Where are the deficiencies in care? (another viewpoint)

***Aim:***

*What is the contribution of each stage of care on overall DALYs / mortality?*

*The interventions we have designed to intervene along HIV care may have an attentuated impact due to upstream / downstream weaknesses in care. For example, we have a powerful ART Outreach intervention that brings back 100% of people lost from care, yet it doesn’t have a huge impact on DALYs averted in the model, this is due to the small proportion of individuals that ever initiate ART due to upstream leaks in care at baseline. I want to understand how important each “stage” of care is, starting from the baseline ‘leaky’ cascade and making each stage in turn ‘perfect’ while keeping all others at baseline values to visualise the impact on DALYs and mortality.*

**Method:**

1. *Calculate the number of DALYs accrued between 2010 and 2030 along with mortality in the baseline leaky cascade scenario.*
2. *In the absence of interventions, test the contribution of each “stage” of care, on DALYs accrued and mortality, while keeping all remaining parameters are baseline values. For example, for testing pre-ART retention: set pre-ART retention to be perfect but keep upstream and downstream care at baseline levels.*
3. *Test the impact of our interventions on each “stage” of care on DALYs accrued and mortality. For example, again for testing pre-ART retention: test the impact of the pre-ART outreach intervention on reducing DALYs accrued and mortality while keeping all other parameters at baseline levels (this is identical to running an intervention as we have done in the paper).*

# Results

***“Baseline Care”***

Baseline= 36.6m DALYs accrued between 2010 and 2030.

**Contribution of each stage of care to DALYs accrued and mortality**

Starting with our baseline care scenario, I split care into 5 discrete stages:

***1. HIV-Testing***

***2. Linkage***

***3. Pre-ART Retention***

***4. ART Retention***

***5. ART Adherence***

**Impact on DALYs averted**

Here we look at the flip-side to the previous document. What if care is at normal “baseline” levels throughout and we then make each stage “perfect” in turn while keeping all upstream and downstream settings the same.

*The definitions for “perfect” in each stage are below:*

***Perfect HIV-Testing*** *–* HIV-testing rates are set to baseline levels but everyone attends an HIV clinic for testing the day they acquire HIV (if time >2004). All other parameters are at baseline levels.

***Perfect Linkage*** *–* Linkage is perfect, but all other parameters are at baseline levels.

***Perfect Pre-ART Retention*** *–* Pre-ART retention levels are perfect, but all other parameters are at baseline levels.

***Perfect ART Retention*** *–* No ART dropout occurs, but all other parameters are at baseline levels.

***Perfect ART Adherence*** *–* Adherence to ART is 100%, but all other parameters are at baseline levels.

Looking at figure 1, if we consider HIV-testing we see that more DALYs are averted by the HBCT and VCT interventions than “perfect care”. This is because the “perfect care” scenario carries the baseline levels of care-seeking behaviour, which are supplemented by HBCT testing (in the HBCT intervention) and increased in the VCT intervention. Perfect HIV-testing does mean that individuals enter care the day they contract HIV but this only applies when HIV is contracted after 2004. Hence, HBCT and indeed HBCT POC CD4 are more powerful interventions than the “perfect HIV-testing” and “perfect HIV-linkage” scenarios.

For the remaining interventions, we see how for instance in the linkage group, “perfect” linkage (100% from the beginning of the model) averts the most DALYs (aside from HBCT POC CD4) compared to the linkage intervention (which sets linkage to 100% from 2010 onwards).

If we look at pre-ART retention, “perfect” pre-ART retention averts many DALYs compared to the pre-ART interventions, due to the fact the interventions only come into play from 2010 onwards. The “perfect” scenarios for ART Retention and ART Adherence are not particularly impactful as due to upstream weaknesses in care, very few individuals ever initiate ART (<25% initiate ART prior to an HIV-related death between 2010 and 2030).

**Impact on mortality**

Figure 2 illustrates the distribution of care among HIV-related deaths between 2010 and 2030.

The first bar is for the “perfect care” scenario with perfect HIV-testing, linkage, pre-ART retention, ART retention and adherence.

The second bar illustates the “baseline” scenario distribution of HIV-related deaths.

Subsequent bars follow the pattern of figure 1 with the “perfect” scenario for each stage of care followed by relevant interventions. No interventions, or stages of care is able to approach the low levels of HIV-related deaths seen in the the “perfect care” across the board scenario.

jjo11:cascade:CareCascadeV2:2015:January:6th:LeaksReverse:plots:mortalityDistribution.pdfjjo11:cascade:CareCascadeV2:2015:January:6th:LeaksReverse:plots:dalysAvertedComparedToPerfectCare.pdf

Figure 2.

Figure 1.