	Very effective (75-90%) and take less frequently e.g., monthly	Moderately effective (35-50%) and take more frequently e.g., daily	Moderately effective (35-50%) and take less frequently e.g., monthly

Figure 1. Main effects of discrete choice experiment in pregnant and breastfeeding women in South Africa and Botswana, December 2023





# Thank you

## DONORS



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