

## ORIGINAL ARTICLE

# An assessment on the implementation of same day antiretroviral therapy initiation in eThekweni clinics, KwaZulu-Natal, South Africa

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**Abstract.** The World Health Organization (WHO) recommends same-day initiation (SDI) of antiretroviral therapy (ART) for all individuals diagnosed with HIV irrespective of CD4+ count or clinical stage. Implementation of program is still far from reaching its goals. This study assessed the level of implementation of same day ART initiation. A longitudinal study was conducted at four primary healthcare clinics in eThekweni municipality KwaZulu-Natal. Data was collected between June 2020 to October 2020 using a data extraction form. Data on individuals tested HIV positive, number of SDI of ART; and clinicians working on UTT program were compiled from clinic registers, and Three Interlinked Electronic Registers.Net (TIER.Net). Non-governmental organisations (NGO) supporting the facility and services information was collected. Among the 403 individuals who tested HIV positive, 279 (69.2%) were initiated on ART on the same day of HIV diagnosis from the four facilities. There was a significant association between health facility and number of HIV positive individuals initiated on SDI (chi-square=10.59; P-value=0.008). There was a significant association between facilities with support from all NGOs and ART SDI (chi-square=10.18; P-value=0.015). There was a significant association between staff provision in a facility and SDI (chi-square=7.51; P-value=0.006). Urban areas clinics

were more likely to have high uptake of SDI compared to rural clinics (chi-square=11.29; P-value=0.003). Implementation of the Universal Test and Treat program varies by facility indicating the need for the government to monitor and standardize implementation of the policy if the program is to yield success.

## Introduction

Human Immunodeficiency Virus (HIV) treatment access is key to the global effort to end AIDS as a public health threat. An estimated 1.5 million individuals worldwide acquired HIV in 2020 (1). As of the end of 2020, 27.4 million people with HIV (73%) were accessing antiretroviral therapy (ART) globally while the rest were still waiting to start ART (2). South Africa in particular bears the greatest brunt of this epidemic with an estimated 500 000 new HIV infections and a prevalence of 18.8% among the 15-49-year age group in 2019 (1). Timely provision of antiretroviral treatment (ART) to individuals diagnosed with HIV is critical in reducing the transmission of HIV and its associated morbidity and mortality (1,3). In September 2015, the World Health Organization (WHO) released revised global guidelines for HIV treatment and care, recommending lifelong ART for anyone testing positive for HIV-an approach that has been dubbed 'test-and-treat' (4). The WHO recommended same-day ART initiation for all eligible individuals testing positive for HIV (5). Studies in South Africa have proved that immediate ART initiation soon after diagnosis is effective in improving clinical outcomes for individuals viral suppression and thus reducing transmission of infection (6).

Despite the indisputable achievements in early ART initiation, the problem is far from being resolved even in regions with full access to ART (7). Estimates from healthcare facilities in United States of America (USA) suggest that of the 85% diagnosed with HIV, only 62% are initiated on ART on the same day of diagnosis (7). On the other hand, studies conducted in Sub-Saharan Africa suggest that there is delayed initiation

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1 among those diagnosed with HIV (5,8) partly due to healthcare  
2 facility challenges (9) and people living with HIV (PLWH)  
3 may wait for over a month before being initiated on ART after  
4 establishment of eligibility (5,10). For instance, in Uganda and  
5 Lesotho, clinics typically initiate ART to diagnosed individ-  
6 uals after an average of 8 and 10 days respectively (11,12). The  
7 reasons for these delays are complex and involve a combination  
8 of structural, social, psychological factors and poor healthcare  
9 infrastructure in some settings (13-15).

10 The South Africa Department of Health has imple-  
11 mented the Universal Test and Treat (UTT) program since  
12 September 2016 (16,17). However, there is a need to optimise  
13 facility-level implementation to ensure the program is effec-  
14 tive. The demand for ART expansion in South Africa has  
15 increased the pressure on an already burdened primary health  
16 care system. In South Africa the implementation of the UTT  
17 and SDI policies in facilities were not supported with expanded  
18 facility infrastructural development and strengthening of  
19 processes. The COVID-19 pandemic has made it worse with  
20 HIV testing and ART initiations heavily reduced due to more  
21 clinicians being allocated to COVID-19 clinics (18). South  
22 Africa encourage same-day ART initiation but evidence on  
23 how best to implement it, particularly in resource constrained  
24 communities remains scarce (19). As part of quality assurance,  
25 the National Department of Health developed the National  
26 Core Standards against which service delivery by health  
27 establishments can be assessed. It is crucial to understand how  
28 public primary healthcare facilities are standardising imple-  
29 menting the UTT policy against the set policy expectations  
30 of SDI. We assessed facility implementing of same day ART  
31 initiation at 4 facilities in eThekweni, KZN, South Africa to  
32 identify gaps and formulate solutions to strengthen the policy  
33 benefits to meet the second 95% of the 2030 HIV targets within  
34 the Sustainable Development Goals which requires initiation  
35 of 95% of the HIV positive individuals.

## 37 **Materials and methods**

38  
39 *Study design and setting.* A longitudinal study was conducted  
40 at four primary healthcare clinics in eThekweni municipality  
41 in KwaZulu-Natal (KZN), South Africa between June 2020  
42 and October 2020. This study was a longitudinal study as it  
43 involved continuous collection of daily data on HIV testing,  
44 ART initiations and support from Non-Governmental  
45 Organizations on SDI. The same data elements were collected  
46 at different time points. Data was collected from the same  
47 sources over monthly intervals and used to track changes in  
48 numbers each month. The study sites were Ithembalabantu,  
49 Pinetown, D and Qadi clinics. KZN has 1.9 million people  
50 living with HIV 32.5% of province population (1) of which  
51 only 1.1 million have been initiated on ART (20). Of the  
52 estimated 650 000 people living with HIV in eThekweni 383  
53 869 people are on the ARV programme (4). The eThekweni  
54 district is densely populated with 1 446.8 people per square  
55 kilometre and comprises of urban, semi urban and rural areas.  
56 We selected study clinics from three settings; i) 2 facilities  
57 (Ithembalabantu and D clinic) in a densely populated township  
58 of Umlazi with a high HV prevalence, ii) Pinetown clinic in  
59 Pinetown, a semi suburban town surrounded by townships and  
60 informal settlements and iii) Qadi clinic in rural Umzinyathi

61 district municipality north of eThekweni municipality. 61  
62 Ithembalabantu clinic focuses on HIV testing and treatment 62  
63 management with has approximately 14 100 patients on ART 63  
64 with about 100 people testing for HIV and an average of 45 64  
65 individuals initiated on treatment each month. Ithembalabantu 65  
66 clinic offers HIV and Tuberculosis (TB) services for the people 66  
67 of Umlazi and surrounding areas. D clinic tests an average 67  
68 of 150 people for HIV monthly with approximately 80 HIV 68  
69 positive with 60 initiating on ART. D clinic is a government 69  
70 comprehensive primary health care facility which provides 70  
71 medical facility that focuses on the initial treatment of medical 71  
72 ailments including HIV and TB-related treatment. The clinic 72  
73 covers a large catchment area of D, W, R, V, B sections of 73  
74 Umlazi. Pinetown Clinic is a municipal primary healthcare 74  
75 facility which provides HIV and TB-related treatment as 75  
76 well other minor health conditions. It is a multi-racial town 76  
77 servicing people from Pinetown, Westville, Cowies Hills, 77  
78 Marianhill and surrounding townships such as Kwandangezi 78  
79 and Nazareth. The clinic tests an average of 200 people for 79  
80 HIV, with 110 testing HIV positive and about 80 initiating on 80  
81 ART monthly. Qadi clinic is government rural facility offers 81  
82 health services to the rural community of Umzinyathi district. 82  
83 The clinic tests an average of 70 people for HIV, with 50 83  
84 testing HIV positive and about 35 initiating on ART monthly. 84

85 The selection of the clinics was intended to ensure compar- 85  
86 ison of the level of policy implementation across study clinics. 86  
87 The clinics were located in socio-economically different 87  
88 settings; peri-urban, urban and rural. As such their infra- 88  
89 structure and the level of support from NGOs, availability of 89  
90 sufficient consultation rooms, water, sanitation and electricity 90  
91 availability varied across the facilities. These factors may 91  
92 have effect on the level of implementation of SDI in different 92  
93 facilities. 93

94  
95 *Data collection.* The data was compiled from paper patient 95  
96 registers, staff registers and Three Interlinked Electronic 96  
97 Registers Net (TIER.Net), which is an electronic ART data- 97  
98 base developed by the University of Cape Town's Centre for 98  
99 Infectious Disease Epidemiology and Research (TIER.Net). 99  
100 TIER.Net is used in public health facilities in South Africa to 100  
101 monitor baseline clinical care and client outcomes over time, 101  
102 and is also the platform into which HIV tests are electronically 102  
103 captured. Patient characteristics and demographic information 103  
104 are routinely captured into TIER.Net by staff working at 104  
105 the healthcare facilities. The data extraction form was used 105  
106 to collect information on the number of Non-governmental 106  
107 organisations (NGO) supporting the facility, and the services 107  
108 provided to compare the level of support the facilities received 108  
109 from partner organisations. Furthermore, data on the number 109  
110 of nurses in the facility, daily HIV diagnosis, number of ART 110  
111 initiations, number of clinic staff members involved in ART 111  
112 initiation and number of days taken by the facility to initiate a 112  
113 newly HIV diagnosed individual on ART were also captured. 113  
114 The data extraction form used to collect the data was loaded 114  
115 on the Kobo Collect application (Cambridge, MA, USA) on 115  
116 Android mobile devices. 116

117  
118 *Data analysis.* We used descriptive statistics [median, 118  
119 interquartile range (IQR)] to report the number of profes- 119  
120 sional nurse's in the clinic on a typical day, number of adults 120

Table I. Clinics profile characteristics.

	Median, [IQR]	
Number of headcount patients serviced by the clinic monthly	8,250 (7,250-10,750)	61
Number of professional nurse's in the clinic on a typical day	9 (6-13)	62
Number of adults tested for HIV each day	38 (19-75)	63
New adults diagnosed with HIV per day	8 (7-10)	64
New adults getting a positive HIV diagnosis each month	70 ( 60-90)	65
Adults initiated on ART on the same day of HIV diagnosis	55 (50 -70)	66
Number of patients on HIV treatment management in the four facilities	7,806 (4,006-13,800)	67
Number of lost to follow up patients	700 (325-2,150)	68
Number of clinic staff members involved in ART initiation program	6 (5-7)	69

tested for HIV each day, new adults diagnosed with HIV per day, number of NGOs supporting the facilities and the actual support provided by the NGO's. We looked at facility related factors that determine SDI such as number of NGO's supporting the facility, number of staff provision from NGO's, number of nurses in the facility and number of nurses trained on SDI in the clinic. We determined association between the number or proportion of HIV positive individuals on SDI for ART and the facility as well as the characteristics of the facilities including clinic setting (i.e. rural, peri-urban and urban, number of NGOs supporting the facilities, number of clinic staff and staff provision from NGO's using the chi-square test.

*Ethical considerations.* The study was approved by the University of KwaZulu-Natal's Biomedical Research Ethics Committee (# 00000819/2019). Written informed consent was obtained from all participants in the study.

## Results

*Clinic profile characteristics.* On a typical day the median number of professional nurses in the clinic was 9 (IQR, 6-13). The median (IQR) number of adults tested for HIV each day was 38 (IQR, 19-75) with 8 (IQR, 7-10) new adults diagnosed with HIV per day and 70 (IQR, 60-90) new adults getting a positive HIV diagnosis each month. From those diagnosed with HIV each month, a median of 55 (IQR, 50-70) were initiated on ART on the same day of HIV diagnosis. The study also showed a median (IQR) of 7806 (4,006-13,800) patients on HIV treatment management in the four facilities with a median of 700 (IQR, 325-2150) lost to follow up. The median number of clinic staff members involved in the ART initiation program was 6 (IQR, 5-7). An individual spent at least 2 h to complete all the processes in the clinic after getting an HIV diagnosis (Table I). Individuals spent more time at clinic D (3-4 h) compared to clinic B (1-2 h). Urban areas clinics were more likely to have high uptake of SDI compared to rural clinics (chi-square=11,29; P-value=0.003).

### *Enablers of SDI implementation*

*Non-governmental organisations support on SDI of ART.* There were 7 seven Non-Governmental Organisations (NGOs) supporting SDI of ART in the study area. Only 3 of these

NGOs i.e. Health Systems Trust (HST), TB HIV, THINK were found to be supporting the four facilities considered in this study. There was a significant association between facilities with all 7 organisations supporting them and ART SDI (chi-square=10.18; P-value=0.015 (Table III). Clinic A was the facility supported by all 7 NGOs operating in eThekweni and reported the highest number of SDI (Health Systems Trust, TB HIV, THINK, Aids Healthcare Foundation, Right-to-Care, MATCH, CAPRISA) 7 vs. clinic B with 3 NGO's (Health Systems Trust, TB HIV, THINK). Extensive support on staff trainings, HIV Counselling and Testing services, TB program support, site performance assessments, provision of personnel, conducting HIV research studies, CCMDD program, provision of equipment and resources and data validation and verification was provided by the NGOs (Table II).

*Staff provision from NGOs and number of nurses in a clinic.* Staff provision from NGO's varied in the four facilities to cover up for staff shortages. There was a significant association between staff provision in a facility and SDI (chi-square=7.51; P-value=0.006) (Table II). Clinic A had the highest number of staff provision with 6 nurses, 6 HIV Counselling and Testing Counsellors, and 5 Data Capturers vs. clinic C with 2 nurses, 3 HIV Counselling and Testing Counsellors and 2 Data Capturers. Twenty-six nurses were trained by HST, HIV TB, MATCH and THINK on ART initiation program focusing on UTT and SDI. Out of the 26 nurses, clinic D had the most number of nurses (11) who were trained, 9 from clinic A and the least trained nurses (3) from clinics B and C. Clinic A had the most number of nurses available for consultations 14 vs. clinic B and C with the least nurses 6. Clinic B was the only facility with a Doctor/s available daily for complicated patients' cases as well as for referrals compared to other 3 facilities (A, C and D clinic) which had a Doctor coming to the facility once a week for complicated booked patients' cases (Table II). The facilities reported different amount of time spent to complete all the ART initiation processes when SDI was implemented. Clinic D reported the longest time (3 h) compared to clinic B (2 h).

*Same day ART initiation individual clinic performance.* A total of 403 individuals were diagnosed with HIV and 279 (69.2%) of them were initiated on ART on the same day in 4

Table II. Association of SDI implementation in individual facilities.

Variables	Same-day initiation (SDI)		Not same-day initiation (NSDI)		P-value
	Freq (n)	%	Freq (n)	%	
Staff provision from NGO's					
More staff provision	82	89.28	61	53.72	0.006
Less staff provision	31	10.72	7	46.28	
Non-Governmental Support in clinic					
All NGO's	82	70.23	18	6.77	0.014
Less than 7 organisations	197	29.77	106	93.23	
Health facility SDI initiations					0.008
Differences in SDI per facility	279	69.24	124	30.76	
Clinic setting					
Urban	82	29.40	18	14.51	0.035
Peri-Urban	128	45.90	75	60.48	
Rural	69	24.70	31	25.01	

Table III. Non-Governmental Organizations clinics support.

Facility(s)	NGOs supporting the facility(s)	Services supported by the NGO's
A, B, C, D	Health Systems Trust	Staff trainings
	TB HIV	TB program support
	THINK	HIV Counselling and Testing services
A, C, D	Aids Healthcare Foundation	Site performance assessments
A, D	Right-to-Care	Provision of personnel
	CAPRISA	Provision of equipment resources
		Data validation and verification
A	MATCH	Conducting HIV research studies
		CCMDD program

facilities during the study period June 2020 to October 2020. Out of the 279 individuals on SDI in the four facilities clinic A recorded the highest number [82 individuals (29.4 %)] and clinic D reported the least number [61 (21.9%)]. There was a total of 124 individuals who were not part of SDI, clinic D recorded the highest number of 40 (32.3%) while clinic A had the lowest (18 individuals i.e14.5%). At a facility level, at clinic D 101 individuals had a positive HIV result with 61 (60.4%) of them initiated on ART on the same day, clinic B had 102 individuals tested HIV positive with 67 (65.7%), clinic A recorded 100 HIV diagnosed individuals and 82 (82.0%) went on SDI and clinic C had 100 individuals tested HIV positive with 69 (69.0%) initiated on the same day. There was a significant association between health facility and number of HIV positive individuals initiated on SDI (chi-square=10.59; P-value=0.008) Table II.

## Discussion

Our assessment of same day ART initiation implementation in eThekweni clinics indicated that all the four facilities were

implementing the UTT policy but at varying levels. Contrary to the observed SDI exceeding 90% (Pascoe *et al*) observed in high-income countries, uptake of SDI in our study facilities was low varying between 60 and 82% reflecting differences in how the policy was being implemented at the different facilities. Moreover, none of the four facilities achieved the second 95% of the 2030 HIV targets within the Sustainable Development Goals which requires initiation of 95% of the HIV positive individuals. This indicates the need for more effort on the second 95, particularly among resource constrained communities so as to reach the 95-95-95 targets.

We observed an association between staff provision in a facility and SDI which may explain the long waiting times in facilities with less staff provision. Shortage of staff has been reported as a barrier to SDI implementation at a health-facility (2). The expansion of the ART program caused staff shortages and several countries in SSA coped by hiring additional staff and training of health care staff to prepare them for task shifting (22). There has of high demands in the health care system under UTT due to increased number of individuals on ART. Under such circumstances staff shortage

1 leads to long queues, often frustrating both patients and health  
2 care providers as some patients are not initiated to ART on the  
3 same day.

4 Patients spent most of their time waiting between service  
5 points for the ART initiation processes after diagnosis. They  
6 spend an average of 2 h to complete ART initiation processes  
7 because of several queues that they should join to complete  
8 the process. Patients are expected to start with the COVID-19  
9 screening, get counselled and tested for HIV, have a record  
10 file, consult with the clinician for all baseline history, phle-  
11 botomist for baseline blood withdrawals and finally collect  
12 medication at the pharmacy point. Uganda has overcome  
13 this challenge by having centralised ART start processes  
14 (McRobie *et al*). Generally, the waiting time we observed  
15 is similar in other infectious disease clinics in Sub-Saharan  
16 Africa (23). Until these delays are fixed, some patients may  
17 prefer to delay their initiation period than wait leading to  
18 poor linkage to HIV care.

19 A heavy dependence on NGO's to assist with the implemen-  
20 tation of UTT was observed at all the facilities. Such support  
21 was on personnel provision, resources, technical and training  
22 assistance. Similar situations prevail in Gauteng clinics where  
23 NGOs were the backbone for the SDI program (22). While the  
24 support of NGOs is important in improving services it does not  
25 guarantee sustainable achievement of the SDI goals if resource  
26 and systems shortfalls are not addressed by the government.  
27 This is because some NGOs lose funding or change scope of  
28 work thus disrupting services they will be supporting.

29 The study was conducted in large urban, peri-urban and  
30 rural communities and this provides a reasonable basis for  
31 generalizability for the majority of people living with HIV  
32 in South Africa. We collected data on multiple providers at  
33 multiple times of the day without interfering with patient flow.  
34 Our study was limited to adults and hence no generalisations  
35 can be made regarding the characteristics of facility perfor-  
36 mance on SDI among infants and children.

## 37 Conclusions

38 There are variations in how facilities even in in the same  
39 municipality are implemented SDI program. There is need for  
40 the government to monitor and standardize implementation  
41 of processes at facility level. Nongovernmental organizations  
42 are a valuable source of technical and financial input, but  
43 perhaps their greatest contribution is their political freedom  
44 to promote innovation. However, the government has to step  
45 up the mobilization of expertise and fostering of partnerships  
46 to develop innovative approaches to delivering HIV services,  
47 to strengthen the system, and to enhance effective program  
48 implementation.

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## 58 Contributions

59 SMG, MJC, conceptualized the study. MJC, supervised the  
60 study processes. SMG, wrote the main manuscript text. CK,  
61 TM, SMG, conducted the analysis. MJC, TM, CK, reviewed  
62 the paper and approved the final manuscript.

## 63 Ethics approval and consent to participate

64 The study was approved by the University of KwaZulu-Natal's  
65 Biomedical Research Ethics Committee (# 00000819/2019).  
66 Written informed consent was obtained from all participants  
67 in the study.

## 68 Availability of data and materials

69 The datasets used and/or analysed during the current study  
70 are available from the corresponding author on reasonable  
71 request.

## 72 Conflict of interest

73 All the authors declare no potential conflict of interest.

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