Differentiated service delivery in Malawi: Provider and client costs of HIV treatment

Linda Sande[1], Mariet Benade[2], Idah Mokhele[1], Wyness Phiri[3], Timothy Tchereni[3], Andrews Gunda[3], Frehiwot Birhanu[3], Rose Nyirenda[4], Stanley Ngoma[4], Sophie Pascoe[1], Amy Huber[1], Sydney Rosen[1,2]

1. Health Economics and Epidemiology Research Office, Johannesburg, South Africa. 2. Department of Global Health, Boston University School of Public Health, Boston, MA, USA. 3. Clinton Health Access Initiative, Lilongwe, Malawi. 4. Ministry of Health, Lilongwe, Malawi

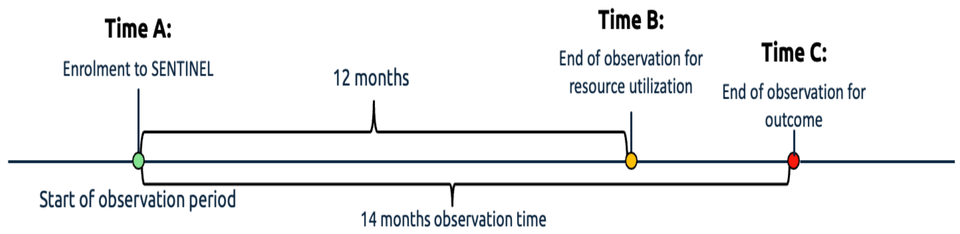
BACKGROUND / INTRODUCTION

- Malawi has offered differentiated service delivery models for HIV treatment since 2016. Current commonly implemented models of care include six-month dispensing, mother-infant pairs, teen clubs, and high viral load clinics.
- The impact of Malawi's DSD models on the costs of providing HIV treatment, at the level of the healthcare facility and for ART clients, has not been documented since the expansion of 6MMD.
- We present preliminary estimates of facility and patient costs for ART clients in 6MMD, other DSD models, and conventional care.

6MMD is slightly less expensive for providers and saves significant time for patients compared to conventional care

METHODS

- From 08/2022 to 02/2023, AMBIT conducted the second round of the SENTINEL survey with ART clients at 12 public clinics in Chiradzulu, Blantyre, and Lilongwe Districts.
- Respondents reported their ART delivery model and associated costs, and their electronic medical records were reviewed to estimate clinic visits, medication pickups, and dispensed medications over a 12-month period.
- Each participant's observation started at survey enrolment (Time A) and lasted 365 days, followed by a 14-month window (Time C) to determine retention.



- SENTINEL also included a time-and-motion study of healthcare providers to assess the duration of ART-patient interactions
- Unit cost data were drawn from Ministry of Health sources for medications, lab tests, and staff compensation.

RESULTS

Table 1. Characteristics of the surveyed population, by model subgroup

Characteristic	Conventional care	6MMD	Mother-infant pair	Teen club	High viral load clinic
N	134 (25%)	117 (21%)	118 (22%)	91 (17%)	45 (8%)
Median age	37	43	30	17	43
Female	93 (69%)	80 (68%)	118 (100%)	48 (53%)	30 (67%)
Years on ART at study enrollment (median, IQR)	5.6 (2.8, 11)	10.3 (5.5, 14)	5.4 (3.1, 10.5)	11.6 (6.5, 15.1)	8.3 (2.8, 12.5)
Education					
Primary school or less	81 (60%)	73 (62%)	78 (66%)	49 (54%)	31 (69%)
High school or more	53 (40%)	44 (37%)	40 (34%)	42 (46%)	14 (31%)
Employment					
Formal employment	8 (6%)	9 (7%)	3 (2%)	0 (0%)	1 (2%)
Informal employment	93 (69%)	91 (78%)	68 (58%)	2 (2%)	35 (78%)
Unemployed	28 (21%)	16 (14%)	46 (39%)	5 (6%)	8 (18%)
Student or trainee	5 (4%)	1 (1%)	1 (1%)	84 (92%)	1 (2%)
Facility setting					
Rural	67 (50%)	65 (56%)	68 (58%)	53 (58%)	29 (64%)
Urban	67 (50%)	52 (44%)	50 (42%)	38 (42%)	16 (36%)

Table 2. Resource utilization per ART client per year (365 days), by model subgroup

Cost ingredient/variable	Conventional care	6MMD	Mother-infant pair	Teen club	High viral load clinic
N	134 (25%)	117 (21%)	118 (22%)	91 (17%)	45 (8%)
% retained at 12 months (EMR data)	78.8%	90.0%	90.1%	94.0%	88.2%
Average number of clinic visits per year (EMR)	3.42	3.04	3.93	6.16	5.35
Average time spent per visit (minutes)					
Nurses	6.07	4.87	6.86	6.01	5.91
Clinicians	8.62	6.02	9.05	6.52	11.94
Personnel costs per visit	$1.73	$1.17	$1.70	$1.35	$1.85
Costs per patient per year					
Personnel	$5.91	$3.54	$6.68	$8.32	$9.92
ARV medication	$34.85	$36.82	$34.67	$30.59	$32.91
One viral load test (assumed)	$17.08	$17.08	$17.08	$17.08	$17.08
Facility overhead (assumed at 10%)	$5.78	$5.74	$5.84	$5.60	$5.99
Total cost/patient/year	**$63.63**	**$63.19**	**$64.27**	**$61.59**	**$65.90**

- 6MMD was the least expensive care model for adults, costing about 1% less than conventional care due to fewer visits and less time spent per visit. (Conventional care may also involve 6-month supplies, narrowing the cost gap.)
- Teen clubs have lower ARV medication costs. While missed visits may cause brief treatment interruptions, high retention rates in the clubs likely mitigate this risk.

Table 3. Unit costs for resources utilized

Resource	Unit	Cost/unit (USD)	Source, comments
ARV medications (TDF-3TC-DTG)	Month	$3.24	Consultation with Ministry of Health, April 2024
Viral load test	Test	$17.08	Costed standard equipment list from the Health Sector Strategic Plan III
Event (visit/interaction) cost for each common model of care			
Conventional care	Event	$1.73	Calculated from staff salaries and time-and-motion data
6MMD		$1.17	
Mother-infant pair		$1.70	
Teen club		$1.35	
High viral load clinic		$1.85	

Table 4. Average cost to ART clients per year, by model subgroup

Model	N	Median (IQR) total time spent in hours per year	% incurring transport costs	Mean transport cost/client incurring any transport cost/year (USD)
Conventional care not eligible for DSD	55	12 (7.2, 19.2)	35%	$3.23
Conventional care eligible for DSD but not enrolled	79	12 (7.5, 17)	46%	$4.10
6-month dispensing	117	6 (4, 9.3)	48%	$3.24
Mother-infant pairs	118	13 (8, 20)	43%	$4.23
Teen club	91	18 (9.6, 30)	36%	$3.62
High viral load clinic	45	16.4 (10.2, 30)	44%	$6.73

- Patients in 6MMD spent around half the time seeking care as those in conventional care and less than half compared to other DSD models.
- The difference is equivalent to approximately one working day.
- Fewer than half of patients incurred transport costs; most walked to the clinic. For those who did pay, costs for 6MMD exceeded 3 days' minimum wage.

CONCLUSION

- 6MMD is slightly less expensive for providers and saves significant time for patients compared to conventional care, with cost differences stemming mainly from the number and duration of clinic visits.
- While medications and viral load tests account for a large portion of costs, 6MMD allows for reallocating of resources to enhance patient volume and quality of care.
- Limitations include a small sample size for patients, providers, and observations.
- **The provider cost differences reflect the value of resources like staff time saved, rather than direct budgetary savings.**

This study was funded by the Gates Foundation.
Further information about AMBIT can be found at https://sites.bu.edu/ambit/.

Further information:
Sydney Rosen: sbrosen@bu.edu
Linda Sande: lsande@heroza.org

CQUIN 8th Annual Meeting | December 9-13, 2024 – Johannesburg, South Africa