Health Indicators Update: Antiretroviral Indicators

2013

Directorate: Monitoring and Evaluation

Issue III
ART Health Indicators Update

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Overview of TIER.Net Implementation

The 3-Tiered Antiretroviral (ART) Monitoring Strategy is a standardised ART monitoring system comprising of standardised ART clinical records or stationery for HIV and ART patient management and a standardised facility monitoring tool consisting of either Tier 1: paper register, or Tier 2: non-networked electronic system (TIER.Net) or Tier 3: electronic medical record referred to as Standardised Monitoring and Evaluation System for Antiretroviral Therapy (SMARTER). This strategy was put in place by the National Health Council in December 2010, the strategy was subsequently introduced in the country during March 2011 and implementation commenced in September 2011.

TIER.Net was selected as the Tier 2 system; this is non-networked electronic monitoring software that works on a standalone computer. It is the middle Tier monitoring system and has considerable focus for implementation in the country as it digitises the facility level patient data for HIV and AIDS, produces push button reports and provides management reports to assist facilities to better manage their patient population. Digitising the patient data also sets the foundation for the future implementation of SMARTER as there is integration between both systems. Therefore, once the network infrastructure becomes available for an EMR a facility could migrate from Tier 2 to Tier 3.

Since 2010, the strategy has focused on implementing Tier Two in health facilities providing ART with more than 500 patients remaining on ART (TROA) in that facility. This TROA is used to identify facilities which are are eligible for The TIER.Net implementation. This estimate is derived from number of patients reporting in the District Health Information System (DHIS). Once eligible facilities have been identified, they are prepared for Tier.Net. This readiness preparation entails training of personnel on Tier.Net, availability of computer equipment and installation of the software. There is also preparation of the all patient folders and/paper registers. Data capturing commences with back capturing of all patients who have ever received treatment in the facility; this establishes the facility’s cohort and enables retrospective measures of initiation, retention and attrition.

Health facilities with existing infrastructure and resources to manage TIER.Net are encouraged to commence implementation even in instances where TROA is fewer than 500. Once all eligible facilities have achieved full implementation (phase 6), facilities with fewer than 500 patients TROA will also implement TIER.Net. All facilities can use, and would benefit from, TIER.Net but the strategy has first focused on the larger sites.

To further guide the TIER.Net implementation in December 2012 the country introduced the ‘phases of implementation’ as it was found that the process of implementation was stagnating. The full outline of phases is presented in Annexure 1. Phase 6 is the point where the patient population has been back captured (digitised), data has been cleaned, the facility has been orientated to the reports produced by the monitoring system and the facility is able to routinely produce the monthly and quarterly reports according to the District Health Management Information Systems (DHMIS) Policy data flow. The data collected on the implementation are collected down to facility level and the National Department of Health (DoH) is able to monitor the phase of implementation by district, province and are able to monitor implementation progress nationally.

The ART programme is a fast growing and dynamic programme. Changes in the programme are not only the growing patient uptake but also revision of patient eligibility criteria and population groups in need which receiving priority. Ever 1 December an announcement is made which require
concomitant change is Tier System. Such changes result to monthly increases in terms of patients who are added to the facility patient population, the number of eligible facilities increases. In January 2013 there were 1421 eligible facilities, in November there were 1803, an increase of 382 eligible facilities for TIER.Net implementation. Moreover, the achievement of phase 6 must be maintained. This is done through regular data use and use of the management reports whilst also following the steps outlined in the ART M&E Standard Operating Procedures (SOPs).

The implementation of TIER.Net has rapidly scaled up and some key achievements of the TIER.Net implementation from April 2013 to November 2013 are presented in:

**Table 1: Key achievements of TIER.Net implementation between April and November 2013**

**Definitions:**
- Phase 0-5: Health facilities that are preparing to implement TIER.Net, conducting installation and training, back capturing, live capturing, conducting data cleaning activities.
- Phase 6: Health facilities that are capturing ART data live and are able to produce monthly and quarterly reports.

<table>
<thead>
<tr>
<th></th>
<th>April 2013</th>
<th>November 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementing, Phase 0 – 5</td>
<td>1,434</td>
<td>1,582</td>
</tr>
<tr>
<td>Phase 6, Full implementation</td>
<td>500</td>
<td>967</td>
</tr>
<tr>
<td>Using paper register (T1)</td>
<td>1,623</td>
<td>991</td>
</tr>
<tr>
<td>Facilities eligible (&gt;500 TROA)</td>
<td>512</td>
<td>299</td>
</tr>
<tr>
<td>for TIER.Net implementation but not implementing</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As time progresses and facilities initiate and transfer-in patients the TROA will increase and thus the number of eligible facilities will increase. Table 1 demonstrates the expansion of the number of facilities implementing and phase 6 facilities.

Table 2 below presents the November implementation data. As additional facilities are reported to have commenced implementation or as facilities achieve phase 6 the numbers will change accordingly.

**Figure 1:** National implementation progress by category presents the categorisations of the implementation in a pie graph. The pie illustrates the process of TIER.Net implementation and the stage achieved.

**Table 2: Summary of TIER.Net implementation by province to November 22, 2013**

<table>
<thead>
<tr>
<th>Province</th>
<th>T2 Eligible</th>
<th>Number of ART facilities categorised as: ph 0 - 5, ph6, t1, non-standard, T3</th>
<th>Impl in Ineligible facilities Phase 0 - 5</th>
<th>Impl in Eligible facilities Phase 0 - 5</th>
<th>All completed (phase 6)</th>
<th>Eligible but not implementing</th>
<th>Non-Standard</th>
<th>T1</th>
<th>T3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastern Cape</td>
<td>245</td>
<td>863</td>
<td>256</td>
<td>148</td>
<td>132</td>
<td>44</td>
<td>3</td>
<td>324</td>
<td>-</td>
</tr>
<tr>
<td>Free State</td>
<td>136</td>
<td>229</td>
<td>44</td>
<td>69</td>
<td>92</td>
<td>3</td>
<td>7</td>
<td>17</td>
<td>-</td>
</tr>
<tr>
<td>Gauteng</td>
<td>302</td>
<td>373</td>
<td>29</td>
<td>160</td>
<td>109</td>
<td>50</td>
<td>32</td>
<td>43</td>
<td>-</td>
</tr>
<tr>
<td>KwaZulu-Natal</td>
<td>477</td>
<td>634</td>
<td>87</td>
<td>281</td>
<td>195</td>
<td>49</td>
<td>2</td>
<td>68</td>
<td>-</td>
</tr>
<tr>
<td>Limpopo</td>
<td>182</td>
<td>480</td>
<td>91</td>
<td>74</td>
<td>113</td>
<td>27</td>
<td>1</td>
<td>201</td>
<td>-</td>
</tr>
<tr>
<td>Mpumalanga</td>
<td>209</td>
<td>311</td>
<td>52</td>
<td>118</td>
<td>84</td>
<td>30</td>
<td>4</td>
<td>53</td>
<td>-</td>
</tr>
<tr>
<td>North West</td>
<td>134</td>
<td>319</td>
<td>50</td>
<td>49</td>
<td>27</td>
<td>78</td>
<td>24</td>
<td>169</td>
<td>-</td>
</tr>
</tbody>
</table>
## ART Health Indicators Update

<table>
<thead>
<tr>
<th></th>
<th>Northern Cape</th>
<th>Western Cape</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients</td>
<td>30</td>
<td>88</td>
<td>1,803</td>
</tr>
<tr>
<td>Active Patients</td>
<td>215</td>
<td>216</td>
<td>3,640</td>
</tr>
<tr>
<td>CD4+</td>
<td>60</td>
<td>-</td>
<td>669</td>
</tr>
<tr>
<td>CD4+ Count</td>
<td>14</td>
<td>-</td>
<td>913</td>
</tr>
<tr>
<td>Viral Load</td>
<td>28</td>
<td>-</td>
<td>967</td>
</tr>
<tr>
<td>Viral Load</td>
<td>6</td>
<td>-</td>
<td>299</td>
</tr>
<tr>
<td>Viral Load</td>
<td>-</td>
<td>187</td>
<td>78</td>
</tr>
<tr>
<td>Viral Load</td>
<td>102</td>
<td>12</td>
<td>991</td>
</tr>
<tr>
<td>Viral Load</td>
<td>-</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>Viral Load</td>
<td>-</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Viral Load</td>
<td>10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
This is the first comprehensive review of the ART programme data since the introduction of the 3-Tiered ART Monitoring Strategy. The 3-Tiered ART Monitoring Strategy is in line with the WHO approach for monitoring, it provides facilities and sub-districts with the tools to monitor their ART services with the system that best suits their context. All systems generate the same aggregate data elements which are reported into the DHIS. This provides for a single aggregate data set at the sub-district and provides the core indicators for ART management. The data elements, both monthly and quarterly, are the minimum data elements to monitor the antiretroviral service.

This report outlines the service provision, outcomes and trends from April 2004 until June 2013 using data produced by TIER.Net of fully back captured facilities (phase 6)
Monthly data
The monthly reporting data comprises of newly initiated patients on ART and total patients on ART (TROA). Data is reported by each facility and aggregated to a national figure. Data is available stratified by province, district, sub-district and facility. New is comprised of all patients started ART who are naïve to treatment, or who have not previously had triple therapy for greater than 30 days. Total remaining on ART (TROA) is comprised of all patients who have started ART excluding those who died, transferred out or are lost to follow up and includes patients who have transferred into the clinic.

Each month facilities are required to submit 4 data elements, and 2 additional data elements are calculated. The monthly enrolments (New) and total remaining on ART informs resource utilisation, informs planning, drug procurement estimations and other facility and district level management activities.

The data elements are as follows:

- Adult started on ART during this month – naïve
- Child under 15 years started on ART during this month – naïve
- Total clients started on ART during this month – naïve (calculated)
- Adult remaining on ART at end of the month – total
- Child under 15 years remaining on ART at end of the month – total
- Total clients remaining on ART at end of the month (calculated)

New initiations in both adult and child categories seem to be levelling off. Figure 2 and Figure 3 compare the January to June initiations for 2012 (blue) and 2013 (rust) side by side. In most cases the 2013 initiations are less than those in 2012 for both the adult and the child categories of initiation.

September 2013 data is the most current data available to the National Department of Health in November 2013. As a result of some delays to the data flow it is not possible to use the most current data available in the DHIS as it is an under report of the New and TROA. Previous months’ data is cleaned during the month and thus it is most practical to report data from August or before August. In August 49,370 adults were started ART and 2,170 children were started ART for a total of 51,540 total new patients started and in August there were 2,322,659 total adults on ART and 148,894 total children and 2,471,553 total patients remaining on ART.
Figure 2: New adult initiation comparison January to June 2012 and 2013

Figure 3: New child initiation comparison January to June 2012 and 2013
Figure 4: Adult and Child new initiations on ART

January 2012 to September 2013
Adult started on ART - naïve

January 2012 to September 2013
Child <15 Started ART- naïve
Figure 5: Adult and child total remaining on ART

January 2012 to September 2013
Adult on ART at end of the month - total

Total patients

January 2012 to September 2013
Child under 15 remaining on ART at end of the month - total

Total patients

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**Figure 5: Adult and child total remaining on ART**

**January 2012 to September 2013**
Adult on ART at end of the month - total

- Adult remaining on ART at end of the month - total, 2,274,422

**January 2012 to September 2013**
Child under 15 remaining on ART at end of the month - total

- Child under 15 years remaining on ART at end of the month - total, 144,742
Quarterly Cohort Data

Quarterly data describes the clinical outcomes of clients on ART, retention on treatment and programme quality indicators and impact of the programme at specific time points and by cohort. This data enables the programme to measure the clinical outcomes to be compared between facilities, sub-districts, and districts and, with the standardisation of monitoring tools, between provinces.

The 24 data elements produced by the monitoring system are provided in annexure 2. The system produces 15 baseline data elements and at 3, 6, 12 and annually thereafter 9 data elements are repeated to monitor the patient outcomes over time. Data is produced at facility level generated by aggregating individual patient outcomes and exported into the DHIS using data exchange between TIER.Net and DHIS (.csv file format). Data is reported quarterly and, similar to the TB programme, is reported one quarter in arrears. The three month delay enables facilities to confirm the outcomes and the capturing of blood results into the system to be included in the reporting. Thus the current report contains data to June 2013 that was reported in September 2013.

The cohort reporting process is relatively new following the introduction of the 3-Tiered ART Monitoring System. Data analysed is on facilities that have achieved phase 6, these are facilities that have fully back captured their patient records (full digitisation). Of the current facilities that have reached phase 6, 73% of phase 6 facilities submitted data according to the data flow timelines as defined by the ART M&E SOP and the DHMIS Policy.

Figure 6 illustrates the expected data to be reported (blue bar), and the actual number of phase 6 facilities that submitted Quarter 2, 2013 data (rust bar). It is evident that the North West and Northern Cape provinces have the least number of facilities on phase 6 and implementation in the two provinces is slow. The remaining provinces have done well in an attempt to get phase 6 facilities reporting cohort data in line with the ART SOP.

Figure 6: Reporting completion
Baseline characteristics of the cohort: by adult and child

The quarterly data reviews patient outcomes for 435,323 treatment naïve adults and 45,107 treatment naïve children reported in the cohorts April 2004 to June 2013. Follow-up extends to adult patients up to 108 months (9 years) on treatment and children up to 96 months (8 years) on treatment.

Figure 7 illustrates the numbers of patients started ART at each year reported. This provides context for the following analysis. Thus, when reviewing outcomes for patients at 108 months on treatment, patients who started ART in FY2004/2005, outcomes are reported for a total of 2,189 patients who started ART. Similarly, FY 2011/2012 reports on data for 110,037 patients who started ART during this point in time.

As additional sites complete back capture and submit cohort data the retrospective figures will be further populated and is expected to increase significantly. Thus, the analysis contained within this report is relevant to this data set. Outcomes containing future analyses, with future data submissions, will have augmented outcomes.

Figure 7: Total adults started ART
The proportion of males who are start ART has hovered between 30% - 35% between 2004 to June 2013. Figure 8 illustrates the varying percentages of males who have started ART since 2004/05 to a high of 35% in 2012/13.

Figure 8: Proportion of males starting ART

![Adult male start ART rate graph]

Figure 9 illustrates the number of pregnant women who started ART. There might be an artificial increase from the previous years as a result of the back capture process. Where clinical records might not have been complete, or difficult to read, pregnancy may not have been captured. As data is prospectively captured, and especially where the standardised clinical records are used, the recording and reporting of pregnancy, and most other data, will be more complete and correct.

Figure 9: Pregnant women at ART start

![Pregnant women started ART - Naive graph]
Figure 10 presents the number of children started, per cohort. This is the data used for the following analysis.

**Figure 10: Child started ART naïve**

As the availability of ART has increased the below figure demonstrates adults are commencing ART when they are more well (Figure 11: Adult baseline CD4 at ART start). The number of adults starting ART with higher CD4 count has risen sharply from 2010/11 to 2012/13.

**Figure 11: Adult baseline CD4 at ART start**

Figure 12 illustrates that over time children are starting ART with higher CD4 counts (percentage and absolute values at appropriate age taken into consideration). This illustrates a remarkable immunologic shift of children initiating ART. The proportion of children starting ART with a CD4 <
15% or <100, depending on age, has declined as the proportion of children starting ART with CD4 between 20 – 25% or between 200 – 350 has increased.

**Figure 12: Child baseline CD4 at ART start**

![Child baseline CD4 rate](image)

The child data has a further disaggregation by age. Children starting ART fit into one of three categories; child <1, child 1 - <5 and child 5 - <15. The data in Figure 13 demonstrates the largest proportion of children starting ART are children between 5 - <15 however the proportion of children <1 starting ART has increased in the past 2 years.

**Figure 13: Child age at ART start**

![Age category at Child ART initiation](image)

Figure 14 and Figure 15 illustrate the need to strengthen TB/HIV integration activities in both the adult and child services. These figures demonstrate that in 2012/2013 just over 25% of adults and just over 20% of children are screened for TB. This could be under-reported as it could be that clinicians might not have recorded this into the clinical stationery and thus the data capturer won’t have captured it into TIER.Net. Clinical documentation is a critical part of quality patient management and not recording the data in the clinical stationery is not acceptable. Thus, if it is not
documented it is not done, not captured and the data will present low results. This highlights the importance of routinely reviewing facility level data to identify areas that require improvement or additional training or identifying areas of demonstrated good clinical management or outcomes.

**Figure 14:** Adult: TB screen, on TB treatment at ART start and on IPT at ART start

![Adult IPT at ART start, screen for TB and on TB treatment at ART start](image1)

**Figure 15:** Child: TB screen, on TB treatment at ART start and on IPT at ART start

![Child IPT at ART start, screen for TB and on TB treatment at ART start](image2)

The initiation of patients on cotrimoxazole prophylaxis has increased to just over 50% in the adult population. This is as recorded in the clinical stationery and captured into TIER.Net (Figure 16 and Figure 17).
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Figure 16: Adult on CPT at ART start

Figure 17: Child on CPT at ART start
Cohort Outcomes

Retention in Care
Retention in care is calculated by using the total number of patients started (TOT) as the denominator. The numerator is calculated per duration of ART completed and subtracts the RIP and LTF from the TOT. Transferred out (TFO) is subtracted from both the numerator and the denominator at the respective duration as it is a managed process and thus the patients are not expected to be in care. Therefore TFO does not affect the %RIC.

Data reviewed demonstrates low rates of remaining in care and rates that are not achieving the targets as outlined in the 2012 – 2016 National Strategic Plan. The National Strategic Plan on HIV, STIs and TB 2012 – 2016 has set the target to measure patients alive and on treatment using the ART cohort data. The impact indicators measure ART patients alive and on treatment at 12, 24, 36, 48 and 60 months. The percentage remaining in care targets are as follows:

- 12 months – 94% remaining in care
- 24 months – 88% remaining in care
- 36 months – 82% remaining in care
- 48 months – 76% remaining in care
- 60 months – 70% remaining in care

Figure 18 and Figure 19 both demonstrate the low patient retention for each year commenced treatment.

The older cohorts of patients, patients who started ART 8+ years ago, illustrate 60% of patients are remaining on ART. The earlier cohorts show a steep downward trend of the retention graph which means if the trend continues the proportion of patients remaining on ART will continue to decline. The NSP targets for retention have not been met for any duration on ART in the adult population.

Figure 18: Adult remaining in care by year started ART (cohort)
Figure 19 below presents the child retention on ART. The outcomes presented are for a smaller number of children but does present greater retention in care for each year started ART when compared to adults, though the NSP targets for retention are hardly being met. The child %RIC at 60 months is 74% where the NSP targets 70% RIC. This is the only duration the NSP target has been met and is reviewing a total of 1,165 total patients started ART.

Figure 19: Child remaining in care by year started ART (cohort)

Cumulative children remaining on ART

Viral Load Done (VLD) and Viral Load Suppression (VLS)

The viral load enables the programme to measure the success of the ART programme. The VLD is calculated by taking the sum of the viral loads done and captured into the monitoring system divided by the sum of patients on ART at the duration on ART under review (patients on first line and second line regimen).

This value can be used as a proxy indicator for quality of care as this presents the number of viral loads that were done and filed into the patient folder, and the result captured into the clinical stationery and captured into the monitoring system. It therefore means the data was available for the clinician to act on and the data capture had the data to capture. This is the source for viral load done (VLD) and is the blue line in the below figures.

\[
\text{VLD} = \frac{\# \text{ viral loads done}}{\# \text{ FLR} + \# \text{ SLR}}
\]

\[
\text{VLS} = \frac{\# \text{ VLD <400}}{\text{VLD}}
\]

The threshold for viral load suppression is any value less than 400 copies/ml. The value, 400 copies/ml, is the upper limit of detection for the viral load tests conducted by the National Health Laboratory Services. An undetectable viral load is any result less than 400 copies/ml. This is used as a proxy for virological suppression and indicates success at that point in time on ART. Viral load suppressed (VLS) is the total number of viral loads <400 (VLS) divided by the number of viral loads done (VLD).
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Figure 20 and Figure 21 presents data for the current patients’ active on ART in April to June 2013. The graph presents the proportions of viral load completion and viral load suppression stratified by duration of months on ART for both adults and children active on ART. Thus, the patients completed ART to 108 months started ART 108 months ago and <50% of viral loads were done and >90% of viral loads are suppressed. The numbers of viral loads done and suppression at 108 months is very small and not generalisable but it is informative.

Of the adult population active on ART at each duration approximately 36% of patients had a viral load done and of the viral loads done nearly 80% of those patients on ART have suppressed viral loads.

In the child population this trend is less stable. When reviewing the data for children the numbers are much smaller and the proportion of viral load suppression is much lower than that of the adults.

Figure 20: VL done (VLD) and VL suppression (VLS) of adult patients on ART

Figure 21: Viral load done and viral load suppression for current patients on ART at each duration of care
The proportion of adults with viral load suppression at 12 months is 78% and 91% at 108 months on treatment. Children have reported viral load suppression of 55% at 12 months and 81% at 96 months on treatment (Figure 20 and Figure 21).

**Lost to follow-up**

Figure 22 and Figure 23 present the lost to follow up for both the adult and child population. It is evident by the data the rate of lost to follow-up is increasing however the rate of lost to follow-up amongst the child population is lower than that of the adults.

The increasing rate of lost to follow-up illustrates the importance of adherence to the ART M&E SOP and using the missed appointment reports available through TIER.Net. Patients who did not attend their expected appointment date show up on the early missed appointment report, the late missed appointment report and finally the unconfirmed defaulter report. Using these reports community based support staff or tracers can recall patients into care. Patients who are untraceable should be confirmed as lost to follow-up. Patients who have been traced but confirmed as died should have their outcome of ‘died’ captured into the monitoring system.

**Figure 22: Adult: Lost to follow-up by year started ART and by months on treatment**

![Adult: Percentage of adults lost to follow up by duration on ART](image)
Figure 23: Child: Lost to follow-up by year started ART and by months on treatment

Child: Cumulative children lost to follow-up on ART

Figure 24: Adult percentage died

Percentage adults died on ART by duration
The review of mortality for both the adult and child population illustrates the rate of patients dying is not increasing. This is unlikely an illustration of the impact of the programme but rather the result of deaths that have not been reported to the facility and thus have not been captured into the monitoring system. The result being the patients who died would be reflected as lost to follow-up because patients who have not attended the clinic in >90 days and not had an event captured into the system would be reported as lost to follow-up. It is therefore important to review the RIP and LTF data together as the full extent of the attrition is presented in Figure 26 and Figure 27. These figures illustrate that of the patients leaving the programme at 12 months, the largest majority are lost to follow-up rather than patients who died.

Figure 26: Adult proportion LTF and RIP at 12 months per year
Figure 27: Child proportion LTF and RIP at 12 months per year

Figure 22 and Figure 24, and Figure 23 and Figure 25 illustrate the sum of the attrition of the patients on ART by adult and children, respectively. Thus, the aforementioned figures are the converse of Figure 18 and Figure 19; Percentage remaining in care.

Second Line Regimen (SLR)

Figure 28 and Figure 29 present the proportion of patients on second line by year started ART and duration on ART by adult and child, respectively.

Table 3 and Table 4 provide the raw data of patients on second line. As the numbers of patients' increases over time, as we measure proportions of patients moving to second line this represents larger absolute numbers of patients' moving to second line. Table 4 presents the absolute numbers of patients on second line. The bolded figures at the end of each column and row represent the accumulative number of patients on second line at the time of reporting.

The data demonstrates patients are moving to second line regimen at 12 months on ART.

The data is captured into TIER.Net by the data capturer as it is written into the clinical stationery. The regimen number (Regimen 1 or Regimen 2) is captured alongside the drug combinations (generally three drugs) which are individually selected. The software then sums the number of patients on second line regimen (SLR) by summing the number of patients with Regimen 2 selected. The proportion of patients on SLR could be under reported if the data capturer incorrectly captures a second line regimen by retaining the Regimen 1 selected but then capturing the drugs that are part of the second line regimen as defined by the 2013 South African Clinical Guidelines.
Figure 28: Adults on second line regimen (SLR) by year and duration on ART

Table 3: Raw data of adults on second line regimen (cumulative figures down the columns)

<table>
<thead>
<tr>
<th></th>
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<td>Adult SLR at 3 months</td>
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<td>Adult SLR at 24 months</td>
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<td>Adult SLR at 72 months</td>
<td>95</td>
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<tr>
<td>Adult SLR at 84 months</td>
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<td>Adult SLR at 96 months</td>
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* Full quarter not completed, thus totals at 6 months do not accumulate to reflect full total at 6 month duration.
Figure 29: Child on second line regimen (SLR) by months and duration

Table 4 Raw data of children on second line regimen (cumulative figures down the columns)

<table>
<thead>
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<tr>
<td>Child SLR at 36 mm</td>
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<td>53</td>
<td>52</td>
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<td>Child SLR at 48 mm</td>
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<td>Child SLR at 72 mm</td>
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<td>50</td>
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</tr>
<tr>
<td>Child SLR at 84 mm</td>
<td>31</td>
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Discussion

The data contained within this report is not reflective of all patients who started or are remaining on ART from the start of the programme; analysis is on 453,323 adults and 45,107 children from April 2004 to June 2013.

The monthly data enables the departments of health, at each level of the health service, to monitor the access to care as well as estimate future trends initiation. The monthly data is also used to inform the drug utilisation and future drug need projections. In 2009 the ART programme expanded access to all primary health care service points and the number of ART service points expanded from 469 in 2009 to over 3,600 primary health care service points in 2013. The current trends in monthly initiations seem to be levelling off to on average 50,000 new patients initiated on ART per month.

In line with recent developments in the ART programme as an attempt to scale up access and provide quality services to patients, it has become evident that more patients are starting ART with high levels of CD4 count.

The cohort data has demonstrated the rates of lost to follow-up are increasing. The reasons for the increase should be considered while efforts are made to increase the numbers of patients onto treatment. As the programme grows the retention in care is decreasing among the adult and child patient populations.

Figure 22 and Figure 23 demonstrate the growing trend of lost to follow-up. TIER.Net provides missed appointment reports which list patients who have not recently attended the facility. The ART M&E SOP provides guidance on when these reports should be generated and the actions to take. Routine and effective use of the management tools built into TIER.Net provides the facility to tools to responsively manage their patient population. It is important the patient management is routinely managed by both the facility manager and the data capturer on the weekly and monthly basis as outlined in the ART M&E SOP.

The viral load completion data for the adults and children both demonstrate the low numbers of patients having viral loads done or a low number of results captured into the monitoring system. This may be an artificially low number of patients having viral loads done but if the results are not being filed in the patient folder this likely means the clinician does not have the result available in the patient file.

The missed appointment reports produced by TIER.Net provide the facility with the lists of patients who have not attended the clinic at their expected visit date. These patient files should be pulled to verify it was a missed appointment. The files that were not captured (missed) should have the patient visit captured and they should be refiled. The patients who genuinely did not attend should be held aside and the files and lists should be given to the community based services (CBS) to ensure the patients who have missed their appointment are recalled into care. In the event facilities do not have telephony services at the facility the use of the community based services (CBS), ward based outreach teams (WBOT) or tracers are of great importance. Facilities that do not have access to community based services (CBS) ward based outreach teams (WBOT) or tracers or telephones should notify their district management teams of this.

The data captured into TIER.Net is transcribed from the clinical stationery and into the monitoring tool. Any possible inconsistencies in the data could be a result of poor clinical record-keeping or from incorrect transcription by the data capturer. This highlights the importance of adherence to the activities outlined in the ART M&E SOP, such as generation of the management reports and acting on them, routine data cleaning prior to quarterly data submission, and regular audits of the
data using the standard audit tool. Further improvements of the data will be achieved through routine analysis and use of the data at the facility and district level.

The data presented throughout this report is available down to facility level. District and facility level comparisons are important to better enable facilities to understand their patient management and patient outcomes.

The National M&E unit will produce provincial reports with inter-district comparisons and a national report with provincial comparisons. These will be presented to provinces in January/February 2014. These reports and orientation around data analysis, interpretation and use is intended to then set the foundation to the establishment of district monitoring forums. The current PIT and DIT are ideal forums to discuss the data in terms of retention in care and programme quality to inform best practices or to address challenges. Establishing a routine forum to discuss achievements and challenges in enrolment, clinical management, and maintaining retention strategies is important to improve the overall district management of the programme.

The district monitoring forum is an optimal forum to discuss challenges to maintaining TIER.Net and the monitoring system and also to identify sites that would be well suited to introduce additional TIER.Net functionality such as pre-ART and HCT. It is important facilities maintain phase 6 before new activities are introduced to the site. Once a facility has demonstrated an ability to maintain phase 6 through routinely submitted monthly and quarterly data and routine audits this will demonstrate the facility’s ability to support the system a process of expanding the use of TIER.Net functionality to include pre-ART patients can commence.

It is important to link activities and 2014 will see greater integration with work of the Integrated Chronic Disease Management (ICDM) and the establishment of district monitoring forums. Through enhanced integration the goal of 2014 is to enhance data driven decision-making whilst also finding innovative ways to strengthen patient retention in care and improve patient outcomes.

It is therefore critical for the National DoH, provinces and Development Partners to escalate the implementation of TIER.Net to scale and support implementation to ensure all implementing facilities reach phase 6. This will ensure future programme analyses are more representative and also enable facilities to better manage their patient population. It is at that point where achievements of the NSP targets will be closely interrogated and this will enable the National and Provincial DoH to devise strategies to improve patient retention which will enable attainment of the NSP targets.
Annexure 1

The Phases of Implementation

The focus of the TIER.Net implementation is to fully digitise the patient population by back capturing existing paper systems or transitioning non-standard system data over to TIER.Net through data exchange. The second focus is to use the process of TIER.Net implementation to strengthen the facility level registry management, data management, data use and overall it is seen as a health systems strengthening exercise.

This process has been categorised into 7 phases, below.

**Phase 0:** Preparation for Tier.net (Buy-in meeting with facility managers, Filing, orientation, and process flow)
- Assess resource needs
- Complete readiness assessment template from National Department of Health
- Assist with registry and filing of blood results

**Phase 1:** Installation and training
- Install TIER.Net
- Open information file
- Ensure SOP and all other training manuals available
- In-service training using latest user manual
- Train on back up process

**Phase 2:** Back capturing
- Back capturing
- Clinical chart training with all staff in clinic
- Continue training on TIER.Net

**Phase 3:** Back capturing with live capturing
- Start using clean-up document
- Training on early, late missed appointment report and defaulter reports.
- Complete Site visit task list
- Initiate a process where patients are captured as they attend each visit,
- Update current visits and back capture all other records once current files are up to date.

**Phase 4:** Live capturing (back capturing complete) and data cleaning in progress
- Complete data clean up document.
- Review the quarterly report and ensure all patients are accounted for across all quarters.
- Complete Site visit task list
- Training on monthly and quarterly report understanding and use

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1 The phases of implementation were conceptualised by BroadReach Health Care following the TIER.Net Master Training. The phases were established from the content learned in the master training, namely the “12 steps of implementation” as coined by Claudine Hennessey at the University of Cape Town: CIDER and Theunis Hurter from Anova Healthcare. The National Department of Health gratefully acknowledges BroadReach, UCT: CIDER and Anova for their contribution to the 3 Tiered ART Monitoring Strategy.
Run defaulter report and check each patient file for actual status, (i.e. check if real defaulter or LTF or RIP)
Do Pre-Audit

Phase 5: Data signoff by DIT/PIT after completion of data clean up and baseline audit done.

- Verification of data clean up document
- Complete the TIER.Net back capture data sign off tool
- Compete Site visit check list
- Audit by DOH

Phase 6: Completion. A live site and site able to produce Monthly and Quarterly reports

- Update new versions
- On-going training on new updated version of TIER.Net software
- On-going training on quarterly reporting to ensure clinics use their own information
- Implement monthly information meeting and teach data capturer how to present data at meetings
- Monitor registry management
- Implement defaulter tracing processes using defaulter reports and CCG’s / CHW
- On-going completion of sit visit task list to monitor data capturer productivity
- High staff turnover – train new staff on TIER.Net
- Audit tool conducted and action taken on the results

The achievement of phase 6 is summarised as:

- The site has been supported through a process and empowered to use the system to support their patient management
- They are better able manage their patient population, and
- They are able to produce reports at the push of a button.
- The facility data reported to the DHIS represents the active patient numbers on treatment and the cohort outcomes

The goal is for a facility to maintain the system and continue to produce high quality reports and manage the patient population. With a simple-to-use system data capturers are able to rapidly capture relevant data to produce the monthly and quarterly reports.

Requiring little data to be captured, all retrieved from the standardised clinical stationery, the system can produce:

- Early missed appointment report
- Late missed appointment report
- Defaulter report
- The nationally required 6 monthly data elements
- Robust and verifiable data down to the patient level is produced a “the push of a button”.
- And, by achieving phase 6 status, sites should submit cohort reports of all treatment outcomes from the start of the facility’s ART programme to the current reporting period.
  Data should be reported according to the schedule in the ART M&E SOP in the following months:
  - January
  - April
The cohort reports produce data that can further inform patient characteristics at baseline, patient outcomes, immunologic and virological outcomes at specific time points. The cohort report enables the facility to better understand their patient population on ART. Data must be cleaned before submission according to the SOP. Data reported to the DHIS is aggregated based on individual patient outcomes as captured in TIER.Net.

**Strengthen systems to prevent regression of phases**

Some sites have been reported to regress in phase due to facility level challenges such as a data capturer resignation, a contract has expired or some other staffing challenge. Other reasons are the computer has been stolen. Regressions should not be easily accepted but rather contingencies found. These challenges are detrimental to the sustainability of any system and must be resolved in order to sustain TIER.Net, or any other monitoring system in the health facilities. The province, district, sub-district and facility should work together to sustain the ART M&E system (and other systems) in the facility. The development partners are also well placed to seek interim solutions or provide support and mentorship to in-facility staff to maintain the system whilst a permanent solution is found.
## Annexure 2: ART Data elements with definitions and descriptions

<table>
<thead>
<tr>
<th>Monthly Data Elements</th>
<th>Formula</th>
<th>Description</th>
<th>Information Provided from the Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adults started ART</td>
<td>Sum of all adults initiated on HAART in a given month excl EXP patients</td>
<td>All adults commenced ART, completed in patient register (source: ART monitoring system either T1, T2 or T3)</td>
<td>Enrolment of adults started ART Informs monthly initiation of adults on HAART and helps to understand the growth of clinic, drug utilisation monthly, other.</td>
</tr>
<tr>
<td>Children (&lt;15) started ART</td>
<td>Sum of all children (&lt;15) excl EXP patients initiated on HAART in a given month</td>
<td>All children (&lt;15) commenced ART, completed in patient register (source: ART monitoring system either T1, T2 or T3)</td>
<td>Enrolment of children started ART Informs monthly initiation of children on HAART and helps to understand the growth of clinic, drug utilisation monthly, other.</td>
</tr>
<tr>
<td>Total patients started</td>
<td>Sum of adults and children started ART in a given month</td>
<td>All patients started ART in a given month. (source: ART monitoring system either T1, T2 or T3)</td>
<td>As above, informs total enrolment on ART monthly</td>
</tr>
<tr>
<td>Adults Total remaining on ART (&gt;15)</td>
<td>Adult TROA = adult(New + TFI + return) - adult(RIP + LTF + TFO)</td>
<td>All adults still remaining on ART at the end of the reporting month (source: ART monitoring system either T1, T2 or T3)</td>
<td>Actual number of adult clients on ART at the ART service point</td>
</tr>
<tr>
<td>Total children remaining on ART (&lt;15)</td>
<td>Child TROA = child(New + TFI + return) - child(RIP + LTF + TFO)</td>
<td>All children (&lt;15) still remaining on ART at the end of the reporting month (source: ART monitoring system either T1, T2 or T3)</td>
<td>Actual number of child clients on ART at the ART service point</td>
</tr>
<tr>
<td>Total remaining on ART (TROA)</td>
<td>Sum of adult and child TRIC All TROA = all(New + TFI + return) - all(RIP + LTF + TFO)</td>
<td>All clients remaining on ART at the end of the reporting month</td>
<td>Actual number of all clients on ART at the ART service point</td>
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# Quarterly Data

<table>
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<tr>
<th>Indicator code</th>
<th>Indicators</th>
<th>Indicator Formula</th>
<th>Description</th>
<th>Information provided from the indicator</th>
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<tr>
<td>TOT</td>
<td>Number ART naive patients commenced</td>
<td>TOT = ART naive male + ART naive female commenced ART Or TOT = (ART naive child &lt;1) + (child 1 to &lt;5) + (child 5 to &lt;15) commencing ART</td>
<td>Total number of ART naive patients commenced ART</td>
<td>Number of ART Naive patients starting ART. In adults it provides the denominator for gender breakdown of adults commencing ART. In children it provides the denominator for age breakdown for children.</td>
</tr>
<tr>
<td>Men</td>
<td>Proportion males on treatment</td>
<td>Male / Adult TOT</td>
<td>% males starting HAART</td>
<td>The proportion of males starting HAART. Conversely the number of woman starting HAART is this value minus 100.</td>
</tr>
<tr>
<td>K&lt;1</td>
<td>Proportion children starting HAART less than 1 year</td>
<td>Child&lt;1 / child TOT</td>
<td>Proportion of children starting HAART who are less than 1</td>
<td>Compare the ages of children starting HAART and those starting HAART who are less than 1 year of age.</td>
</tr>
<tr>
<td>K1&lt;5</td>
<td>Proportion children starting HAART between 1 and less than 5</td>
<td>Child 1 - &lt;5 / child TOT</td>
<td>Proportion of children starting HAART between 1 and &lt; 5</td>
<td>Compare the ages of children starting HAART and identify those starting HAART who are between the ages of 1 and who are less than 5</td>
</tr>
<tr>
<td>K5&lt;15</td>
<td>Proportion children starting HAART between 5 - &lt;15</td>
<td>Child 5 - &lt;15 / child TOT</td>
<td>Proportion of children starting HAART between 5 and are &lt; 15 years of age</td>
<td>Compare the ages of children starting HAART and identify those staring HAART who are between 5 and less than 15</td>
</tr>
<tr>
<td>TBS</td>
<td>Proportion screened for TB</td>
<td>number screened for TB / TOT – on TB Rx</td>
<td>Proportion screened for TB of the total started ART minus those on TB treatment</td>
<td>Of TOT the number screened for TB</td>
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<tr>
<td>TBT</td>
<td>Number on TB Treatment at ART start</td>
<td>Number on TB Rx</td>
<td>Proportion on TB Rx at ART start</td>
<td>Of TOT the number on TB Rx at ART start</td>
</tr>
<tr>
<td>IPT</td>
<td>Number on IPT at ART start</td>
<td>Number on IPT</td>
<td>Number on IPT at ART start</td>
<td>Of TOT the number on IPT at ART start</td>
</tr>
<tr>
<td>CPT</td>
<td>Number on CPT at ART start</td>
<td>Number on CPT</td>
<td>Number on CPT at ART start</td>
<td>Of TOT the number on CPT at ART start</td>
</tr>
<tr>
<td>PRG</td>
<td>Number pregnant at ART start</td>
<td>Number pregnant at ART start</td>
<td>Proportion of women started ART who are pregnant</td>
<td>To understand the number of women started on ART who are pregnant</td>
</tr>
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</tr>
<tr>
<td>CDDB</td>
<td>Total number of CD4 count done</td>
<td>CDD / TOT</td>
<td>Proportion of CD4s being evaluated</td>
<td>Baseline characteristics of clients starting HAART are evaluated. Provides denominator in evaluating baseline CD4 results</td>
</tr>
<tr>
<td>C&lt;100</td>
<td>CD4 &lt; 100 proportion or CD4 &lt; 15% TLC (child)</td>
<td>(CD4&lt;100) / CDD</td>
<td>% CD4 counts less than 100 at baseline for adults or the % CD4 &lt; 15% TLC at baseline for children</td>
<td>Proportion of clients starting HAART who are severely immunologically compromised. If the value changes over time the programme will be able to assess the impact of the intervention.</td>
</tr>
<tr>
<td>C100-199</td>
<td>CD4 &lt; between 100 and 199 (adults) and CD4 &lt; 20% TLC children</td>
<td>(CD4&lt;199) / CDD</td>
<td>% clients starting HAART with CD4 between 100 and &lt; 199 or children with CD4 &lt; 20%</td>
<td>Proportion of clients starting HAART who are starting HAART with CD4 in the range of 100 to 199 or children starting HAART with a CD4 between 15 and 20%</td>
</tr>
<tr>
<td>C200-350</td>
<td>CD4 200 to 350 or CD4 &lt; 25% TLC for children</td>
<td>(CD4&lt;350) / CDD</td>
<td>Proportion of clients starting HAART with a CD4 between 199 and 350</td>
<td>Proportion of clients starting HAART with a CD4 between 199 and 350 or between 20 and 25%</td>
</tr>
<tr>
<td>EXP</td>
<td>Treatment experienced commenced</td>
<td>EXP / (EXP+TOT)</td>
<td>Treatment experienced clients starting ART</td>
<td>Proportion of all clients commenced ART who are treatment experienced</td>
</tr>
<tr>
<td>FLR</td>
<td>Continuing first line</td>
<td>FLR / (FLR+SLR+STO)</td>
<td>% continuing first line regimen</td>
<td>The proportion of clients continuing on first line regimen at the reported time period</td>
</tr>
<tr>
<td>SLR</td>
<td>Proportion second line</td>
<td>SLR / (FLR+SLR+STO)</td>
<td>% on second-line regimen</td>
<td>The proportion of clients changing from first line regimen to second line regimen will be able to be assessed over time at the reported time period</td>
</tr>
<tr>
<td>STO</td>
<td>In care but stopped HAART</td>
<td>STO / (FLR+SLR+STO)</td>
<td>% in second-line regimen</td>
<td>This will illustrate the proportion of patients in care but stopped HAART at the reported time period</td>
</tr>
<tr>
<td>RIC **</td>
<td>Cumulative % in care</td>
<td>(TOT-LTF-RIP-TFO) / (TOT-TFO)</td>
<td>% remaining in care at x months***</td>
<td>This value will enable to programme to assess retention in care at the reported time period</td>
</tr>
<tr>
<td>RIP **</td>
<td>Cumulative % died at x time period</td>
<td>(RIP) / (TOT-TFO)</td>
<td>Cumulative % patients died x months***</td>
<td>At different time points the cumulative number of clients can be analysed. e.g. the number of patients who die early in treatment versus later on treatment</td>
</tr>
<tr>
<td>LTF **</td>
<td>Cumulative % LTF</td>
<td>(LTF) / (TOT-TFO)</td>
<td>Cumulative % of patients</td>
<td>This value shows the attrition of the programme of clients</td>
</tr>
<tr>
<td>Indicator</td>
<td>Description</td>
<td>Formula</td>
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</tr>
<tr>
<td>VLD</td>
<td>Viral Load Done</td>
<td>VLD / (FLR + SLR)</td>
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<tr>
<td>VLS</td>
<td>Viral Load Suppressed</td>
<td>VLS / VLD</td>
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</tr>
</tbody>
</table>

*Note that the TFO, LTF and RIP used in the formula are the cumulative totals of all clients left care to that point, as opposed to the total in the most recent interval.

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